VIGNAN'S INSTITUTE OF MANAGEMENT AND TECHNOLOGY FOR WOMEN
B. Tech. in CSE (DATA SCIENCE)
COURSE STRUCTURE – VR25

I B. Tech. – I Semester

S.No	Course Code	Course	L	T	P	Credits
1	25MA101BS	Matrices and Calculus	3	1	0	4
2	25PH102BS	Advanced Engineering Physics	3	0	0	3
3	25ME103ES	Engineering Drawing and Computer Aided Drafting	2	0	2	3
4	25EE104ES	Basic Electrical Engineering	3	0	0	3
5	25CS105ES	Programming for Problem Solving	3	0	0	3
6	25IT106ES	IT Workshop	0	0	2	1
7	25PH107BS	Advanced Engineering Physics Lab	0	0	2	1
8	25CS108ES	Programming for Problem Solving Lab	0	0	2	1
9	25EE109ES	Basic Electrical Engineering Lab	0	0	2	1
		Total	**14**	**1**	**10**	**20**

I B. Tech. - II Semester

S.No	Course Code	Course	L	T	P	Credits
1	25MA201BS	Ordinary Differential Equations and Vector Calculus	3	0	0	3
2	25CH202BS	Engineering Chemistry	3	0	0	3
3	25EN203HS	English for Skill Enhancement	3	0	0	3
4	25EC204ES	Electronic Devices and Circuits	3	0	0	3
5	25DS205ES	Data Structures	3	0	0	3
6	25CH206BS	Engineering Chemistry Lab	0	0	2	1
7	25DS207ES	Data Structures Lab	0	0	2	1
8	25ML208ES	Python Programming Lab	0	0	2	1
9	25EN209HS	English Language and Communication Skills Lab	0	0	2	1
10	25ME210ES	Engineering Workshop	0	0	2	1
		Total	**15**	**0**	**10**	**20**

Note: L - Theory T - Tutorial P - Practical C - Credits

B.Tech. **L T P C**

I Year - I Semester **3 1 0 4**

MATRICES AND CALCULUS

(Common for CSE, CSE(AI&ML), ECE, IT, CSE(DS))

Objectives: To learn

- Applying basic operations on matrices and their properties.
- Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Concept of eigen values and eigen vectors and to reduce the quadratic form to canonical form
- Geometrical approach to the mean value theorems and their application to the mathematical problems
- Finding maxima and minima of functions of two and three variables.
- Evaluation of multiple integrals and their applications.

Course Outcomes: After learning the contents of this paper the student must be able to

- Apply matrix operations to solve systems of linear equations using Echelon form, Gauss-Jordan method, and iterative techniques like Gauss-Seidel.
- Analyze and interpret eigenvalues, eigenvectors, and quadratic forms to perform matrix diagonalization and transformations using Cayley-Hamilton Theorem.
- Demonstrate understanding of single-variable calculus concepts including limits, continuity, mean value theorems, and Taylor's series, and apply them to curve tracing.
- Use partial differentiation techniques including Euler's theorem, Jacobians, and Lagrange multipliers to solve multivariable optimization problems.
- Evaluate double and triple integrals in various coordinate systems and apply them to compute areas and volumes in engineering contexts.

UNIT-I: Matrices

Rank of a matrix by Echelon form and Normal form – Inverse of Non-singular matrices by Gauss-Jordan method. System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations. Gauss Seidel Iteration Method.

UNIT-II: Eigen values and Eigen vectors

Linear Transformation and Orthogonal Transformation: 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 form by Orthogonal Transformation.

UNIT-III: Calculus

Limit and Continuous of functions and its properties. Mean value theorems: Rolle's theorem – Lagrange's Mean value theorem with their Geometrical Interpretation and applications – Cauchy's Mean value Theorem – Taylor's Series (All the theorems without proof). Curve Tracing: Curve tracing in cartesian coordinates.

UNIT-IV: Multivariable Calculus (Partial Differentiation and applications)

Definitions of Limit and continuity – Partial Differentiation: Euler's Theorem – Total derivative – Jacobian – Functional dependence & independence. Applications: Maxima and minima of functions of two variables and three variables using Lagrange multipliers.

UNIT-V: Multivariable Calculus (Integration)

Evaluation of Double Integrals (Cartesian and polar coordinates) – change of order of integration (only Cartesian form) – Change of variables for double integrals (Cartesian to polar). Evaluation of Triple Integrals – Change of variables for triple integrals (Cartesian to Spherical and Cylindrical polar coordinates). Applications: Areas by double integrals and volumes by triple integrals.

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Editon, 2016.

Reference Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson, Reprint, 2002.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
4. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, New Delhi.

25PH102BS **Vignan's Institute of Management and Technology for Women** VR25

An Autonomous Institution

B.Tech.	**L**	**T**	**P**	**C**
I Year - I Semester	**3**	**0**	**0**	**3**

ADVANCED ENGINEERING PHYSICS
(Common to CSE(AIML) ECE, IT & CSE(DS)

Course Objectives: The objectives of this course for the student are to:

- To understand fundamental concepts of quantum mechanics and their applications in solids.
- Understand the underlying mechanism involved in construction and working principles of various semiconductor devices & Nanomaterials.
- To introduce Quantum computing principles and quantum gates.
- To learn the properties and applications of magnetic and dielectric materials.
- To explore the working and applications of lasers and fiber optics in modern technology.

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

- Apply quantum mechanical principles to explain particle behavior and energy band formation in solids.
- Identify the role of semiconductor devices in science and engineering applications & understand Nanomaterials.
- Understand concepts of quantum computing use quantum gates.
- Classify magnetic and dielectric materials and explain their properties, synthesis and applications.
- Explain the principles of lasers and fiber optics and their applications in communication and sensing.

UNIT - I: QUANTUM MECHANICS

Introduction, de-Broglie hypothesis, Heisenberg uncertainty principle, physical significance of wave function, postulates of quantum mechanics: operators in quantum mechanics, eigen values and eigen functions, expectation value; Schrödinger's time independent wave equation, particle in a 1D box.

Bloch's theorem (qualitative), Kronig-Penney model (Qualitative): E-k diagram, formation of energy bands, origin of band gap classification of solids.

UNIT - II: Semiconductor physics & Nanotechnology

Intrinsic and extrinsic semiconductors – Dependence of Fermi level on carrier-concentration and temperature (Qualitative) - Hall effect - direct and indirect band gap semiconductors - construction, principle of operation and characteristics of P-N Junction diode, Zener diode - LED and Solar cells, their structure, materials, working principle and characteristics.

Nanoscale, concept of discrete energy levels and quantum confinement in nanomaterials, surface to volume ratio, bottom-up fabrication: sol-gel method, top-down fabrication: ball milling method, characterization techniques - X -ray diffraction (XRD): Bragg's law, powder method, calculation of average crystallite size using Debye Scherrer's formula, Scanning electron microscopy(SEM): block diagram, working principle, applications of nanomaterials.

UNIT - III: Quantum Computing

Introduction, linear algebra for quantum computation, Dirac's Bra and Ket notation and their properties, Hilbert space, Bloch's sphere, concept of quantum computer, classical bits, Qubits, multiple Qubit system, quantum computing system for information processing, evolution of quantum systems (Qualitative), Quantum measurements, entanglement, Quantum logic gates: Single Qubit (Pauli's Hadamard) gates, Multiple Qubit gates (CNOT), Applications.

UNIT – IV Magnetic and Dielectric Materials

Introduction to magnetic materials, origin of magnetic moment-classification of magnetic materials, hysteresis, Weiss domain theory of ferromagnetism, soft and hard magnetic materials, applications: magnetic hyperthermia for cancer treatment, magnets for EV, Giant Magneto Resistance (GMR) device.

Introduction to dielectric materials, types of polarization (qualitative): electronics, ionic & orientation; ferroelectric, piezoelectric, pyroelectric materials and their applications: Ferroelectric Random-Access Memory (Fe-RAM) and fire sensor.

UNIT - V: LASER AND FIBER OPTICS

Introduction to laser, characteristics of laser, Einstein coefficients and their relations, metastable state, population inversion, pumping, lasing action, Ruby laser, He-Ne laser, semiconductor diode laser, applications: Bar code scanner, LIDAR for autonomous vehicle.

Introduction to fibre optics, total internal reflection, construction of optical fibre, acceptance angle, numerical aperture, classification of optical fibres, losses in optical fibre, applications: optical fibre for communication system, sensor for structural health monitoring (Temperature and Pressure sensor).

