DEPARTMENT OF RUBBER AND PLASTICS TECHNOLOGY
ANNA UNIVERSITY :: MIT CAMPUS

VISION:
The Department of Rubber and Plastics Technology shall constantly strive to be renowned for its academic and research excellence with professionalism and social responsibilities.

MISSION:
The Mission of the Department of Rubber and Plastics Technology is to:

- Equip its graduates to meet the expectations of Rubber, Plastics and allied industries and professional organizations
- Expand its knowledge base in collaboration with Rubber, Plastics and allied industries and research organizations
- Emphasize on product design aspects so as to enable graduates to be innovators in the field of Rubber, Plastics and allied areas of Technology
- Enable students to become entrepreneurs
- Carry out inter-disciplinary research and development activities integrating Rubber and Plastics Technology with other Engineering disciplines
ANNA UNIVERSITY, CHENNAI
UNIVERSITY DEPARTMENTS
REGULATIONS - 2023
CHOICE BASED CREDIT SYSTEM
B.TECH. RUBBER AND PLASTICS TECHNOLOGY

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

I. Graduates of the programme, with the acquired knowledge and skills in Rubber, Plastics and allied domains, will provide quality services to Rubber and Plastics industries and professional organizations.

II. Graduates of the programme will be in the forefront of innovation, updating new knowledge through continuous learning, research and developmental activities.

III. Graduates of the programme, by keeping pace with changing technological developments, will provide leadership to industry and research organizations.

PROGRAM OUTCOMES (POs)

PO# Graduate Attribute
1 Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2 Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3 Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4 Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5 Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6 The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7 Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8 Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9 Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10 Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11 Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12 **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**PROGRAM SPECIFIC OUTCOMES (PSOs)**

1. Graduates will be able to design and develop rubber, plastics and composites products
2. Graduates will be able to innovatively consider environmental sustainability while designing processes, products and in research endeavours
3. Graduates will strive to be socially responsible entrepreneurs

**PEO’s – PO’s & PSO’s MAPPING:**

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## ANNA UNIVERSITY, CHENNAI

**UNIVERSITY DEPARTMENTS**

**REGULATIONS 2023**

**B. TECH. RUBBER AND PLASTICS TECHNOLOGY**

**CHOICE BASED CREDIT SYSTEM**

**CURRICULUM AND SYLLABI FOR SEMESTERS I AND II**

### SEMESTER I

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| **PRACTICALS** |             |                                             |          |      |          |                      |         |
| 8.     | PH3161      | Physics Laboratory                          | BSC      | 0    0   2        | 2                      | 1       |
| 9.     | GE3162      | English Laboratory - I                       | EEC      | 0    0   2        | 2                      | 1       |

**TOTAL** 17 1 12 30 24

\[\text{\# Skill Based Course}\]

### SEMESTER II

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| **PRACTICALS** |             |                                             |          |      |          |                      |         |
| 8.     | CY3161      | Chemistry Laboratory                        | BSC      | 0    0   2        | 2                      | 1       |
| 9.     | GE3161      | Engineering Practices Laboratory            | ESC      | 0    0   4        | 4                      | 2       |
| 10.    | GE3261      | English Laboratory - II                      | EEC      | 0    0   2        | 2                      | 1       |

**TOTAL** 16 2 10 28 23

\[\# NCC Credit Course level 1 is offered for NCC students only. Other students may enroll for NSS/NSO/YRC activity. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA. \]

\[\# Skill Based Course.\]
OBJECTIVES

- To build lexical competency and accuracy that will help learners to use language effectively.
- To comprehend the nuances of spoken and written communication in different contexts.
- To learn and use various language functions required for effective communication.
- To read and write different types of texts and comprehend their connotative and denotative meanings.
- To enhance students' listening skills by using different types of audio materials and help them extract necessary information from those materials.

UNIT I  BASICS OF COMMUNICATION
Listening – Telephone conversation & Writing message, gap filling; Reading – Telephone message, bio-note; Writing – Personal profile; Grammar – Simple present tense, Present continuous tense, Asking questions (wh-questions); Vocabulary – One word substitution, Synonyms

UNIT II  NARRATION
Listening – Travel podcast / Watching a travel documentary; Reading – An excerpt from a travelogue, Newspaper Report; Writing – Narrative (Event, personal experience etc.); Grammar – Subject – verb agreement, Simple past, Past continuous Tenses; Vocabulary – Antonyms, Word formation (Prefix and Suffix).

