GLOBAL INSTITUTE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)
COURSE CATALOGUE
REGULATIONS B.TECH – GR - 25
COMPUTER SCIENCE AND ENGINEERING
I YEAR I SEMESTER

Course Code	Course Name	Subject Area	Category	Periods Per Week			Credits	Scheme of Examination Max Marks		
				L	T	P		CIA	SEE	Total
INDUCTION PROGRAM										
THEORY										
MA101BS	Matrices and Calculus	BSC	Foundation	3	1	0	4	40	60	100
CH102BS	Engineering Chemistry	BSC	Foundation	3	0	0	3	40	60	100
EC103ES	Electronic Devices & Circuits	ESC	Foundation	3	0	0	3	40	60	100
CS104ES	Programming for Problem Solving	ESC	Foundation	3	0	0	3	40	60	100
EN106HS	English for Skill Enhancement	HSMC	Foundation	3	0	0	3	40	60	100
PRACTICAL										
ME105ES	Engineering Workshop	ESC	Foundation	0	0	2	1	40	60	100
CH107BS	Engineering Chemistry Lab	BSC	Foundation	0	0	2	1	40	60	100
CS108ES	Programming for Problem Solving Lab	ESC	Foundation	0	0	2	1	40	60	100
EN109HS	English Language and Communication Skills Lab	HSMC	Foundation	0	0	2	1	40	60	100
			Total Credits	**15**	**1**	**8**	**20**			

COURSE CONTENT

MATRICES AND CALCULUS							
I Year - I Semester: ECE, CSE, CSE (AI & ML), CSE (Data Science), CE & ME							
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**	
MA101BS	**Foundation**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	1	-	4	40	60	100
Contact Classes: 48	Tutorial Classes: 16	Practical Classes: Nil				**Total Classes: 64**	
Prerequisite: Mathematical Knowledge at the pre-university level							

1. **COURSE OVERVIEW**

   This course Matrices and Calculus is a foundation course of mathematics for all engineering branches. The concepts of Matrices, Eigen Values, Eigen Vectors, Functions of Single and Several Variables, Curve Tracing and Multiple Integrals. This course is applicable for simulations, colour imaging processes, and finding optimal solutions in all fields of industries.

2. **COURSE OBJECTIVE**

   The students will try to Learn:

   1) Types of matrices and their properties.
   2) The concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
   3) Concept of eigenvalues and eigenvectors and to reduce the quadratic form to canonical form.
   4) A geometrical approach to the mean value theorems and their application to the mathematical problems.
   5) Evaluation of surface areas and volumes of revolutions of curves.
   6) A basic idea of tracing geometrical figure of an algebraic equation.
   7) Partial differentiation, the concept of total derivative.
   8) Finding maxima and minima of a function of two and three variables.
   9) Evaluation of multiple integrals and their applications.

3. **COURSE OUTCOMES**

   After successful completion of the course, students should be able to:

CO 1	Find rank of a matrix by Echelon and Normal Form. Write the matrix representation of a set of linear equations and analyse the solution of the system of equations.
CO 2	Find the Eigen Values and Eigenvectors. Reduce the quadratic form to canonical form using orthogonal transformations. To do verification and Application of Cayley Hamilton Theorem.
CO 3	Solve the applications on the mean value theorems. Expand a function using Taylors Series. Trace a basic geometrical figure of a given curve.
CO 4	Find the extreme values of functions of two variables with / without constraints and to apply Lagrange's Multipliers.
CO 5	Evaluate the multiple integrals, change the order and apply the concept to find areas, volumes.

4. **COURSE CONTENT**

UNIT - I: Matrices   **8 L**

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   **10 L**

Linear Transformation and Orthogonal Transformation: Eigen values – Eigen vectors and their properties – Diagonalization of a matrix – Cayley-Hamilton Theorem (without proof) – Fnding 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: Single Variable Calculus   **10 L**

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. Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates).

UNIT - IV: Multivariable Calculus (Partial Differentiation and applications)   **10 L**

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 method of Lagrange multipliers.