TEXT BOOKS:

1. Charles Kittel, *Introduction to Solid State Physics*, John Wiley & Sons, Inc.
2. Semiconductor Physics and Devices- Basic Principle – Donald A, Neamen, Tata Mc Graw Hill, 4th Edition, 2021.
3. Thomas G. Wong, *Introduction to Classical and Quantum Computing*, Rooted Grove

REFERENCE BOOKS:

1. Jozef Gruska, Quantum Computing, McGraw Hill
2. Michael A. Nielsen & Isaac L. Chuang, Quantum Computation and Quantum Information, Cambridge Univesity Press.
3. Quantum Physics, H.C. Verma, TBS Publication, 2nd Edition 2012.
4. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley &Sons, 11th Edition, 2018.
5. Introduction to Solid State Physics, Charles Kittel, Wiley Eastern, 2019.
6. Elementary Solid-State Physics, S.L. Gupta and V. Kumar, Pragathi Prakashan, 2019.
7. A.K. Bandyopadhyay - Nano Materials, New Age International, 1stEdition, 2007.
8. Semiconductor Physics and Devices- Basic Principle – Donald A, Neamen, Mc Graw Hill, 4th Edition,2021.

Useful Links

- https://shijuinpallotti.wordpress.com/wp-content/uploads/2019/07/optical-fiber-communications-principles-and-pr.pdf
- https://dpbck.ac.in/wp-content/uploads/2022/10/Introduction-to-Solid-State-PhysicsCharles- Kittel.pdf
- https://www.thomaswong.net/introduction-to-classical-and-quantum-computing-1e4p.pdf
- https://www.fi.muni.cz/usr/gruska/qbook1.pdf
- https://profmcruz.wordpress.com/wp-content/uploads/2017/08/quantum-computation-and- quantum-information-nielsen-chuang.pdf

25ME103ES **Vignan's Institute of Management and Technology for Women** VR25

An Autonomous Institution

B.Tech.	**L**	**T**	**P**	**C**
I Year - I Semester	**2**	**0**	**2**	**3**

ENGINEERING DRAWING AND COMPUTER AIDED DRAFTING

(Common to CSE(AIML), CSE(DS), IT & ECE)

Course Objectives:

- To introduce the fundamentals of engineering drawing and projection systems.
- To develop skills in constructing orthographic, isometric, and sectional views.
- To train students in interpreting and creating technical drawings using CAD tools.
- To familiarize students with dimensioning standards and drafting conventions.
- To bridge manual drafting techniques with computer-aided drafting practices.

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

- Understand and apply the principles of orthographic and isometric projections.
- Create sectional views and dimensioned drawings using BIS standards.
- Use CAD software to generate 2D engineering drawings.
- Visualize and construct solid models from 2D views.
- Interpret and produce engineering drawings of mechanical components and assemblies.
- Demonstrate drafting skills for practical and industrial applications.

UNIT-I: **Introduction to Engineering Graphics (Conventional)**

Principles of Engineering Graphics and their Significance, Geometrical Constructions, Scales, Plain and Diagonal, Conic Sections including the Rectangular Hyperbola, General method only. Cycloid, Epicycloid and Hypocycloid.

UNIT-II: Orthographic Projections (Conventional and Computer Aided)

Principles of Orthographic Projections, Conventions, Projections of Points and Lines, Projections of Plane regular geometric figures. Auxiliary Planes. Computer aided orthographic projections, points, lines and planes. Introduction to Computer aided drafting, views, commands and conics.

UNIT–III: Projections of Regular Solids (Conventional and Computer Aided)

Auxiliary Views, Sections or Sectional views of Right Regular Solids, Prism, Cylinder, Pyramid, Cone, Auxiliary views, Computer aided projections of solids, sectional views.

UNIT-IV: **Development of Surfaces (Conventional)**

Prism, Cylinder, Pyramid and Cone.

UNIT-V: **Isometric Projections (Conventional and Computer Aided)**

Principles of Isometric Projection, Isometric Scale, Isometric Views, Conventions, Isometric Views of Lines, Plane Figures, Simple and Compound Solids, Isometric Projection of objects having non-isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions. Conversion of orthographic projection into isometric view.

Note:

1. The End Semester Examination will be in conventional mode.
2. CIE — I will be in conventional mode.
3. CIE — II will be using Computer.

Text Books:

1. Engineering Drawing, N.D. Bhatt, Charotar, 54th Edition, 2023.
2. Engineering Drawing and Graphics Using AutoCAD, T. Jeyapoovan and Vikas, S. Chand and Company Ltd., 3rd Edition, 2010.

Reference Books:

1. Engineering Drawing, Basant Agrawal and C.M. Agrawal, McGraw Hill, 3rd Edition, 2019.
2. Engineering Graphics and Design, John Wiley and Sons Inc., 3rd Edition, 2020.
3. Engineering Drawing, M. B. Shah and B.C. Rane, Pearson, 2nd Edition, 2009.
4. Engineering Drawing, N. S. Parthasarathy and Vela Murali, Oxford, 18th Edition, 2015.
5. Computer Aided Engineering Drawing, K. Balaveera Reddy, CBS Publishers, 2nd Edition, 2015.

25EE104ES **Vignan's Institute of Management and Technology for Women** VR25

An Autonomous Institution

B.Tech. **L T P C**

I Year - I Semester **3 0 0 3**

BASIC ELECTRICAL ENGINEERING

(Common to CSE(AIML), CSE(DS) & IT)

Course Objectives:

- To understand DC and Single & Three phase AC circuits.
- To study and understand the different types of DC, AC machines and Transformers.
- To import the knowledge of various electrical installations and the concept of power, powerfactor and its improvement.

Course Outcomes: After learning the contents of this paper the student must be able to

- Understand and analyze basic Electrical circuits.
- Study the working principles of Electrical Machines and Transformers.
- Introduce components of Low Voltage Electrical Installations.

UNIT-I:

D.C. Circuits: Electrical circuit elements (R, L and C), voltage and current sources, KVL&KCL, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits.

UNIT-II:

A.C. Circuits: Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance in series R-L-C circuit. Three-phase balanced circuits, voltage and current relations in star and delta connections.

UNIT-III:

Transformers: Ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

UNIT-IV:

Electrical Machines: Construction and working principle of dc machine, performance characteristics of dc shunt machine. Generation of rotating magnetic field, Construction and working of a three-phase induction motor, Significance of torque-slip characteristics. Single-phase induction motor, Construction and working. Construction and working of synchronous generator.

UNIT-V:

Electrical Installations: Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

TEXT BOOKS:

1. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition,2019.
2. MS Naidu and S Kamakshaiah, "Basic Electrical Engineering", Tata McGraw Hill, 2nd Edition,2008.

REFERENCE BOOKS:

1. P. Ramana, M. Suryakalavathi, G.T. Chandrasheker, "Basic Electrical Engineering", S. Chand,2nd Edition, 2019.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009
3. M. S. Sukhija, T. K. Nagsarkar, "Basic Electrical and Electronics Engineering", Oxford, 1stEdition, 2012.
4. Abhijit Chakrabarthi, Sudipta Debnath, Chandan Kumar Chanda, "Basic ElectricalEngineering", 2nd Edition, McGraw Hill, 2021.
5. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
6. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
7. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989

25CS105ES **Vignan's Institute of Management and Technology for Women** VR25

An Autonomous Institution

B.Tech. CSE	**L**	**T**	**P**	**C**
I Year - I Semester	**3**	**0**	**0**	**3**

PROGRAMMING FOR PROBLEM SOLVING

(Common for CSE, CSE(AI&ML), CSE(DS), IT and ECE)

Course Objectives:

- To learn the fundamentals of computers.
- To understand the various steps in program development.
- To learn the syntax and semantics of the C programming language.
- To learn the usage of structured programming approaches in solving problems.

Course Outcomes: The student will learn

- To write algorithms and to draw flowcharts for solving problems.
- To convert the algorithms/flowcharts to C programs.
- To code and test a given logic in the C programming language.
- To decompose a problem into functions and to develop modular reusable code.
- To use arrays, pointers, strings and structures to write C programs.
- Searching and sorting problems.

UNIT - I:

Overview of C:C Language Elements, Variable Declarations and Data Types, type conversion, The main method and command line arguments, Executable Statements, General Form of a C Program, Arithmetic Expressions, Formatting Numbers in Program Output.