UNIT III  DESCRIPTION
Listening – Conversation, Radio/TV advertisement; Reading – A tourist brochure and planning an itinerary, descriptive article / excerpt from literature; Writing – Descriptive writing, Checklists; Grammar – Future tense, Perfect tenses, Preposition; Vocabulary – Adjectives and Adverbs

UNIT IV  CLASSIFICATION
Listening – Announcements and filling a table; Reading – An article, social media posts and classifying (channel conversion – text to table); Writing – Note making, Note taking and Summarising, a classification paragraph; Grammar – Connectives, Transition words; Vocabulary – Contextual vocabulary, Words used both as noun and verb, Classification related words.

UNIT V  EXPRESSION OF VIEWS
Listening – Debate / Discussion; Reading – Formal letters, Letters to Editor, Opinion articles / Blogs; Writing – Letter writing/ Email writing (Enquiry / Permission, Letter to Editor); Grammar – Question tags, Indirect questions, Yes / No questions; Vocabulary – Compound words, Phrasal verbs.

TOTAL: 45 PERIODS

Assessment
Two Written Assessments: 35% weightage each
Assignment: 30% weightage
Designing a tourist brochure / Writing an opinion article / Making a travel podcast
End Semester Exam: 3-hour written exam

COURSE OUTCOMES
At the end of the course, students will be able to
CO1: Use grammar and vocabulary suitable for general context.
CO2: Comprehend the nuances of spoken and written communication.
CO3: Use descriptive and analytical words, phrases, and sentence structures in written communication.
CO4: Read different types of texts and comprehend their denotative and connotative meanings.
CO5: Write different types of texts using appropriate formats.

TEXT BOOKS:
1. “English for Engineers and Technologists” Volume I by Orient Blackswan, 2022

REFERENCES
4. www.uefap.com

CO-PO & PSO MAPPING

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MA3151 MATRICES AND CALCULUS L T P C
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COURSE OBJECTIVES:
- To develop the use of matrix algebra techniques in solving practical problems.
- To familiarize the student with functions of several variables.
- To solving integrals by using Beta and Gamma functions.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals.
- To acquaint the students with the concepts of vector calculus which naturally arises in many engineering problems.

UNIT I MATRICES 9+3
Eigen values and Eigen vectors of a real matrix – Properties of Eigen values - Cayley- Hamilton theorem (excluding proof) – Diagonalization of matrices - Reduction of Quadratic form to canonical form by using orthogonal transformation - Nature of a Quadratic form.

UNIT II DIFFERENTIAL CALCULUS 9+3
UNIT III INTEGRAL CALCULUS 9+3
Improper integrals of the first and second kind and their convergence – Differentiation under integrals - Evaluation of integrals involving a parameter by Leibnitz rule – Beta and Gamma functions-Properties – Evaluation of integrals by using Beta and Gamma functions – Error functions.

UNIT IV MULTIPLE INTEGRALS 9+3

UNIT V VECTOR CALCULUS 9+3
Gradient of a scalar field, directional derivative – Divergence and Curl – Solenoidal and Irrotational vector fields - Line integrals over a plane curve - Surface integrals – Area of a curved surface – Volume Integral - Green’s theorem, Stoke’s and Gauss divergence theorems – Verification and applications in evaluating line, surface and volume integrals.

TOTAL : 60 PERIODS

COURSE OUTCOMES:
At the end of the course, the students will be able to:
CO1: Use the matrix algebra methods for solving practical problems.
CO2: Use differential calculus ideas on several variable functions.
CO3: Apply different methods of integration in solving practical problems by using Beta and Gamma functions.
CO4: Apply multiple integral ideas in solving areas and volumes problems.
CO5: Apply the concept of vectors in solving practical problems.

TEXT BOOKS:

REFERENCES:
CO-PO Mapping

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PH3151 ENGINEERING PHYSICS

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OBJECTIVES
- To impart knowledge on Mechanics of Materials.
- To impart knowledge of oscillations, sound and Thermal Physics
- To facilitate understanding of optics and its applications, different types of Lasers and fiber optics exist.
- To introduce the basics of Quantum Mechanics and its importance.
- To familiarize with crystal structure, bonding and crystal growth.

UNIT I MECHANICS OF MATERIALS

UNIT II OSCILLATIONS, SOUND AND THERMAL PHYSICS

UNIT III OPTICS AND LASERS

UNIT IV QUANTUM MECHANICS
Black body radiation (Qualitative) – Planck’s hypothesis – Einstein’s theory of Radiation - Matter waves–de Broglie hypothesis - Electron microscope – Uncertainty Principle – The Schrodinger Wave equation (time-independent and time-dependent) – Meaning and Physical significance of wave function - Normalization - Particle in an infinite potential well-particle in a three-dimensional box - Degenerate energy states - Barrier penetration and quantum
tunneling - Tunneling microscope.