UNIT-V: Multivariable Calculus (Integration)   **8 L**

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.

5. **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 Edition, 2016.

6. **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) N.P. Bali and Manish Goyal, A textbook of Engineering Mathematics, Laxmi Publications,
   4) Reprint, 2008.
   5) H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, New Delhi.

CO-PO-PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	3	2										2	3	2
CO 2	2	3										2	2	3
CO 3	2	3											2	3
CO 4	3	-	1		2								3	-
CO 5	3	3			1							2	3	3

ENGINEERING CHEMISTRY							
I Year - I Semester: CSE I Year - II Semester: CE, ME, ECE, CSE(AIML), CSE(DS)							
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
CH102BS	**Foundation**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**-**	**-**	**3**	**40**	**60**	**100**
Contact Classes: 48	Tutorial Classes: Nil	Practical Classes: Nil			**Total Classes: 48**			
Prerequisite: Basic principles of Chemistry							

1. **COURSE OVERVIEW**

   Engineering Chemistry Course, focuses on the chemical principles and technologies relevant to engineering and industry. It covers water chemistry and treatment methods, electrochemical processes, batteries, corrosion mechanisms and control techniques, and the application of smart materials and biosensors. The course also explores challenges and future opportunities in sustainable energy solutions, particularly green hydrogen.

2. **COURSE OBJECTIVE**

   The students will try to Learn:

   1) The new advances in Engineering Chemistry and acquire the essential skills to become a competent engineering professional.
   2) The industrial significance of water treatment, fundamental principles of battery chemistry, and the impact of corrosion along with its control methods for structural protection.
   3) The foundational knowledge of various energy sources and their practical applications in engineering and classification, properties, and engineering applications of polymers for material selection and industrial advancements.
   4) The working of smart materials, biosensors, and analytical techniques applicable in engineering, industrial, environmental, and biomedical fields.

3. **COURSE OUTCOMES**

   After successful completion of the course, students should be able to:

CO 1	Understand the fundamental properties of water and its applications in both domestic and industrial purposes.
CO 2	Gain basic knowledge of electrochemical processes and their relevance to corrosion and its control methods.
CO 3	Comprehend the significance and practical applications of batteries and various energy sources, enhancing their potential as future engineers and entrepreneurs.
CO 4	The basic concepts and properties of polymers, lubricants and other engineering materials.
CO 5	Apply the principles of UV-Visible, IR spectroscopy and Raman spectroscopy in analyzing pollutants in dye industries and biomedical applications.

4. **COURSE CONTENT**

UNIT – I: Water and its treatment: [8]
Introduction, types 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 break-point 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 [8]
Introduction - Electrode potential, standard electrode potential, types of electrodes, Nernst equation (no derivation), Galvanic cell, cell representation, EMF of cell- Numerical problems. Reference electrodes - Primary reference electrode – Standard Hydrogen Electrode (SHE), Secondary reference electrode - Calomel electrode. Determination of pH of an unknown solution using SHE and Calomel electrode.

Corrosion: Introduction - Definition, causes and effects of corrosion - Theories of corrosion, chemical and electrochemical corrosion - Mechanism of electrochemical 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: [8]
Batteries: Introduction – Classification of batteries - Primary, secondary and reserve batteries with examples. Construction, working and applications of Zn-air and Lithium ion battery. Fuel Cells – Differences between a battery and a fuel cell, construction and applications of Direct Methanol Fuel Cell (DMFC).

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

Fossil **fuels:** Introduction, classification, Petroleum - Refining of Crude oil, 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: [8]
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).

Thermoplastics and thermosetting plastics, Fiber reinforced plastics (FRP).

Conducting polymers: Definition and classification with examples - Mechanism of conduction in trans-Polyacetylene and applications of conducting polymers.

Biodegradable polymers: Polylactic acid (PLA) and its applications.

UNIT - V: Applications of Materials: [8]
Cement: Portland cement, its composition, setting and hardening.

Phase rule: Definition – Phase, component, degrees of freedom. Phase rule equation. Phase diagrams - One component system - water. Two component system - Lead silver system.