Selection Structures: Control Structures, Conditions, if Statement, if Statements with Compound Statements, Decision Steps in Algorithms.

Repetition and Loop Statements: Repetition in Programs, Counting Loops and the while Statement, Computing a Sum or Product in a Loop, for Statement, Conditional Loops, Loop Design, Nested Loops, do-while Statement.

UNIT - II:

Top-Down Design with Functions: Building Programs from Existing Information, Library Functions, Top-Down Design and Structure Charts, Functions without Arguments, Functions with Input Arguments.

Pointers and Modular Programming: Pointers and the Indirection Operator, Functions with Output Parameters, Multiple Calls to a Function with Input/ Output Parameters, Scope of Names, Formal Output Parameters as Actual Arguments

UNIT - III:

Arrays: Declaring and Referencing Arrays, Array Subscripts, Using for Loops for Sequential Access, Using Array Elements as Function Arguments, Array Arguments, Searching and Sorting an Array, Parallel Arrays and Enumerated Types, Multidimensional Arrays. Strings: String Basics, String Library Functions: Assignment and Substrings, Longer Strings: Concatenation and Whole-Line Input, String Comparison, Arrays of Pointers.

UNIT - IV:

Recursion: The Nature of Recursion, Tracing a Recursive Function, Recursive Mathematical Functions, Recursive Functions with Array and String Parameters , Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays of different data types ,Structure and Union Types: User-Defined Structure Types, Structure Type Data as Input and Output Parameters, Functions with Structured Result Values, Union Types.

UNIT - V:

Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef ,Text and Binary File Pointers: Input/ Output Files - Review and Further Study, Binary Files, Searching a Database.

Searching and Sorting: Basic searching in an array of elements (linear and binary search techniques), Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms).

Text Books:

1. **Jeri R. Hanly and Elliot B.Koffman**, Problem solving and Program Design in C 7th Edition, Pearson
2. **B.A. Forouzan and R.F. Gilberg**, C Programming and Data Structures, Cengage Learning, (3rd Edition)

Reference Books:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
2. E. Balagurusamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill
3. Yashavant Kanetkar, Let Us C, 18th Edition, BPB
4. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
5. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
6. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition
7. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

25IT106ES **Vignan's Institute of Management and Technology for Women** VR25

An Autonomous Institution

B.Tech.	**L**	**T**	**P**	**C**
I Year - I Semester	**0**	**0**	**2**	**1**

IT WORKSHOP

(Common for CSE(AI&ML), CSE(DS))

Course Objectives:

- To understand the components of PC hardware, their functions, and system installation.
- To learSn Internet connectivity, security fundamentals, safe browsing, and usage of the World Wide Web.
- To gain hands-on experience with LaTeX, MS Word and Overleaf (or equivalent FOSS tools) for document preparation, formatting, and publishing.
- To practice data handling, analysis, and visualization using MS Excel (or equivalent FOSS tools).
- To develop effective presentations and publications using PowerPoint and related utilities.

Course Outcomes: The student will learn.

- Identify PC hardware components, assemble/disassemble systems, and install operating systems (Windows/Linux).
- Configure Internet connectivity, apply cybersecurity fundamentals, and practice safe browsing and cyber hygiene.
- Prepare professional documents, certificates, abstracts, and newsletters using LaTeX, MS Word, and Overleaf.
- Perform data entry, formatting, calculations, analysis, and visualization using MS Excel, including Pivot Tables.
- Design and deliver effective presentations with multimedia elements using MS PowerPoint.

PC Hardware:

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 it to your instructor.

Task 2: Every student should disassemble and assemble the PC back to working conditions. 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 with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Internet & World Wide Web:

Task1: Orientation, Security & Cybersecurity Fundamentals: Students will be introduced to the basics of Internet connectivity and the importance of security while accessing online resources. They will learn to configure TCP/IP settings and understand fundamentals of cybersecurity such as safe browsing, strong passwords, use of firewalls

and antivirus, and recognizing common threats like phishing and malware. Students should demonstrate secure login and safe access to websites and email.

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 LaTeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of LaTeX 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 LaTeX and word — Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word..

Task 2: Using LaTeX 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 LaTeX 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.

Task 5: Introduction to Overleaf: Overview of the cloud-based LaTeX editor, Creating and saving projects, Uploading and downloading files, Sharing and collaboration features, Using templates for reports, certificates, newsletters, and research papers, Real-time preview and exporting PDFs.

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

Task 4: Features to be covered: Creating Pivot Tables, Arranging Fields, Grouping Data, Filtering and Sorting in Pivot Tables, Summarizing Data using Functions, Pivot Charts.

PowerPoint:

Task 1: Students will be working on basic power point utilities and tools which help them

create basic PowerPoint 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.

TEXT BOOK:

1. IT Essentials PC Hardware and Software Labs and Study Guide Third Edition by Patrick Regan— CISCO Press, *Pearson Education.*

REFERENCE BOOKS:

1. Comdex Information Technology course tool kit Vikas Gupta, *WILEY Dreamtech*
2. The Complete Computer upgrade and repair book, 3rd edition Cheryl A Schmidt, *WILEY Dreamtech*
3. Introduction to Information Technology, ITL Education Solutions limited, *Pearson Education.*
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 Third Edition by David Anfinson and Ken Quamme. — *CISCO Press, Pearson Education.*

B.Tech.	L	T	P	C
I Year - I Semester	0	0	2	1

ADVANCED ENGINEERING PHYSICS LABORATORY

(Common to CSE(AIML), ECE, IT & CSE(DS))

Course Objectives: The objectives of this course for the student to

- To provide practical exposure to advanced concepts in solid-state and modern physics.
- To synthesize and study the physical properties of materials like semiconductors, ferromagnetic and ferroelectric substances.
- To perform semiconductor characterization using Hall effect and band gap experiments.
- To explore the working principles of LED, Lasers and Optical Fibers through hands-on experiments.
- To develop skills in data analysis, interpretation, and scientific reporting.

Course Outcomes: The students will be able to:

- Appreciate Quantum physics in semiconductor devices and optoelectronics.
- Determine key electrical, magnetic, and optical properties of semiconductors and other functional materials.
- Characterize semiconductors using Hall effect and energy gap measurement techniques.
- Demonstrate working knowledge of laser systems and optical fiber parameters through experimental study.
- Apply scientific methods for accurate data collection, analysis, and technical report writing.

LIST OF EXPERIMENTS:

1. To Study of V-I characteristics of a given P-N Junction diode.
2. Determination of energy gap of a semiconductor.
3. Determination of Hall coefficient and carrier concertation of a given semiconductor.
4. Determination of Magnetic field along the axis of current carrying coil – Stewart and Gee's method.
5. Study of B-H curve of a ferro magnetic material.
6. A) To study the V-I Characteristics of Light emitting diode.
   B) To study the V-I Characteristics & Fill factor of Solar cell.
7. Determination of dielectric constant of a given material.
8. Determination of Curie's temperature of a given ferroelectric material.
9. A) Determination of wavelength of a laser using diffraction grating.
   B) Study of V-I & L-I characteristics of a given laser diode.
10. A) Determination of numerical aperture of a given optical fiber.
    B) Determination of bending losses of a given optical fiber.

Note: Any 8 experiments are to be performed.

25CS108ES **Vignan's Institute of Management and Technology for Women** VR25

An Autonomous Institution

B.Tech.	**L**	**T**	**P**	**C**
I Year - I Semester	**0**	**0**	**2**	**1**

PROGRAMMING FOR PROBLEM SOLVING LABORATORY

(Common for CSE, CSE(AI&ML), CSE(DS),IT and ECE)

Course Objectives: The students will learn the following:

- To work with an IDE to create, edit, compile, run and debug programs
- To analyze the various steps in program development.
- To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
- To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
- To write programs using the Dynamic Memory Allocation concept.
- To create, read from and write to text and binary files

Course Outcomes: The candidate is expected to be able to:

- formulate the algorithms for simple problems
- translate given algorithms to a working and correct program
- correct syntax errors as reported by the compilers
- identify and correct logical errors encountered during execution
- represent and manipulate data with arrays, strings and structures
- use pointers of different types
- create, read and write to and from simple text and binary files 8. modularize the code with functions so that they can be reused

Practice sessions:

Simple numeric problems:

a) Write a program for finding the max and min from the three numbers.

b) Write the program for the simple, compound interest.

c) Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, for a number 5 and rows = 3, the output should be: 5 x 1 = 5 5 x 2 = 10 5 x 3 = 15

d) d) Write a program that shows the binary equivalent of a given positive number between 0 to 255.