UNIT V CRYSTAL PHYSICS

Total Periods = 45

OUTCOME
After completion of this course, the students shall be
CO1: Understand the important mechanical properties of materials
CO2: Express the knowledge of oscillations, sound and applications of Thermal Physics
CO3: Know the basics of optics and lasers and its applications
CO4: Understand the basics and importance of quantum physics.
CO5: Understand the significance of crystal physics.

TEXT BOOKS:

REFERENCES:

CO-PO & PSO MAPPING

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CY3151 ENGINEERING CHEMISTRY L T P C
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OBJECTIVES:
- To introduce the basic concepts of polymers, their properties and some of the important applications.
- To impart knowledge on the basic principles and preparatory methods of nanomaterials.
- To facilitate the understanding of corrosion science and protecting coatings.
• To familiarize the operating principles and applications of energy conversion, its processes and storage devices.
• To inculcate sound understanding of water quality parameters and water treatment techniques.

UNIT I POLYMER CHEMISTRY  9

UNIT II NANOCHEMISTRY  9

UNIT III CORROSION SCIENCE  9

UNIT IV ENERGY SOURCES  9
Batteries - Characteristics - types of batteries – primary battery (dry cell), secondary battery (lead acid, lithium-ion-battery)- emerging batteries – nickel-metal hydride battery, aluminum air battery, batteries for automobiles and satellites - Fuel cells (Types) – H2-O2 fuel cell - Supercapacitors-Types and Applications, Renewable Energy: Solar- solar cells, DSSC.

UNIT V WATER TECHNOLOGY  9

OUTCOMES:
CO1: To recognize and apply basic knowledge on different types of polymeric materials, their general preparation methods and applications to futuristic material fabrication needs.
CO2: To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.
CO3: To recognize and apply basic knowledge on suitable corrosion protection technique for practical problems.

Total = 45 Periods
CO4: To recognize different storage devices and apply them for suitable applications in energy sectors.

CO5: To demonstrate the knowledge of water and their quality in using at different industries.

TEXT BOOKS:

REFERENCE BOOKS:

CO - PO Mapping

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- 1' = Low; '2' = Medium; '3' = High

GE3153 PROGRAMMING IN C

UNIT I - BASICS OF C PROGRAMMING
Introduction to programming paradigms — Structure of C program - C programming:
Data Types - Constants - Keywords - Operators: Precedence and Associativity -
Expressions - Input/Output statements, Assignment statements - Decision making
statements - Switch statement.
PRACTICALS:
- Designing programs with algorithms/flowchart
- Programs for i/o operations with different data types
- Programs using various operators
- Programs using decision making and branching statements

UNIT II – LOOP CONTROL STATEMENTS AND ARRAYS
Iteration statements: For, while, Do-while statements, nested loops, break & continue
statements - Introduction to Arrays: Declaration, Initialization - One dimensional array
-Two dimensional arrays – Searching and sorting in Arrays – Strings – string handling
functions - array of strings

PRACTICALS:
- Programs using for, while, do-while loops and nested loops.
- Programs using arrays and operations on arrays.
- Programs implementing searching and sorting using arrays
- Programs implementing string operations on arrays
UNIT III - FUNCTIONS AND POINTERS 6+12
Modular programming - Function prototype, function definition, function call, Built-in functions – Recursion – Recursive functions - Pointers - Pointer increment, Pointer arithmetic - Parameter passing: Pass by value, Pass by reference, pointer and arrays, dynamic memory allocation with malloc/calloc

PRACTICALS:
- Programs using functions
- Programs using recursion
- Programs using pointers & strings with pointers
- Programs using Dynamic Memory Allocation

UNIT IV - STRUCTURES AND UNION 6+12
Storage class, Structure and union, Features of structures, Declaration and initialization of structures, array of structures, Pointer to structure, structure and functions, typedef , bit fields , enumerated data types, Union.

PRACTICALS:
- Programs using Structures
- Programs using Unions
- Programs using pointers to structures and self-referential structures

UNIT V – MACROS AND FILE PROCESSING 6+12

PRACTICALS:
- Programs using pre-processor directives & macros
- Programs to handle file operations
- Programs to handle file with structure

COURSE OUTCOMES:
Upon completion of the course, the students will be able to
CO1: Write simple C programs using basic constructs.
CO2: Design searching and sorting algorithms using arrays and strings.
CO3: Implement modular applications using Functions and pointers.
CO4: Develop and execute applications using structures and Unions.
CO5: Solve real world problem using files.

Total Hours: 90 (30+60)

TEXT BOOKS:

REFERENCE BOOKS:
COURSE OBJECTIVES:
The learning objectives of this course is to develop in students, the engineering graphic skills for communication of concepts, ideas and design of engineering products and expose them to existing national standards related to technical drawings.