Lubricants: Definition and characteristics of a good lubricant – thin film mechanism of lubrication, properties of lubricants - viscosity, cloud and pour point, flash and fire point.

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).

5. 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.

3) Engineering Chemistry: by Thirumala Chary Laxminarayana & Shashikala, Pearson Publications (2020).

4) Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi 2011.

5) Engineering Analysis of Smart Material Systems by Donald J. Leo, Wiley, 2007.

6) Raman Spectroscopy in Human Health and Biomedicine.

6. 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 Analysis of Smart Material Systems by Donald J. Leo, Wiley, 2007.

4) Raman Spectroscopy in Human Health and Biomedicine.

CO-PO-PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	2													2
CO 2	1		3				2							
CO 3	1				3									2
CO 4	3				2									
CO 5	3	2												

COURSE CONTENT

ELECTRONIC DEVICES AND CIRCUITS								
I Year - I Semester: CSE								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
EC103ES	**Foundation**	3	-	-	3	40	60	100
Contact Classes: 48	Tutorial Classes: Nil	Practical Classes: Nil				**Total Classes: 48**		
Prerequisite:								

1. COURSE OVERVIEW

This course introduces fundamental semiconductor devices and their behaviour, 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.)

2. COURSE OBJECTIVE

The students will try to Learn:

1) To introduce components such as diodes, BJTs and FETs.

2) To know the applications of devices.

3) To know the switching characteristics of devices.

3. COURSE OUTCOMES

After successful completion of the course, students should be able to:

CO 1	Analyze the electrical characteristics and models of semiconductor diodes and apply them in rectifier and clipping circuits.
CO 2	Evaluate the operation and configurations of Bipolar Junction Transistors (BJTs) and analyze their input and output characteristics.
CO 3	Design appropriate biasing networks for BJTs and determine the operating point for amplifier
CO 4	Analyze transistor amplifier circuits using h-parameter models and assess performance for various configurations
CO 5	Analyze the structure, working, and characteristics of JFETs, MOSFETs, and advanced devices like FinFETs and CNTFETs, and compare modern device technologies.

4. COURSE CONTENT

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 transistor action, Configurations: Common Base (CB), Common Emitter (CE), Common Collector (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.

5. **TEXT BOOKS**

   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.

6. **REFERENCE BOOKS**

   1) Bell, David A. Electronic Devices and Circuits. Oxford University Press, 5th ed., 2008.
   2) Neamen, Donald A. Electronic Circuit Analysis and Design. McGraw-Hill, 2nd ed., 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, 2nd ed., 2013.
   5) Taur, Yuan, and Tak H. Ning. Fundamentals of Modern VLSI Devices. Cambridge University Press, 2nd ed., 2009

7. **REFERENCE BOOKS**

   1) https://onlinecourses.nptel.ac.in/noc21_ee55/preview

CO-PO-PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	3	3	2	2	1	1	-	-	-	-	1	1	2	2
CO 2	3	3	2	2	1	1	-	-	-	-	1	1	2	2
CO 3	3	3	2	2	1	1	-	-	-	-	1	1	2	2
CO 4	3	3	2	2	1	1	-	-	-	-	1	1	2	2
CO 5	3	3	2	2	1	1	-	-	-	-	1	1	2	2

PROGRAMMING FOR PROBLEM SOLVING							
I Year - I Semester: CSE							
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
CS104ES	**Foundation**	3	-	-	3	40	60	100
Contact Classes: 48	Tutorial Classes: Nil	Practical Classes: Nil				**Total Classes: 48**		
Prerequisite: Nil								

1. COURSE OVERVIEW

This course introduces the fundamental concepts of problem solving using structured programming techniques with the C language. It focuses on developing logical thinking, algorithm design, and translating solutions into efficient C programs. Students will gain hands-on experience in writing, compiling, debugging, and executing C programs while strengthening their analytical and problem-solving skills.

2. COURSE OBJECTIVE

The students will try to Learn:

1) To learn the fundamentals of computers.