Expression Evaluation:

a) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement).

b) Write a program that finds if a given number is a prime number.

c) Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.

d) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms

in the sequence. Write a C program to generate the first n terms of the sequence.

Arrays, Pointers and Functions:

a) Write a C program to find the minimum, maximum and average in an array of integers. b) Write a C program that uses functions to perform the following:

b) I. Addition of Two Matrices

c) II. Multiplication of Two Matrices

d) Write a program for reading elements using a pointer into an array and display the values using the array.

e) Write a program for display values reverse order from an array using a pointer.

Files:

a) Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.

b) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).

Strings:

a. Write a C program that uses functions to perform the following operations:
   i. To insert a sub-string into a given main string from a given position.
   ii. To delete n Characters from a given position in a given string

b. Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abcba, etc.)

c. Write a C program that displays the position of a character ch in the string S or – 1 if S doesn't contain ch.

d. Write a C program to count the lines, words and characters in a given text.

Sorting and Searching:

a) Write a C program that uses non-recursive function to search for a Key value in a given list of integers using linear search method.

b) Write a C program that uses non-recursive function to search for a Key value in a given sorted list of integers using binary search method.

c) Write a C program that implements the Bubble sort method to sort a given list of integers in ascending order.

d) Write a C program that sorts the given array of integers using selection sort in descending order

e) Write a C program that sorts the given array of integers using insertion sort in ascending order

f) Write a C program that sorts a given array of names.

Text Books:

1. Jeri R. Hanly and Elliot B.Koffman, Problem solving and Program Design in C 7th Edition, Pearson
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rdEdition)

Reference Books:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, PHI
2. E. Balagurusamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill
3. Yashavant Kanetkar, Let Us C, 18th Edition, BPB
4. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
5. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
6. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition
7. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

25EE109ES **Vignan's Institute of Management and Technology for Women** VR25

An Autonomous Institution

B.Tech | **L** | **T** | **P** | **C**

I Year – I Semester | **0** | **0** | **2** | **1**

BASIC ELECTRICAL ENGINEERING LABORATORY

(Common to CSE(AIML), CSE(DS) & IT)

Course Objectives:

- To measure the electrical parameters for different types of DC and AC circuits using conventional and theorems approach.
- To study the transient response of various R, L and C circuits using different excitations.
- To determine the performance of different types of DC, AC machines and Transformers.

Course Outcomes: After learning the contents of this paper, the student must be able to

- Verify the basic Electrical circuits through different experiments.
- Evaluate the performance calculations of Electrical Machines and Transformers through various testing methods.
- Analyze the transient responses of R, L and C circuits for different input conditions.

List of experiments/demonstrations:

PART- A (compulsory)

1. Verification of KVL and KCL
2. Verification of Thevenin's and Norton's theorem
3. Transient Response of Series RL and RC circuits for DC excitation
4. Resonance in series RLC circuit
5. Calculations and Verification of Impedance and Current of RL, RC and RLC Series circuits
6. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer
7. Performance Characteristics of a DC Shunt Motor
8. Torque-Speed Characteristics of a Three-phase Induction Motor.

PART-B (any two experiments from the given list)

1. Verification of Superposition theorem.
2. Three Phase Transformer: Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta-star, Star-Star)
3. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
4. Measurement of Active and Reactive Power in a balanced Three-phase circuit
5. No-Load Characteristics of a Three-phase Alternator

TEXT BOOKS:

1. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition,2019.
2. MS Naidu and S Kamakshaiah, "Basic Electrical Engineering", Tata McGraw Hill, 2nd Edition,2008.

REFERENCE BOOKS:

1. P. Ramana, M. Suryakalavathi, G.T. Chandrasheker, "Basic Electrical Engineering", S. Chand,2nd Edition, 2019.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009
3. M. S. Sukhija, T. K. Nagsarkar, "Basic Electrical and Electronics Engineering", Oxford, 1stEdition, 2012.
4. Abhijit Chakrabarthi, Sudipta Debnath, Chandan Kumar Chanda, "Basic Electrical Engineering", 2nd Edition, McGraw Hill, 2021.
5. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
6. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
7. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989

25MA201BS **Vignan's Institute of Management and Technology for Women** VR25

An Autonomous Institution

B.Tech.	**L**	**T**	**P**	**C**
I Year - II Semester	**3**	**0**	**0**	**3**

ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

(Common for CSE, CSE(AI&ML), ECE, IT, CSE(DS))

Course Objectives: To learn

- Methods of solving the differential equations of first and higher order.
- Concept, properties of Laplace transform.
- Solving ordinary differential equations using Laplace transforms techniques.
- The physical quantities involved in engineering field related to vector valued functions.
- The basic properties of vector valued functions and their applications to line, surface and volume integrals.

Course outcomes: After learning the contents of this paper the student must be able to

- Solve first-order ordinary differential equations using exact, linear, and Bernoulli methods and model physical phenomena like cooling and growth.
- Solve higher-order linear differential equations with constant coefficients and non-homogeneous terms using appropriate techniques including variation of parameters.
- Use Laplace Transforms to simplify and solve initial value problems, including handling periodic functions and evaluating integrals.
- Compute and interpret gradient, divergence, and curl of vector fields, and verify vector identities and properties of scalar potential functions.
- Evaluate line, surface, and volume integrals and apply Green's, Gauss's, and Stokes' theorems to solve problems in vector calculus.

UNIT-I: First Order ODE

Exact differential equations – Equations reducible to exact differential equations – linear and Bernoulli's equations – Orthogonal Trajectories (only in Cartesian Coordinates). Applications: Newton's law of cooling – Law of natural growth and decay.

UNIT-II: Ordinary Differential Equations of Higher Order

Higher order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{ax}, sin ax, cos ax, polynomials in x, $e^{ax}V(x)$ and $x\ V(x)$ – Method of variation of parameters

UNIT-III: Laplace transforms

Laplace Transforms: Laplace Transform of standard functions – First shifting theorem – Laplace transforms of functions multiplied by 't' and divided by 't' – Laplace transforms of derivatives and integrals of function – Evaluation of integrals by Laplace transforms – Laplace transform of periodic functions – Inverse Laplace transform by different methods, convolution theorem (without proof). Applications: solving Initial value problems by Laplace Transform method.

UNIT-IV: Vector Differentiation

Vector point functions and scalar point functions – Gradient – Divergence and Curl – Directional derivatives – Vector Identities – Scalar potential functions – Solenoidal and Irrotational vectors.

UNIT-V: Vector Integration

Line, Surface and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36thEdition, 2010
2. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Edition, 2016.

Reference Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson,
   Reprint, 2002.
3. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, New Delhi
4. N.P.Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications,
   Reprint, 2008.

B Tech **L T P C**

I Year - II Semester **3 0 0 3**

ENGINEERING CHEMISTRY
(Common to CSE(AIML), CSE(DS), IT & ECE)

Course Objectives:

- To develop adaptability to new advances in Engineering Chemistry and acquire the essential skills to become a competent engineering professional.
- To understand the industrial significance of water treatment, fundamental principles of battery chemistry, and the impact of corrosion along with its control methods for structural protection.
- To impart foundational knowledge of various energy sources and their practical applications in engineering.
- To equip students with an understanding of smart materials, bio-sensors and analytical techniques applicable in engineering, industrial, environmental, and biomedical fields.

Course Outcomes:

- Students will be able to understand the fundamental properties of water and its applications in both domestic and industrial purposes.
- Students will gain basic knowledge of electro chemical processes and their relevance to corrosion and its control methods.
- Students will comprehend the significance and practical applications of batteries and various energy sources, enhancing their potential as future engineers and entrepreneurs.
- Students will learn the basic concepts and properties of polymers and other engineering materials.
- Students will be able to apply the principles of UV-Visible, IR-spectroscopy and Raman spectroscopy in analyzing pollutants in dye industries and biomedical applications.

UNIT-I: Water and its treatment:

Introduction- Hardness, types, degree of hardness and units. Estimation of hardness of water by complexometric method - Numerical problems. Potable water and its specifications (WHO) - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and breakpoint chlorination. Defluoridation - Nalgonda technique.