CONCEPTS AND CONVENTIONS (NOT FOR EXAMINATION)
Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

UNIT I PLANE CURVES
Basic Geometrical constructions, Curves used in engineering practices: Conics — Construction of ellipse, parabola and hyperbola by eccentricity method — Construction of cycloid — construction of involutes of square and circle — Drawing of tangents and normal to the above curves.

UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACE
Orthographic projection- Principal planes - First angle projection - projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method and traces. Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

UNIT III PROJECTION OF SOLIDS AND FREEHAND SKETCHING
Projection of simple solids like prisms, pyramids, cylinder, and cone when the axis is inclined to both the principal planes by rotating object method. Visualization concepts and Free Hand sketching: Visualization principles —Representation of Three-Dimensional objects — Layout of views- Freehand sketching of multiple views from pictorial views of objects. Practicing three dimensional modeling of simple objects by CAD Software (Not for examination).

UNIT IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES
Sectioning of simple solids like prisms, pyramids, cylinder, and cone in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other — obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids — Prisms, pyramids cylinders and cones.
Development of lateral surfaces of solids with cut-outs and holes. Practicing three dimensional modeling of simple truncated objects by CAD Software (Not for examination).

UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS 6+12
Principles of isometric projection — isometric scale - Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions - Perspective projection of simple solids-Prisms, pyramids, cone and cylinders by visual ray method. Creating isometric model of simple objects from orthographic projections using CAD software (Not for examination).  TOTAL : 90 PERIODS

COURSE OUTCOMES:
On successful completion of this course, the student will be able to
CO1. Draw conic curves, cycloids and involutes
CO2. Draw orthographic projections of points, lines and planes
CO3. Draw orthographic projections and free hand sketches of solids
CO4. Draw sectional views of the objects and development of surfaces.
CO5. Draw isometric and perspective views of simple solids

TEXTBOOKS:

REFERENCES:

Publication of Bureau of Indian Standards:
CO-PO & PSO MAPPING

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* 1' = Low; '2' = Medium; '3' = High

GE3154  

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**Course Outcomes**

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* 1' = Low; '2' = Medium; '3' = High
**TEXT-CUM-REFERENCE BOOKS**

1. Social Life of the Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
2. Social Life of Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies).
3. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
4. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
5. Keeladi - ‘Sangam City Civilization on the banks of river Vaigai’ (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
6. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
7. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)

**UNIT I LANGUAGE AND LITERATURE**


**UNIT II HERITAGE - ROCK ART PAINTINGS TO MODERN ART –SCULPTURE**

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.

**UNIT III FOLK AND MARTIAL ARTS**

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.
UNIT IV  THINAI CONCEPT OF TAMILS  3
Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.

UNIT V  CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE  3
Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.

Total = 15 Periods

TEXT-CUM-REFERENCE BOOKS
1. தமிழ் வரலை – மக்களும் பண் பொடும் – மக். மக்.பிள்மள (தமிழ்நொடு பொடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினி தமிழ் – முமனவர் இல.சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – மவமகநதிக்கமரில் எங்ககொலநகரிகம் (ததொல்லியல் தவளியீடு)
4. பாதாகத் – அற்றங்கமரிகம். (ததொல்லியல் தவளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
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PHYSICS LABORATORY

OBJECTIVES:
- To inculcate experimental skills to test basic materials' properties including materials mechanical, thermal and optical properties.
- To induce the students to familiarize themselves with the properties of sound waves and ultrasonic waves.
- To impart practical skills and to understand the characteristics of mechanical vibrations and logic operation.
- To elucidate to understand the electric and magnetic parameters of materials and semiconductors devices and sensors.
Any SEVEN Experiments
1. Torsional Pendulum - Determination of rigidity modulus of wire and moment of inertia of the disc
2. Non-uniform bending - Determination of Young’s modulus of the material of the beam.
3. Uniform bending - Determination of Young’s modulus of the material of the beam.
4. Lee’s Disc Experiment - Determination of thermal conductivity of bad conductors.
5. Viscosity of Liquids.
6. Acoustic grating - Determination of the velocity of ultrasonic waves in liquids.
7. Ultrasonic interferometer – determination of sound velocity and liquids compressibility
8. Laser - Determination of the wavelength of the laser using grating
   - Determination of the width of the groove of the compact disc using laser.
   - Estimation of laser parameters.
9. Air wedge - Determination of the thickness of a thin sheet/wire
10. a) Optical fibre - Determination of Numerical Aperture and acceptance angle
    b) - Determination of bending loss of fibre.
11. Spectrometer - Determination of the wavelength of light using grating
12. Michelson Interferometer - Determination of wavelength of the monochromatic source of light.
13. Photoelectric effect – Determination of Planck’s constant
14. Black body radiation (Demonstration)
15. Melde’s string experiment - Standing waves.
16. Forced and Damped Oscillations.
17. Thermistor sensor
18. Thermocouple sensor
20. Design LCR series and parallel circuit and estimation of the resonant frequency.
22. Four Probe Set up – determination of band gap/resistivity of a material.