2) To understand the various steps in program development.

3) To learn the syntax and semantics of the C programming language.

4) To learn the usage of structured programming approaches in solving problems

3. COURSE OUTCOMES

After successful completion of the course, students should be able to:

CO 1	Apply control structures in C programs to solve computational problems involving decision making and iterative processes.
CO 2	Develop modular programs using functions and pointers, demonstrating the principles of top-down design and parameter passing.
CO 3	Implement and manipulate arrays and strings in C, including performing searching, sorting, and string operations using library functions.
CO 4	Design recursive solutions for mathematical and programming problems, and use structures and unions to model and manage complex data.
CO 5	Apply file handling techniques in C for text and binary data processing, and implement efficient searching and sorting algorithms.

4. COURSE CONTENT

UNIT - I: (10L)

Overview of C: C Language Elements, Variable Declarations and Data Types, 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: (10L)

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: (10L)

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: (10L)

Recursion: The Nature of Recursion, Tracing a Recursive Function, Recursive Mathematical Functions, Recursive Functions with Array and String Parameters

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: (8L)

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).

5. **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).

6. **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.

CO-PO-PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	3	3	2	2	1									
CO 2	3	3	2	2	2									
CO 3	3	3	2	2	2									
CO 4	3	3	3	2	2									
CO 5	3	3	2	2	2									

COURSE CONTENT

ENGLISH FOR SKILL ENHANCEMENT								
I Year - I Semester: CE, ME, ECE & CSE **I Year - II Semester: CSE (AIML) & CSE(DS)**								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
EN106HS	**Foundation**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	-	-	3	40	60	100
Contact Classes: 48	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes: 48		
Prerequisite: Oxford Advanced Learners Dictionary, Basic Word and Sentence formation								

1. COURSE OVERVIEW

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 eco system. 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 encouraged 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.

2. COURSE OBJECTIVE

The students will try to Learn:

1) Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
2) Develop study skills and communication skills in various professional situations.
3) Equip students to study engineering subjects more effectively and critically using the theoretical and practical components of the syllabus.

3. COURSE OUTCOMES

After successful completion of the course, students should be able to:

CO 1	Choose appropriate vocabulary in their oral and written communication.
CO 2	Demonstrate their understanding of the rules of functional grammar and sentence structures.
CO 3	Develop comprehension skills from known and unknown passages.
CO 4	Write paragraphs, essays, précis and draft letters.
CO 5	Write abstracts and reports in various contexts.

4. **COURSE CONTENT**

UNIT-I:

Theme:	**Perspectives**
	Lesson on 'The Generation Gap' by Benjamin M. Spock from the prescribed textbook 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 textbook titled English for the Young in the Digital World published by Orient BlackSwan 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 Author from the prescribed textbook titled English for the Young in the Digital World published by Orient BlackSwan 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' by Pranav Jain from the prescribed textbook titled English for the Young in the Digital World published by Orient BlackSwan 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 textbook titled English for the Young in the Digital World published by Orient BlackSwan Pvt. Ltd.**
Vocabulary:	Technical Vocabulary and their Usage– One Word Substitutes – Collocations.
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.

5. **TEXT BOOKS**

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

6. **REFERENCE BOOKS**

   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) Vishwamohan, Aysha. (2013). English for Technical Communication for Engineering Students. Mc Graw-Hill Education India Pvt. Ltd.

CO-PO-PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1									2	3		3		2
CO 2									2	3		3		2
CO 3									2	3		3		2
CO 4									2	3		3		2
CO 5									2	3		3		2

ENGINEERING WORKSHOP							
I Year - I Semester: Common to Civil Engineering, Mechanical Engineering, ECE and CSE							
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
ME105ES	**Foundation**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	-	2	1	40	60	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 32				**Total Classes: 32**		
Prerequisite: Practical skill								

1. COURSE OVERVIEW

This hands-on workshop course offers foundational training across key engineering trades, blending practical exercises with technical demonstrations. Students will gain proficiency in Carpentry, Fitting, Tin Smithy, Foundry, Welding, House Wiring, and Black Smithy through structured joint-making, moulding, and fabrication tasks. Complementary exposure to Plumbing, Machine Shop operations, Water Plasma cutting, and power tools enhances real-world readiness. Each module emphasizes safety, precision, and craftsmanship to build core industrial skills. The course fosters a multidisciplinary understanding essential for careers in mechanical and construction fields.