Boiler troubles: Scales, Sludges and Caustic embrittlement. Internal treatment of boiler feed water - Calgon conditioning, Phosphate conditioning, Colloidal conditioning. External treatment methods - Softening of water by ion- exchange processes. Desalination of brackish water – Reverse osmosis.

UNIT-II: Electrochemistry and Corrosion:

Introduction- Electrode potential, standard electrode potential, Nernst equation (no derivation), electrochemical cell - Galvanic cell, cell representation, EMF of cell - Numerical problems. Types of electrodes, reference electrodes - Primary reference electrode - Standard Hydrogen Electrode (SHE), Secondary reference electrode - Calomel electrode. Construction, working and determination of pH of unknown solution using SHE

and Calomel electrode.

Corrosion: Introduction- Definition, causes and effects of corrosion – Theories of corrosion, chemical and electrochemical theories of corrosion, Types of corrosion: galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion - Nature of the metal, Nature of the corroding environment. Corrosion control methods - Cathodic protection Methods - Sacrificial anode and impressed current methods.

UNIT–III: Energy sources:

Batteries: Introduction – Classification of batteries - Primary, secondary and reserve batteries with examples. Construction, working and applications of Zn-air and Lithium ion batteries. Fuel Cells – Differences between a battery and a fuel cell, Construction and applications of Direct Methanol Fuel Cell (DMFC).

Fuels: Introduction and characteristics of a good fuel, Calorific value – Units - HCV, LCV- Dulong's formula - Numerical problems.

Fossil fuels: Introduction, Classification, Petroleum - Refining of Crude oil, Cracking - Types of cracking - Moving bed catalytic cracking.LPG and CNG composition and uses.

Synthetic Fuels: Fischer-Tropsch process, Introduction and applications of Hythane and Green Hydrogen.

UNIT - IV: Polymers:

Definition - Classification of polymers: Based on origin and tacticity with examples – Types of polymerization - Addition (free radical addition mechanism) and condensation polymerization. Plastics, Elastomers and Fibers: Definition and applications (PVC, Buna-S, Nylon-6,6). Differences between thermoplastics and thermo setting plastics, Fiber reinforced plastics (FRP). Conducting polymers: Definition and Classification with examples - Mechanism of conduction in trans poly-acetylene and applications of conducting polymers.

Biodegradable polymers: Polylactic acid and its applications.

UNIT-V- Advanced Functional Materials:

Smart materials: Introduction, Classification with examples - Shape Memory Alloys – Nitinol, Piezoelectric materials – quartz and their engineering applications.

Biosensor - Definition, Amperometric Glucose monitor sensor.

Interpretative spectroscopic applications of UV-Visible spectroscopy for Analysis of pollutants in dye industry, IR spectroscopy in night vision-security, Pollution Under Control- CO sensor (Passive Infrared detection), Raman spectroscopy (application) - Tumour detection in medical applications.

TEXT BOOKS:

1. Engineering Chemistry by P.C.Jain and M.Jain, Dhanpatrai Publishing Company, 2010.
2. Engineering Chemistry by Rama Devi, Dr.P.Aparna and Rath, Cengage learning, 2025.

REFERENCE BOOKS:

1. Engineering Chemistry: by Thirumala Chary Laxminarayana & Shashikala, Pearson Publications (2020)
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi 2011.
3. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi 2015.

4. Engineering Analysis of Smart Material Systems by DonaldJ.Leo, Wiley, 2007.
5. Challenges and Opportunities in Green Hydrogen by Editors: Paramvir Singh, Avinash Kumar Agarwal, Anupma Thakur, R.K Sinha.
6. Raman Spectroscopy in Human Health and Bio- medicine, **https://www.worldscientific.com/doi/epdf/10.1142/13094**
7. **E-Content-https://doi.org/10.1142/13094|October2023**
8. E - b o o k s : **https://archive.org/details/EngineeringChemistryByShashiChawla/page/n11/mode/2u**

25EN203HS **Vignan's Institute of Management and Technology for Women** VR25

An Autonomous Institution

B.Tech.	**L**	**T**	**P**	**C**
I Year - II Semester	**3**	**0**	**0**	**3**

ENGLISH FOR SKILL ENHANCEMENT

(Common for CSE(AIML), CSE(DS) & IT)

INTRODUCTION

National Education Policy-2020 aims at preparing students with knowledge, skills, values, leadership qualities and initiates them for lifelong learning. It also emphasizes language study and promotion of languages through understanding and proper interpretation. English language is central to the educational ecosystem.

The importance of language as medium of communication for personal, social, official and professional needs to be emphasized for clear and concise expression. Teaching and learning of receptive and productive skills viz., Listening, Speaking, Reading and Writing (LSRW) are to be taught and learnt effectively in the undergraduate Engineering programs. Learners should be encouraged to engage in a rigorous process of learning to become proficient users of English language by adopting a deeply focused and yet flexible approach as opposed to rote learning. In this connection, suitable syllabus, effective pedagogy, continuous assessments and students' involvement result in productive learning.

This course supports the latest knowledge and skill requirements and shall meet specified learning outcomes. The main objectives of English language teaching and learning as medium of communication and for promotion of cultural values are embedded in this syllabus. Efforts are being made in providing a holistic approach towards value-based language learning which equips the learner with receptive as well as productive skills.

The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed textbook for detailed study. The students should be courage to read the texts leading to reading comprehension. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material.

Learning Objectives:

- Improve their vocabulary.
- Use appropriate sentence structures in their oral and written communication.
- Develop their reading and study skills.
- Equip students to write paragraphs, essays, and précis and draft letters.
- Acquire skills for Technical report writing.

Course Outcomes: The student will learn

- Choose appropriate vocabulary in their oral and written communication.
- Demonstrate their understanding of the rules of functional grammar and sentence Structures.
- Develop comprehension skills from known and unknown passages.
- Write paragraphs, essays, and précis and draft letters.
- Write abstracts and reports in various contexts.

SYLLABUS: The Course content/study material is divided into Five Units.

UNIT - I:

Theme: **Perspectives**

Lesson on 'The Generation Gap' by Benjamin M. Spock from the prescribed textbooks titled English for the young in the Digital World published by Orient Black Swan Pvt.Ltd

Vocabulary: The Concept of Word Formation -The Use of Prefixes and Suffixes – Words Often Misspelt - Synonyms and Antonyms

Grammar: Identifying Common Errors in Writing with Reference to Parts of Speech particularly Articles and Prepositions – Degrees of Comparison

Reading: Reading and Its Importance- Sub Skills of Reading – Skimming and Scanning.

Writing: Sentence Structures and Types -Use of Phrases and Clauses in Sentences-Importance of Proper Punctuation- Techniques for Writing Precisely – Nature and Style of Formal Writing.

UNIT - II

Theme: **Digital Transformation**

Lesson on '*Emerging Technologies'* from the prescribed textbooks titled English for the young in the Digital World published by orient Black Swan Pvt. Ltd

Vocabulary: Homophones, Homonyms and Homographs

Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.

Reading: Reading Strategies-Guessing Meaning from Context – Identifying Main Ideas - Exercises for Practice

Writing: Paragraph Writing – Types, Structures and Features of a Paragraph – Creating Coherence – Linkers and Connectives - Organizing Principles in a Paragraph – Defining- Describing People, Objects, Places and Events – Classifying- Providing Examples or Evidence - Essay Writing - Writing Introduction and Conclusion.

UNIT - III:

Theme: **Attitude and Gratitude**

Poems on '*Leisure'* by William Henry Davies and '*Be Thankful'* –Unknown. from the prescribed textbooks titled English for the young in the Digital World published by orient Black Swan Pvt.Ltd

Vocabulary: Words Often Confused - Words from Foreign Languages and their Use in English.

Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.

Reading: Sub-Skills of Reading – Identifying Topic Sentence and Providing Supporting Ideas - Exercises for Practice.

Writing: Format of a Formal Letter-Writing Formal Letters E.g.., Letter of Complaint, Letter of Requisition, Job Application with CV/Resume – Difference between Writing a Letter and an Email - Email Etiquette.

UNIT - IV:

Theme: **Entrepreneurship**

Lesson on '*Why a Start-Up Needs to Find its Customers First*' from the prescribed textbooks titled English for the young in the Digital World published by orient Black Swan Pvt.Ltd

Vocabulary: Standard Abbreviations in English – Inferring Meanings of Words through Context – Phrasal Verbs – Idioms.

Grammar: Redundancies and Clichés in Written Communication – Converting Passive to Active Voice and Vice-Versa.