TOTAL: 30 PERIODS

COURSE OUTCOMES:
Upon completion of the course, the students will be able
CO1: To determine various moduli of elasticity, thermal properties of materials and viscosity of liquids
CO2: To determine the velocity of ultrasonic waves in Liquids.
CO3: To calculate and analyze various optical properties.
CO4: To build and analyze the characteristics of mechanical vibrations and logic operation.
CO5: To determine the desired electric and magnetic parameters of materials, semiconductors devices and sensors.

Course Articulation Matrix -

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- 1-low, 2-medium, 3-high, ‘-’ - no correlation
OBJECTIVES

- To improve the communicative competence of learners
- To help learners use language effectively in formal and informal conversations.
- To use language efficiently in expressing their opinions in discussions and talks.

UNIT I

SELF-INTRODUCTION

Introducing oneself; Telephone conversation, Relaying telephone message – Role play

UNIT II

NARRATION

Narrating one’s personal experience in front of a group (formal and informal context)
Ex.: First day in college / vacation / first achievement etc.

UNIT III

CONVERSATION

Making conversation – formal and informal – Turn taking and Turn giving – Small talk

UNIT IV

SHORT SPEECH

Giving short speeches on topics like College Clubs and their activities in the college / Campus Facilities / native place and its major attractions.

UNIT V

DISCUSSION

Taking part in a group discussion on general topics – Debating on topics of interest and relevance.

Assessment

Internals – 100%
Short Speeches
Group discussion

TOTAL: 30 PERIODS

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

CO1. Communicate effectively in formal and informal contexts
CO2. Converse appropriately and confidently with different people
CO3. Express their opinions assertively in group discussions

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- 1-low, 2-medium, 3-high, "-"- no correlation
OBJECTIVES

- To actively listen and collect relevant data from various forms of oral content like presentations, lectures and videos.
- To develop study skills and communication skills in formal and informal situations.
- To comprehend various reading materials relevant to technical context and understand the main and supporting ideas of the reading materials.
- To explore definitions, essay and report writing techniques and practice them in order to develop associated skills.
- To write effective job applications along with detailed CV for internship or placements.

UNIT I  CAUSE AND EFFECT  9
Listening – Radio / TV / Podcast Interview (survivors tale) and framing a set of instructions/ Do’s and Don’ts; Reading – Excerpts of Literature (short stories), Journal articles on issues like Global warming; Writing - Instructions; Official letter / email (Request for internship / Industrial visit); Grammar – If conditionals, Imperatives; Vocabulary – Cause and effect expressions, Idiom.

UNIT II  COMPARE AND CONTRAST  9
Listening – Product reviews and gap fill exercises, Short Talks (like TED Talks) for specific information; Reading – Graphical content (table / chart / graph) and making inferences; Writing – Compare and Contrast Essay; Grammar – Degrees of Comparison; Mixed Tenses; Vocabulary – Order of Adjectives, Transition words.

UNIT III  PROBLEM AND SOLUTION  9
Listening – Group discussion (case study); Reading – Visual content (Pictures on social issues / natural disasters) for comprehension; Editorial; Writing – Problem and Solution Essay; Grammar – Modal verbs; Relative pronoun; Vocabulary – Negative prefixes, Signal words for problem and solution.

UNIT IV  REPORTING  9
Listening – Oral news report; Reading – Newspaper report on survey findings – Writing – Survey report, Making recommendations; Grammar – Active and passive voice, Direct and Indirect speech; Vocabulary – Reporting verbs, Numerical adjectives.

UNIT V  PRESENTATION  9
Listening – Job interview, Telephone interview; Reading - Job advertisement and company profile and making inferences; Writing – Job application (cover letter and CV) Grammar – Prepositional phrases; Vocabulary – Fixed expressions, Collocations.

TOTAL: 45 PERIODS

Assessment
Two Written Assessments : 35% weightage each
Assignment: 30% weightage
Conducting a survey on specific topic and write a final survey report.
End Semester Exam: 3-hour written exam

COURSE OUTCOMES
On completion of the course, the students will be able to:
CO1. Listen effectively to various oral forms of conversation, lectures, discussion and understand the main gist of the content.
CO2. Communicate effectively in formal and informal context.
CO3. Read and comprehend technical texts effortlessly.
CO4. Write reports and job application for internship or placement.
CO5. Learn to use language effectively in a professional context.