2. COURSE OBJECTIVE

The students will try to Learn:

1) To acquire hands-on skills in key trades: Carpentry, Welding, Fitting, House Wiring, Foundry, Tin Smithy, and Black Smithy.
2) To perform essential fabrication techniques including joint making, sand moulding, metal shaping, and electrical installations.
3) To gain exposure to advanced tools and processes in Plumbing, Machine Shop, Water Plasma Cutting, and Wood Working.
4) To emphasize safety, accuracy, and craftsmanship in all practical sessions.

3. COURSE OUTCOMES

After successful completion of the course, students should be able to:

CO 1	Demonstrate practical skills in core trades such as carpentry, welding, fitting, house wiring, smithy, and foundry through completion of structured exercises.
CO 2	Apply fabrication techniques including joint making, metal shaping, sand moulding, and electrical installations with accuracy and safety.
CO 3	Operate basic and advanced tools used in plumbing, machining, water plasma cutting, and wood working with confidence and care.
CO 4	Interpret technical drawings and instructions to execute trade-specific tasks effectively in workshop settings.
CO 5	Exhibit professional workshop behaviour, including adherence to safety protocols, teamwork, and time management.

4. **COURSE CONTENT**

1) **TRADES FOR EXERCISES:**
   At least two exercises from each trade:
   i. Carpentry: T- Lap Joint, Dovetail Joint, Mortise and Tenon Joint
   ii. Fitting: Straight Fitting, V- Fit, and Dovetail Fit
   iii. Tin Smithy: Square Tin, Rectangular Scoop and Conical Hopper
   iv. Foundry: Preparation of Green Sand Mould using Single Piece and Split Pattern
   v. Welding Practice: Arc Welding - Butt Joint and Lap Joint
   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.

5. **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, Rpt.2025.

6. **REFERENCE BOOKS**

   1) Workshop Manual, K. Venugopal, Anuradha Publications, 2012th edition, 2012

CO-PO-PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	3	2	2	1	2							1	3	2
CO 2	3	3	2	2	2	2							3	2
CO 3	2	3	2	2	2								3	2
CO 4	3	3	3		3		2						3	2
CO 5		2				3						1	3	2

ENGINEERING CHEMISTRY LABORATORY								
I Year - I Semester: CSE I Year - II Semester: ECE, CE, ME, CSE(AI&ML), CSE(DS)								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
CH107BS	**Foundation**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	-	2	1	40	60	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 32				**Total Classes: 32**		
Prerequisite: Basic principles of chemistry								

1. **COURSE OVERVIEW**

   This laboratory course equips B. Tech students with practical skills in key chemical analysis techniques such as volumetric analysis, conductometry, potentiometry, and pH measurement, enabling precise quantification of chemical substances. It also includes experiments on polymer preparation, corrosion rate determination, and lubricant property evaluation. Additionally, virtual lab sessions introduce students to advanced topics like fuel cells, smart biomedical materials, electric vehicle batteries, and solar cell applications, bridging theoretical knowledge with modern technological advancements and fostering a comprehensive understanding of chemistry's role in engineering.

2. **COURSE OBJECTIVE**

   The students will try to Learn:
   1) The core chemical principles relevant to engineering applications.
   2) The water hardness estimation method to assess its suitability for drinking purposes.
   3) The ability to perform acid-base titrations using instrumental methods such as conductometry, potentiometry, and pH metry.
   4) The hands-on synthesis of polymers, specifically Bakelite and Nylon – 6, 6, gaining practical experience in polymer preparation techniques in the laboratory.