Reading: Prompt Engineering Techniques– Comprehending and Generating Appropriate Prompts - Exercises for Practice

Writing: Writing Practices- Note Making-Précis Writing.

UNIT - V:

Theme: **Integrity and Professionalism**

Lesson on '*Professional Ethics*'. from the prescribed textbooks titled English for the young in the Digital World published by orient Black Swan Pvt.Ltd

Vocabulary: Technical Vocabulary and their Usage–One Word Substitutes

Grammar: Direct and Indirect Speech **-** Common Errors in English (Covering all the other aspects of grammar which were not covered in the previous units)

Reading: Survey, Question, Read, Recite and Review (SQ3R Method) – Inferring the Meaning and Evaluating a Text- Exercises for Practice

Writing: ***Report Writing - Technical Reports- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Technical Report.***

<u>Note:</u> ***Listening and speaking skills which are given under unit-6 in AICTE Model Curriculum are covered in the syllabus of ELCS Lab Course.***

- (**Note:** AS the syllabus of English given in AICTE Model Curriculum -2018 for B.Tech First year is ***open-ended*** besides following the prescribed textbook it is required to prepare teaching/learning materials **by the teachers collectively** in the form of handouts based on the needs of the students in their respective colleges for effectives teaching/learning in the class.)

Text Books:

1. Board of Editors.2025.English for the Young in the Digital World. Orient Black Swan Pvt.Ltd.

REFERENCEBOOKS:

1. Swan, Michael. (2016).*Practical English Usage.* Oxford University Press .New Edition.
2. *Karal, Rajeevan.2023.English Grammar Just for You.* Oxford University Press. New Delhi
3. 2024. *Empowering with Language: Communicative English for Undergraduates* Cengage Learning India Pvt. Ltd. New Delhi
4. Sanjay Kumar & Pushp Lata. 2022. *Communication Skills – A Workbook.* Oxford University Press. New Delhi
5. Wood, F.T. (2007).*Remedial English Grammar.* Macmillan.
6. Vishwa mohan, Aysha. (2013).*English for Technical Communication for Engineering Students.* McGraw-Hill Education India Pvt .Ltd.

25EC204ES **VR25**

Vignan's Institute of Management and Technology for Women
An Autonomous Institution

B.Tech.	**L**	**T**	**P**	**C**
I Year II Sem	**3**	**0**	**0**	**3**

ELECTRONIC DEVICES AND CIRCUITS

(Common to CSE (DS), IT, CSE (AIML))

Course Overview: This course introduces fundamental semiconductor devices and their behavior, including diodes, BJTs, and FETs. It covers their characteristics, applications, and the analysis of basic electronic circuits. The course also explores rectifiers, voltage regulation, amplifier design, and advanced semiconductor technologies like FinFETs and CNTFETs. Emphasis is placed on developing a strong foundation for analog circuit design and understanding modern device technologies in electronics.

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

- Analyze the electrical characteristics and models of semiconductor diodes and apply the min rectifier and clipping circuits.
- Evaluate the operation and configurations of Bipolar Junction Transistors (BJTs) and analyze their input and output characteristics.
- Design appropriate biasing networks for BJTs and determine the operating point for amplifier applications.
- Analyze transistor amplifier circuits using h-parameter models and assess performance for various configurations.
- Analyze the structure, working, and characteristics of JFETs, MOSFETs, and advanced devices like FinFETs and CNTFETs, and compare modern device technologies.

UNIT-I:

Diode Characteristics and Applications: PN junction diode – I-V characteristics, Diode resistance and capacitance, Diode models (Ideal, Simplified, Piecewise Linear), Rectifiers – Half-wave, Full-wave (Center-tap and bridge), Capacitor filter for rectifiers, Clippers and clampers, Zener diode –I-V characteristics and voltage regulation.

UNIT-II:

Bipolar Junction Transistor(BJT): Structure and working principle of BJT, Current components and transistoraction,Configurations:CommonBase(CB),CommonEmitter(CE),CommonCollector(CC), Input and output characteristics, Determination of h-parameters from transistor characteristics.

UNIT-III:

BJT Biasing: Need for biasing and stabilization, Load line and operating point, Biasing techniques: Fixed bias, Collector-to-base bias, Voltage divider bias, Stability factors and thermal runaway

UNIT-IV:

Transistor Amplifiers: Transistor as a small-signal amplifier, h-parameter equivalent circuit, CE, CB, CC amplifier analysis using h-parameters, Approximate CE model – with and without emitter bypass capacitor.

UNIT-V:

Special Purpose Diodes: Principle of Operation of– SCR, Tunnel Diode, Varactor Diode, Photo Diode, Solar Cell, LED and Schottky Diode.

Field Effect Transistors and Advanced Devices: JFET: Structure, operation, and characteristics, MOSFET: Enhancement and Depletion modes –Structure, operation, and characteristics, Advanced Devices: FinFETs - 3D structure, Scaling advantages, CNTFETs - Structure, ballistic transport, fabrication, Comparison: CMOS vs. FinFET vs. CNTFET.

TEXTBOOKS:

1. Millman, Jacob, and Christos C. Halkias. *Electronic Devices and Circuits*. Tata McGraw-Hill, 1991.
2. Boylestad, Robert L., and Louis Nashelsky. *Electronic Devices and Circuit Theory*. Pearson, 11th ed., 2013.
3. Sedra, Adel S., and Kenneth C. Smith. *Microelectronic Circuits*. Oxford University Press, 7th ed., 2014.

REFERENCEBOOKS:

1. Bell, David A. *Electronic Devices and Circuits*. Oxford University Press,5thed.,2008.
2. Neamen, Donald A.*Electronic Circuit Analysis and Design*.McGraw-Hill,2nded.,2001.
3. Salivahanan,S.and N. Suresh Kumar. *Electronic Devices and Circuits*.McGraw-Hill Education, 4th ed., 2017.
4. Razavi,Behzad. *Fundamentals of Microelectronics*.Wiley,2nded.,2013.
5. Taur, Yuan, and Tak H. Ning. *Fundamentals of Modern VLSI Devices*. Cambridge University Press, 2nd ed., 2009.

25DS205ES **VR25**

Vignan's Institute of Management and Technology for Women
An Autonomous Institution

B.Tech.	**L**	**T**	**P**	**C**
I Year - II Semester	**3**	**0**	**0**	**3**

DATA STRUCTURE

((Common for CSE, CSE(AI&ML), ECE, IT, CSE(DS))**)**

Prerequisites: A course on "Programming for Problem Solving

Course Objectives

- Exploring basic data structures such as stacks and queues.
- Introduces a variety of data structures such as hash tables, search trees, tries, heaps, graphs.
- Introduces sorting and pattern matching algorithms.

Course Outcomes

- Ability to select the data structures that efficiently model the information in a problem.
- Ability to assess efficiency trade-offs among different data structure implementations or combinations.
- Implement and know the application of algorithms for sorting and pattern matching.
- Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.

UNIT–I

Introduction to Data Structures: Basic Terminology, Classification of Data Structures, Operation on Data Structures, abstract data types, selecting a Data Structure, Linear list –Introduction, singly linked list, Circular Linked Lists, Doubly Linked List, Stacks-Operations, Stack algorithm, Stack ADT, Stack applications, Queues- operations, Queue Algorithm, Queue ADT, Queue Applications.

UNIT-II

Trees: Introduction, Types of Trees, creating a Binary Tree from a General Tree, traversing a Binary Tree, Binary Search Trees (BST), BST Operations- Searching, Insertion and Deletion, BST ADT, BST Applications, Threaded Binary Trees, AVL Trees, Red –Black Trees, Splay Trees

UNIT–III

Multi way Search Trees: Introduction, B Trees, B Trees ADT,2-3Trees,2-3- Tree, B* Tree, B+ Trees Heaps: Binary Heaps, Binomial heaps, Fibonacci heaps, Comparison of Various Heaps, Applications Searching: Introduction, Interpolation Search, Jump search

UNIT-IV

Graphs: Introduction, Directed Graphs, Bi connected Components, Representation of Graphs, Graph Traversal Algorithms, Graph ADT, Applications of Graphs

Sorting: Radix Sort, Heap sort, Shell Sort, Tree Sort,

UNIT–V

Hashing and Collision: Introduction, Hash Tables, Hash Functions, Different Hash Functions: Division Method, Multiplication Method, Mid-square Method, Folding Method; collisions: Collision Resolution by Open Addressing, Collision Resolution by Chaining

Files and their Organization: Introduction, Data hierarchy, File Attributes, Text and Binary Files, Basic File Operations, File Organization, Indexing

Text Books:

1. Data Structures: APseudocodeApproachwithC,2nd Edition, R.F. Gilberg and B.A. Forouzan, Cengage Learning
2. Data Structure using C–ReemaThareja,3rd Edition, Oxford University Press.