TEXT BOOKS
1. “English for Engineers and Technologists” Volume 2 by Orient Blackswan, 2022

REFERENCES
4. www.uefap.com

CO-PO & PSO MAPPING

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- 1-low, 2-medium, 3-high, “-”- no correlation
- **Note**: The average value of this course to be used for program articulation matrix.

MA3251 ORDINARY DIFFERENTIAL EQUATIONS AND TRANSFORM TECHNIQUES

COURSE OBJECTIVES:
- To acquaint the students with Differential Equations which are significantly used in engineering problems.
- To make the students appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.
- To develop the analytic solutions for partial differential equations used in engineering by Fourier series;
- To acquaint the student with Fourier transform techniques used in wide variety of situations in which the functions used are not periodic
- To develop Z-transform techniques which will perform the same task for discrete time systems as Laplace Transform, a valuable aid in analysis of continuous time systems.

UNIT I ORDINARY DIFFERENTIAL EQUATIONS OF HIGHER ORDER

UNIT II LAPLACE TRANSFORMS 9+3

UNIT III FOURIER SERIES 9+3
Dirichlet’s conditions – General Fourier series – Odd and even functions – Half-range Sine and Cosine series – Complex form of Fourier series – Parseval’s identity – Harmonic Analysis.

UNIT IV FOURIER TRANSFORMS 9+3
Fourier integral theorem – Fourier transform pair - Fourier sine and cosine transforms – Properties – Transform of elementary functions - Convolution theorem (without proof) – Parseval’s identity.

UNIT V Z–TRANSFORM AND DIFFERENCE EQUATIONS 9+3

TOTAL: 60 PERIODS

COURSE OUTCOMES:
At the end of the course, the students will be able to:
CO1: Solve higher order ordinary differential equations which arise in engineering applications.
CO2: Apply Laplace transform techniques in solving linear differential equations.
CO3: Apply Fourier series techniques in engineering applications.
CO4: Understand the Fourier transforms techniques in solving engineering problems.
CO5: Understand the Z-transforms techniques in solving difference equations.

TEXT BOOKS:
2. Erwin Kreyszig "Advanced Engineering Mathematics", Wiley India Pvt Ltd., New Delhi, 2015

REFERENCES:

CO-PO MAPPING

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OBJECTIVE:

- To familiarize with chemical kinetics, catalysis, electrochemistry, corrosion.
- To make the students learn the mechanism of various chemical reaction.
- To develop knowledge of preparation methods of diamine.

UNIT I  CHEMICAL KINETICS AND CATALYSIS

Chemical kinetics – order – molecularity – rate of reaction – activation energy – catalysis –
surface science – application of catalysis – phase rule and phase diagrams- colligative
properties of solutions

UNIT II  ELECTRO CHEMISTRY / CORROSION

Electro chemistry – electrochemical series – transport numbers and ionic mobility – buffer
indicators – redox reaction – potentiometric, conductometric, polarographic studies –
galvanic cells – electrolysis – thermodynamic parameters.

UNIT III  STRUCTURE OF ORGANIC COMPOUNDS

Bonding in organic compounds- structure – property relationships – electronic effects like
inductive, mesomeric, electronic and hyper conjugation effects – free radicals, carbo cations,
carbanions, elementary ideas about stereo chemistry.

UNIT IV  DETAILS OF REACTION MECHANISMS

Free radical substitution, Electrophilic addition, aromatic electrophilic substitution,
Nucleophilic additions, condensation reactions, nucleophilic substitutions in aliphatic and
aromatic compounds, cyclo addition, rearrangements, uses of these reactions in polymer
preparation.

UNIT V  ORGANIC SUBSTANCES OF IMPORTANCE TO POLYMET TECHNOLOGY

Amines, important of heterocyclic compounds- furan, thiophene, pyrrole, quinoline, iso
quinoline, imidazole, thiazoles, diisocyanates, epichlorohydrin, fluoro alkenes, acrylonitrile.
Diamines, dicarboxylic acids, polyhydric alcohols. Aromatic and aliphatic amines, amino
acids and proteins.

COURSE OUTCOME:

On completion of the course, the students will be able to:

1. Understand the principles of chemical kinetics and catalysis, including reaction rates,
   activation energy, and the role of catalysis in chemical reaction.
2. Explain the fundamentals of electrochemistry and corrosion, including redox reaction,
   electrolysis, and the thermodynamics of electrochemical systems.
3. Analyse the structure of organic compounds and their properties, including electronic
   effects and stereochemistry.
4. Describe the mechanism of various organic reactions, including substitution, addition,
   and rearrangement reaction, and their applications in polymer preparation.
5. Identify and evaluate the importance of various organic compounds in polymer
   technology, including amines, hetrocyclic compounds, diisocyanates, and amino
   acids.
TEXT BOOK