3. **COURSE OUTCOMES**

   After successful completion of the course, students should be able to:

CO 1	Perform volumetric analysis by estimating water hardness using complexometry
CO 2	Develop skills in conductometric techniques to determine the concentration of acids.
CO 3	Gain practical experience in potentiometric analysis in to estimate acid concentration and also Iron(II) from the given samples
CO 4	Understand and apply pH metry techniques to determine acid concentrations
CO 5	Acquire hands-on experience in polymer synthesis by preparing Bakelite and Nylon-6,6 in the laboratory.
CO 6	Explore corrosion measurement methods, lubricant property evaluation, and virtual labs on renewable energy technologies, smart materials, and battery applications to bridge theoretical concepts with modern engineering applications.

4. **LIST OF EXPERIMENTS / DEMONSTRATIONS:**

   1) Volumetric Analysis: Estimation of Hardness of water by EDTA Complexometry method.
   2) Conductometry:
      a) Estimation of the concentration of strong acid by Conductometry.
      b) Estimation of the concentration of strong and weak acid in an acid mixture by Conductometry.

3) Potentiometry:
   a) Estimation of concentration of Fe+2ion by Potentiometry using KMnO4.
   b) Estimation of concentration of strong acid with strong base by Potentiometry using quinhydrone.
4) pH Metry: Determination of an acid concentration using pH meter.
5) Preparations:
   a) Preparation of Bakelite.
   b) Preparation Nylon – 6, 6.
6) Corrosion: Determination of rate of corrosion of mild steel in the presence and absence of inhibitor.
7) Lubricants:
   a) Estimation of acid value of given lubricant oil.
   b) Estimation of viscosity of lubricant oil using Ostwald's Viscometer.
8) Virtual lab experiments:
   a) Construction of Fuel cell and it's working.
   b) Smart materials for Biomedical applications.
   c) Batteries for electrical vehicles.
   d) Functioning of solar cell and its applications.

5. REFERENCE BOOK

1) Lab manual for Engineering chemistry by B. Ramadevi and P. Aparna, S Chand Publications, New Delhi (2022).
2) Vogel's text book of practical organic chemistry 5th edition.
3) Inorganic Quantitative analysis by A.I. Vogel, ELBS Publications.
4) College Practical Chemistry by V.K. Ahluwalia, Narosa Publications Ltd. New Delhi (2007).

6. MATERIALS ONLINE
1) Course template
2) Lab manual

CO-PO-PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	2													2
CO 2	1		3				2							
CO 3	1				3									2
CO 4	3				2									
CO 5	3	2												

PROGRAMMING FOR PROBLEM SOLVING LAB								
I Year - I Semester: CSE								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
CS108ES	**Foundation**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	-	2	1	40	60	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 32				**Total Classes: 32**		
Prerequisite: Nil								

1. COURSE OVERVIEW

The Programming for Problem Solving Laboratory focuses on foundational programming skills using C. Students learn to create, debug, and execute programs using an IDE, addressing various numeric and algorithmic problems. The course emphasizes the use of arrays, pointers, functions, and file operations to develop modular and efficient code. It also covers string manipulations, sorting, and searching algorithms. The lab sessions provide practical experience in problem-solving and code optimization.

2. COURSE OBJECTIVE

The students will try to Learn:
1) To learn the fundamentals of computers.
2) To understand the various steps in program development.
3) To learn the syntax and semantics of the C programming language.
4) To learn the usage of structured programming approaches in solving problems.

3. COURSE OUTCOMES

After successful completion of the course, students should be able to:

CO 1	Develop and debug C programs using an IDE.
CO 2	Solve basic numeric and algorithmic problems with C.
CO 3	Implement and manage arrays, pointers, and functions in C.
CO 4	Handle file operations in C for reading, writing, and processing.
CO 5	Perform string manipulations and various sorting/searching algorithms.

4. LIST OF EXPERIMENTS:

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

2) **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.

3) **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:
      i. Addition of Two Matrices
      ii. Multiplication of Two Matrices
   c) Write a program for reading elements using a pointer into an array and display the values using the array.
   d) Write a program for display values reverse order from an array using a pointer.