Reference:

1. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson Education.

25CH206BS **Vignan's Institute of Management and Technology for Women** VR25

An Autonomous Institution

B Tech	**L**	**T**	**P**	**C**
I Year - II Semester	**0**	**0**	**2**	**1**

ENGINEERING CHEMISTRY LABORATORY

(Common for **CSE(AIML), CSE(DS), IT & ECE)**

Course Objectives: The course consists of experiments related to the principles of Chemistry required for engineering student. The student will learn:

- Students will understand and perform experiments based on core chemical principles relevant to engineering applications.
- Students will learn to estimate the hardness of water to assess its suitability for drinking purposes.
- Students will acquire the ability to perform acid-base titrations using instrumental methods such as conductometry, potentiometry, and pH metry.
- Students will gain hands-on experience in synthesizing polymers like Bakelite and Nylon – 6, in the laboratory.
- Students will learn to determine the unknown concentration of potassium permanganate ($KMnO_4$) using a calibration curve.

Course Outcomes: The experiments will make the student gain skills on:

- Students will develop practical skills through hands-on chemistry experiments relevant to engineering.
- Students will learn to determine important parameters such as water hardness and the corrosion rate of mild steel under various conditions.
- Students will be able to apply techniques like conductometry, potentiometry and pH metry to determine concentrations or equivalence points in acid-base reactions.
- Students will gain experience in synthesizing polymers such as Bakelite, Nylon-6,6.
- Students will understand the working principle of colorimetry and the relationship between absorbance and concentration (Beer-Lambert Law).

List of Experiments:

I. **Volumetric Analysis:** Estimation of Hardness of water by EDTA Complexometry method.

II. **Conductometry:**

1. Estimation of the concentration of strong acid by conductometry.
2. Estimation of the concentration of strong and weak acid in an acid mixture by Conductometry.

III. **Potentiometry:**

1. Estimation of concentration of Fe^{+2} ion by Potentiometry using KMnO4.
2. Estimation of concentration of strong acid with strong base by Potentiometry using quinhydrone

IV. **pH -Metry:** Determination of an acid concentration using pH-meter.

V. **Colorimetry:** Verification of Lambert-Beer's law using $KMnO_4$.

VI. **Preparations:**

1. Preparation of Bakelite.
2. PreparationNylon–6, 6.

VII. **Corrosion:** Determination of rate of corrosion of mild steel in the presence and absence of inhibitor.

VIII. **Virtual lab experiments:**

1. Construction of Fuel cell and it's working.
2. Smart materials for Biomedical applications
3. Batteries for electrical vehicles.
4. Functioning of solar cells and its applications.

Reference Books:

1. Lab manual for Engineering chemistry by B. Ramadevi and P. Aparna, S Chand Publications, New Delhi (2022)
2. Vogel'stextbookofpracticalorganicchemistry5thedition
3. Inorganic Quantitative analysis by A.I.Vogel, ELBSPublications.
4. College Practical Chemistry by V.K.Ahluwalia, Narosa Publications Ltd. New Delhi (2007).

25DS207ES **VR25**

Vignan's Institute of Management and Technology for Women
An Autonomous Institution

B.Tech. **L T P C**

I Year - II Semester **0 0 2 1**

DATA STRUCTURE LAB

(Common for CSE, CSE(AI&ML), ECE, IT, CSE(DS))

Prerequisites: 1.A Course on "Programming for problem solving".

Course Objectives:

- It covers various concepts of C programming language
- It introduces searching and sorting algorithms
- It provides an understanding of data structures such as stacks and queues.

Course Outcomes:

- Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
- Ability to Implement searching and sorting algorithms

List of Experiments

1. Write a program that uses functions to perform the following operations on singly linked list.:
   i) Creation ii) Insertion iii) Deletion iv) Traversal
2. Write a program that uses functions toper form the following operations on doubly linked list.:
   i) Creation ii) Insertion iii) Deletion iv) Traversal
3. Write a program that uses functions toper form the following operations on circular linked list.:
   i) Creation ii) Insertion iii) Deletion iv) Traversal
4. Write a program that implement stack (its operations) using
   i) Arrays ii) ADT
5. Write a program that implement Queue (its operations) using
   i) Arrays ii) ADT
6. Write a program that implements the following sorting methods to sort a given list of integers in ascending order
   i) Radix Sort, ii) Heapsort, iii) Shell Sort, iv) Tree Sort
7. Write a program to implement the tree traversal methods (Recursive and Non-Recursive).
8. Write a program to implement
   i) Binary Search tree ii) B Trees iii) B+ Trees iv) AVL trees
   v) Red – Black trees
9. Write a program to implement the graph traversal methods.
10. Write a program to implement the following Hash Functions: i) Division Method, ii) Multiplication Method, iii) Mid-square Method, iv) Folding Method

Text Books:

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.
2. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M. J. Augenstein, PHI/Pearson Education.

Reference Book:

1. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B. A. Forouzan, Cengage Learning.

25ML208ES **VR25**

Vignan's Institute of Management and Technology for Women
An Autonomous Institution

B.Tech. **L T P C**
I Year II Sem. **0 0 2 1**

PYTHON PROGRAMMING LAB

(Common for CSE, CSE(AI&ML), CSE(DS))

Course Objectives:

- To install and run the Python interpreter
- To learn control structures.
- To Understand Lists, Dictionaries in python
- To Handle Strings and Files in Python

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

- Develop the application specific codes using python.
- Understand Strings, Lists, Tuples and Dictionaries in Python
- Verify programs using modular approach, file I/O, Python standard library
- Implement Digital Systems using Python

Note: The lab experiments will be like the following experiment examples.

List of Experiments:

1. a. Use a web browser to go to the Python website http://python.org. This page contains
   information about Python and links to Python-related pages, and it gives you the ability to search the Python documentation.
   b. Start the Python interpreter and type help() to start the online help utility.
2. Start a Python interpreter and use it as a Calculator.
3. Write a program to calculate compound interest when principal, rate and number of periods are given.
4. Read the name, address, email and phone number of a person through the keyboard and print the details.
5. Print the below triangle using for loop. 5
   i. 4 4
   ii. 3 3 3
   iii. 2 2 2 2
   iv. 1 1 1 1 1
6. Write a program to check whether the given input is digit or lowercase character or uppercase character or a special character(use 'if-else-if' ladder)
7. Python program to print all prime numbers in a given interval (use break)
8. Write a program to convert a list and tuple into arrays.
9. Write a program to find common values between two arrays.
10. Write a function called palindrome that takes a string argument and returnsTrue if it is a palindrome and False otherwise. Remember that you can use the built-in function len to check the length of a string.
11. Write a function called is_sorted that takes a list as a parameter and returns True if the list is sorted in ascending order and False otherwise.

12. Write a function called has_duplicates that takes a list and returns True if there is any element that appears more than once. It should not modify the original list.
13. Write a function called remove_duplicates that takes a list and returns a new list with only the unique elements from the original. Hint: they don't have to be in the same order.
14. The wordlist I provided, words.txt, doesn't contain single letter words. So you might want to add "I", "a", and the empty string.
15. Write a python code to read dictionary values from the user. Construct a function to invert its content. i.e., keys should be values and values should be keys.
16. Add a comma between the characters. If the given word is 'Apple', it should become 'A,p,p,l,e'
17. Remove the given word in all the places in a string?
18. Write a function that takes a sentence as an input parameter and replaces the first letter of every word with the corresponding upper case letter and the rest of the letters in the word by corresponding letters in lower case without using a built-in function?
19. Writes a recursive function that generates all binary strings of n-bit length
20. Write a python program that defines a matrix and prints
21. Write a python program to perform multiplication of two square matrices
22. How do you make a module? Give an example of construction of a module using different geometrical shapes and operations on them as its functions.
23. Use the structure of exception handling all general-purpose exceptions.
24. Write a function called draw_rectangle that takes a Canvas and a Rectangle as arguments and draws a representation of the Rectangle on the Canvas.
25. Add an attribute named color to your Rectangle objects and modify draw_rectangle so that it uses the color attribute as the fill color.
26. Write a function called draw_point that takes a Canvas and a Point as arguments and draws a representation of the Point on the Canvas.
27. Define a new class called Circle with appropriate attributes and instantiate a few Circle objects. Write a function called draw_circle that draws circles on the canvas.
28. Write a python code to read a phone number and email-id from the user and validate it for correctness.
29. Write a Python code to merge two given file contents into a third file.
30. Write a Python code to open a given file and construct a function to check for given words present in it and display on found.
31. Write a Python code to Read text from a text file, find the word with most number of occurrences
32. Write a function that reads a file *file1*and displays the number of words, number of vowels, blank spaces, lower case letters and uppercase letters.
33. Import numpy, Plotpy and Scipy and explore their functionalities.
34. Install NumPypackage with pip and explore it.
35. Write a program to implement Digital Logic Gates – AND, OR, NOT, EX-OR
36. Write a GUI program to create a window wizard having two text labels, two text fields and two buttons as Submit and Reset.