REFERENCE BOOK

DIGITAL REFERENCE LINK
1. https://www.youtube.com/watch?v=i9TSLa3XNpQ
2. https://www.youtube.com/watch?v=m4MbFsPktVwI&t=883s
3. https://www.youtube.com/watch?v=jX4dEOFwaLQ

CO-PO MAPPING

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EE3151 BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

UNIT – I ELECTRICAL CIRCUITS
9

UNIT – II ELECTRICAL MACHINES
9

UNIT – III ANALOG AND DIGITAL ELECTRONICS
9
Operation and Characteristics of electronic devices: PN Junction Diodes, Zener Diode, BJT, JFET and MOSFET– Operational Amplifiers (OPAMPs) : Characteristics and basic application circuits-555 timer IC based astable and monostable multivibrator.
Basic switching circuits – Gates and Flip-Flops-Sample and hold circuit- R-2R ladder type DAC- Successive approximation based ADC.

UNIT – IV SENSORS AND TRANSDUCERS
Solenoids, electro-pneumatic systems, proximity sensors, limit switches, piezoelectric, hall effect, photo sensors, Strain gauge, LVDT, differential pressure transducer, optical and digital transducers, Smart sensors, Thermal Imagers.

UNIT – V MEASUREMENTS AND INSTRUMENTATION

TOTAL: 45 PERIODS

LABORATORY EXPERIMENTS:
LIST OF EXPERIMENTS:
ELECTRICAL
1. Verification of ohms and Kirchhoff’s Laws.
2. Load test on DC Shunt Motor.
3. Load test on Single Phase Transformer.
4. Load test on 3 Phase Induction Motor.
ELECTRONICS
1. Half wave and full wave Rectifiers.
2. Application of Zener diode as shunt regulator.
3. Inverting and non-inverting amplifier using operational amplifier.

TOTAL: 30 PERIODS

COURSE OUTCOMES
Upon successful completion of the course, students should be able to:
CO 1: Compute and demonstrate the electric circuit parameters for simple problems.
CO 2: Explain the working principles and characteristics of electrical machines, electronic devices and measuring instruments.
CO 3: Identify general applications of electrical machines, electronic devices and measuring instruments.
CO 4: Analyze and demonstrate the basic electrical and electronic circuits and characteristics of electrical machines..
CO 5: Explain the types and operating principles of sensors and transducers.

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1 – Slight, 2 – Moderate, 3 – Substantial

TEXT BOOKS:
REFERENCES:

GE3151 ENGINEERING MECHANICS

COURSE OBJECTIVES:
The main learning objective of this course is to prepare the students for:
- Determining the resultant forces acting on a particle in 2D and 3D and for applying methods of equilibrium on a particle in 2D and 3D.
- Evaluating the reaction forces for bodies under equilibrium, for determining the moment of a force, moment of a couple, for resolving force into a force-couple system and for analyzing trusses
- Assessing the centroids of 2D sections / center of gravity of volumes and for calculating area moments of inertia for the sections and mass moment of inertia of solids.
- Evaluating the frictional forces acting at the contact surfaces of various engineering systems and for applying the work-energy principles on a particle.
- Determining kinetic and kinematic parameters of the rigid bodies subjected to concurrent coplanar forces.

UNIT I STATICS OF PARTICLES 9+3

UNIT II EQUILIBRIUM OF RIGID BODIES AND TRUSSES 9+3

UNIT III DISTRIBUTED FORCES 9+3
Centroids of lines and areas – symmetrical and unsymmetrical shapes, Determination of Centroids by Integration, Theorems of Pappus-Guldinus, Distributed Loads on Beams,
Centre of Gravity of a Three-Dimensional Body, Centroid of a Volume, Composite Bodies, Determination of Centroids of Volumes by Integration.
Moments of Inertia of Areas and Mass - Determination of the Moment of Inertia of an Area by Integration, Polar Moment of Inertia, Radius of Gyration of an Area, Parallel-Axis Theorem, Moments of Inertia of Composite Areas, Moments of Inertia of a Mass - Moments of Inertia of Thin Plates, Determination of the Moment of Inertia of a Three-Dimensional Body by Integration.

UNIT IV  FRICTION AND WORK PRINCIPLES  9+3

UNIT V  DYNAMICS OF PARTICLES AND RIGID BODIES  9+3

TOTAL :60 PERIODS

COURSE OUTCOMES:
Upon completion of this course, the students will be able to:
CO1 To determine the resultant forces acting on a particle in 2D and 3D and to apply methods of equilibrium on a particle in 2D and 3D.
CO2 Evaluate the reaction forces for bodies under equilibrium, to determine moment of a force, moment of a couple, to resolve force into a force-couple system and to analyze trusses
CO3 Assess the centroids of 2D sections / center of gravity of volumes and to calculate area moments of inertia for the sections and mass moment of inertia of solids.
CO4 Evaluate the frictional forces acting at the contact surfaces of various engineering systems and apply the work-energy principles on a particle. evaluate the kinetic and kinematic parameters of a particle.
CO5 Determine kinetic and kinematic parameters of the rigid bodies subjected to concurrent coplanar forces.