4) **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).

5) **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.

6) **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.

5. 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).

6. **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

CO-PO-PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	3	2			2				2	2		2		
CO 2	3	3	2	2	2					2		2		
CO 3	3	3	2	2	2				2			2		
CO 4	3	2	2		2							2		
CO 5	3	3	2	2	3							2		

ENGLISH LANGUAGE & COMMUNICATION SKILLS LABORATORY								
I Year - I Semester: CE, ME, ECE & CSE **I Year - II Semester: CSE (AIML) & CSE(DS)**								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
EN109HS	**Foundation**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	-	2	1	40	60	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 32				**Total Classes: 32**		
Prerequisite: Computer with Headphones, OALD & Interactive Communication Skills Lab								

1. **COURSE OVERVIEW:**

   The Professional Communication Skills (PCS) Lab focuses 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.

2. **COURSE OBJECTIVES:**

   The students will try to Learn:

   1) To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
   2) To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
   3) To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
   4) To improve the fluency of students in spoken English and neutralize the impact of dialects.

3. **COURSE OUTCOMES:**

   After successful completion of the course, students should be able to

CO 1	Understand the speech sounds, word accent, intonation and rhythm in day-to-day communication.
CO 2	Understand the nuances of English language through audio- visual experience and group activities.
CO 3	Neutralise their accent for intelligibility.
CO 4	Speak with clarity and confidence which in turn enhances their employability skills.
CO 5	Train students to use language appropriately for public speaking and group discussions.

4. **COURRSE CONTENT**

Exercise – I

CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening.

Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants – Minimal Pairs- Consonant Clusters- Past Tense Marker and Plural Marker- Testing Exercises.

ICS Lab:

Understand: Spoken vs. Written language- Formal and Informal English.

Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise – II

CALL Lab:

Understand: Structure of Syllables – Word Stress– Weak Forms and Strong Forms – Stress pattern in sentences — Intonation.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Stress pattern in sentences — Intonation - Testing Exercises.

ICS Lab:

Understand: Features of Good Conversation – Strategies for Effective Communication.

Practice: Situational Dialogues – Role Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise – III

CALL Lab:

Understand: Errors in Pronunciation-Neutralising Mother Tongue Interference (MTI).

Practice: Common Indian Variants in Pronunciation – Differences between British and American Pronunciation -Testing Exercises.

ICS Lab:

Understand: Descriptions- Narrations- Giving Directions and Guidelines – Blog Writing.

Practice: Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

Exercise – IV

CALL Lab:

Understand: Listening for General Details.

Practice: Listening Comprehension Tests - Testing Exercises.

ICS Lab:

Understand: Public Speaking — Exposure to Structured Talks - Non-verbal Communication- Presentation Skills.

Practice: Making a Short Speech – Extempore- Making a Presentation.

Exercise – V

CALL Lab:

Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests -Testing Exercises.

ICS Lab:

Understand: Group Discussion

Practice: Group Discussion

5. **TEXT BOOKS:**

   1) (2022). English Language Communication Skills – Lab Manual cum Workbook. Cengage Learning India Pvt. Ltd.

6. **REFERENCE BOOKS**:

   1) Shobha, KN & Rayen, J. Lourdes. (2019). Communicative English – A workbook. Cambridge University Press.
   2) Kumar, Sanjay & Lata, Pushp. (2019). Communication Skills: A Workbook. Oxford University Press.
   3) Board of Editors. (2016). ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities. Orient Black Swan Pvt. Ltd.
   4) Vishwa Mohan, Aysha. (2013). English for Technical Communication for Engineering Students.Mc Graw-Hill Education India Pvt. Ltd.

7. **SUGGESTED SOFTWARE**

   1) Cambridge Advanced Learners' English Dictionary with CD.
   2) English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge UniversityPress.
   3) English Vocabulary in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
   4) TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS).

CO-PO-PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1									3	3		3		2
CO 2									3	3		3		2
CO 3									3	3		3		2
CO 4									3	3		3		2
CO 5									3	3		3		2