Text Books:

1. Supercharged Python: Take your code to the next level, Overland
2. Learning Python, Mark Lutz, O'reilly

Reference Books:

1. Python Programming: A Modern Approach, Vamsi Kurama, Pearson
2. Python Programming A Modular Approach with Graphics, Database, Mobile, and Web Applications, Sheetal Taneja, Naveen Kumar, Pearson
3. Introduction to Python Programming, Gowrishakar S, Veena A, CRC Press
4. Programming with Python, A User's Book, Michael Dawson, Cengage Learning, India Edition
5. Python for Data Science, Dr. Mohd Abdul Hameed, Wiley publications
6. Core Python Programming, Dr. R. Nageswara Rao, Dreamtech press
7. Introduction to Python, Gowrishankar S, Veena A., CRC Press

B.Tech.	L	T	P	C
I Year - II Semester	0	0	2	1

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY
(Common for CSE(AIML), CSE(DS) & IT)

The **English Language and Communication skills (ELCS)** Lab focuses on listening and speaking skills, particularly on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Listening Skills:

Objectives

- To enable students, develop their active listening skills
- To equip students with necessary training in listening, so that they can comprehend the speech of people from different linguistic backgrounds

Speaking Skills:

- To improve their pronunciation and neutralize accent
- To enable students express themselves fluently and appropriately
- To practice speaking in social and professional contexts

Learning Outcomes: Students will be able to:

- Listen actively and identify important information in spoken texts
- Interpret the speech and infer the intention of the speaker
- Improve their accent for intelligibility
- Speak fluently with clarity and confidence
- Use the language in real life situations

Syllabus: English Language and Communication Skills Lab (ELCS) shall have two parts:

a. **Computer Assisted Language Learning (CALL) Lab which focuses on listening skills**
b. **Interactive Communication Skills (ICS) Lab which focuses on speaking skills**

The following course content is prescribed for the **English Language and Communication Skills Lab.**

Exercise – I

CALL Lab:

Instruction: Speech Sounds-Listening Skill - Importance – Purpose - Types- Barriers-Active Listening

Practice: Listening to Distinguish Speech Sounds (Minimal Pairs) **-** *Testing Exercises*

ICS Lab:

❖ **Diagnostic Test – Activity titled '*Express Your View*'**

Instruction: Spoken and Written language - Formal and Informal English - Greetings - Introducing Oneself and Others

Practice: Any Ice-Breaking Activity

Exercise- II

CALL Lab:

Instruction: Listening vs. Hearing - Barriers to Listening

Practice: Listening for General Information - Multiple Choice Questions - *Listening Comprehension Exercises (It is essential to identify a suitable passage with exercises for practice.)*

ICS Lab:

Instruction: Features of Good Conversation – Strategies for Effective Communication

Practice: Role Play Activity -Situational Dialogues –Expressions used in Various Situations –Making Requests and Seeking Permissions – Taking Leave - Telephone Etiquette

Exercise - III

CALL Lab:

Instruction: Errors in Pronunciation – Tips for Neutralizing Mother Tongue Influence (MTI)

Practice: Differences between British and American Pronunciation –*Listening Comprehension Exercises*

ICS Lab:

Instruction: Describing Objects, Situations, Places, People and Events

Practice: Picture Description Activity – Looking at a Picture and Describing Objects, Situations, Places, People and Events *(A wide range of Materials / Handouts are to be made available in the lab.)*

Exercise – IV

CALL Lab:

Instruction: Techniques for *Effective* Listening

Practice: Listening for Specific Details - Listening - Gap Fill Exercises - *Listening Comprehension Exercises*

(It is essential to identify a suitable passage with exercises for practice.)

ICS Lab:

Instruction: How to Tell a Good Story - Story Star- Sequencing-Creativity

Practice: Activity on Telling and Retelling Stories - Collage

Exercise – V

CALL Lab:

Instruction: Identifying the literal and implied meaning

Practice: Listening for Evaluation - Write the Summary – Listening Comprehension Exercises

(It is essential to identify a suitable passage with exercises for practice.)

ICS Lab:

Instruction: Understanding Non-Verbal Communication

Practice: Silent Speech - Dumb Charades Activity

- **Post-Assessment Test on 'Express Your View'**

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. **Computer Assisted Language Learning (CALL) Lab:**

The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.

System Requirement (Hardware component):

Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:

i) Computers with Suitable Configuration
ii) High Fidelity Headphones

Interactive Communication Skills (ICS) Lab:

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V. or LCD, a digital stereo – audio & video system and camcorder etc.

Note: English Language Teachers are requested to prepare Materials / Handouts for each Activity for the Use of those Materials in CALL & ICS Labs.

Suggested Software:

- Cambridge Advanced Learners' English Dictionary with CD.
- Grammar Made Easy by Darling Kindersley.
- Punctuation Made Easy by Darling Kindersley.
- Oxford Advanced Learner's Compass, 10th Edition.
- English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
- English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- English Vocabulary in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS).

Reference Books:

1. Shobha, KN &Rayen, J. Lourdes. (2019). *Communicative English – A workbook.* Cambridge University Press
2. Board of Editors. (2016). *ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities.* Orient Black Swan Pvt. Ltd.
3. Mishra, Veerendra et al. (2020). *English Language Skills: A Practical Approach.* Cambridge University Press
4. (2022). *English Language Communication Skills – Lab Manual cum Workbook.* Cengage Learning India Pvt. Ltd.
5. Ur, Penny and Wright, Andrew. 2022. *Five Minute Activities – A Resource Book for Language Teachers.* Cambridge University Press.

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ENGINEERING WORKSHOP

(Common to CSE(AIML), CSE(DS), IT & ECE)

Course Objectives:

- To introduce students to basic manufacturing processes and workshop practices.
- To provide hands-on training in carpentry, fitting, welding, sheet metal, and machining.
- To develop skills in using hand tools and measuring instruments.
- To enhance safety awareness and proper handling of workshop equipment.
- To build a foundational understanding of industrial production and fabrication.

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

- Understand the basic manufacturing processes and operations.
- Use hand tools and equipment safely and efficiently.
- Perform basic operations in carpentry, fitting, welding, sheet metal work, and machining.
- Read and interpret workshop drawings.
- Develop teamwork, time management, and quality awareness in a workshop environment.

1. TRADES FOR EXERCISES: (At least two exercises from each trade)

i. Carpentry: T-Lap Joint, Dovetail Joint, Mortise and Tenon Joint
ii. Fitting: V-Fit, Dovetail Fit and Semi-circular Fit
iii. Tin Smithy: Square Tin, Rectangular Tray and Conical Funnel
iv. Foundry: Preparation of Green Sand Mould using Single Piece and Split Pattern
v. Welding Practice: Arc Welding and Gas Welding
vi. House Wiring: Parallel and Series, Two-way Switch and Tube Light
vii. Black Smithy: Round to Square, Fan Hook and S-Hook

2. TRADES FOR DEMONSTRATION AND EXPOSURE: Plumbing, Machine Shop, Metal Cutting (Water Plasma), Power Tools in Construction and Wood Working

TEXT BOOKS:

1. Workshop Practice, B. L. Juneja, Cengage Learning India, 1st Edition, 2015.
2. Workshop Practice Manual, K. Venkata Reddy, BS Publication, 6th Edition, Reprint 2025.

REFERENCE BOOK:

1. Workshop Manual, K. Venugopal, Anuradha Publications, 2012th Edition.