TEXTBOOKS:

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*1-low, 2-medium, 3-high, ‘-’- no correlation

GE3251
dispense the cell biology

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course I

course II

course III

course IV

course V
GE3251  TAMILS AND TECHNOLOGY  L  T  P  C
UNIT I  WEAVING AND CERAMIC TECHNOLOGY  3
Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.

UNIT II  DESIGN AND CONSTRUCTION TECHNOLOGY  3
Designing and Structural construction House & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.

UNIT III  MANUFACTURING TECHNOLOGY  3

UNIT IV  AGRICULTURE AND IRRIGATION TECHNOLOGY  3
UNIT V  SCIENTIFIC TAMIL & TAMIL COMPUTING


Total Periods = 15

TEXT-CUM-REFERENCE BOOKS
1. தமிழகவரலொறு –மக்களும் பண் பொடும் –மக.மக.பிள்மள (தவளியீடு:தங்கணாத்திருச்சிரா பங்கார் மஞ்சும் கல்வியியல் பல்கிளை குடியிருப்பு).
2. கணினித் தமிழ் –விகடன் பிரசுரம். (விகடன் பிரசுரம்).
3. சமநூல் –செம்கசுகிக்கறுப்பில் தமிழகருக்கு உலக காண்பிக்கும் (தகவலியிலே செம்கசுக்கு காண்பிக்கும்).
4. நோய்மருடம் – புதுக்குறைக்காரம் தகவலியிலே (தகவலியிலே புதுக்குறைக்காரம்).
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies).
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - ‘Sangam City Civilization on the banks of river Vaigai’ (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bookand Educational Services Corporation, Tamil Nadu)

NCC Credit Course Level 1*

NX3251 (ARMY WING) NCC Credit Course Level - I

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PD 1  Self-Awareness, Empathy, Critical & Creative Thinking, Decision Making and Problem Solving  2
PD 2  Communication Skills  3
PD 3  Group Discussion: Stress & Emotions  2

LEADERSHIP  5
L 1  Leadership Capsule: Traits, Indicators, Motivation, Moral Values, Honour Code  3
L 2  Case Studies: Shivaji, Jhasi Ki Rani  2

SOCIAL SERVICE AND COMMUNITY DEVELOPMENT  8
SS 1  Basics, Rural Development Programmes, NGOs, Contribution of Youth  3
SS 4  Protection of Children and Women Safety  1
SS 5  Road / Rail Travel Safety  1
SS 6  New Initiatives  2
SS 7  Cyber and Mobile Security Awareness  1

TOTAL : 30 PERIODS
NCC Credit Course Level 1*

NX3253 (AIR FORCE WING) NCC Credit Course Level - I

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NCC GENERAL
NCC 1  Aims, Objectives & Organization of NCC  6
NCC 2  Incentives  1
NCC 3  Duties of NCC Cadet  2
NCC 4  NCC Camps: Types & Conduct  1

NATIONAL INTEGRATION AND AWARENESS
NI 1  National Integration: Importance & Necessity  1
NI 2  Factors Affecting National Integration  2
NI 3  Unity in Diversity & Role of NCC in Nation Building  1
NI 4  Threats to National Security  1

PERSONALITY DEVELOPMENT
PD 1  Self-Awareness, Empathy, Critical & Creative Thinking, Decision Making and Problem Solving  7
PD 2  Communication Skills  3
PD 3  Group Discussion: Stress & Emotions  2

LEADERSHIP
L 1  Leadership Capsule: Traits, Indicators, Motivation, Moral Values, Honour Code  5
L 2  Case Studies: Shivaji, Jhasi Ki Rani  2

SOCIAL SERVICE AND COMMUNITY DEVELOPMENT
SS 1  Basics, Rural Development Programmes, NGOs, Contribution of Youth  8
SS 4  Protection of Children and Women Safety  3
SS 5  Road / Rail Travel Safety  1
SS 6  New Initiatives  2
SS 7  Cyber and Mobile Security Awareness  1

TOTAL : 30 PERIODS

CY3161 CHEMISTRY LABORATORY (Minimum of 8 experiments to be conducted)

L  T  P  C
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OBJECTIVES:
• To inculcate experimental skills to test basic understanding of water quality parameters, such as, alkalinity, hardness, DO, chloride and copper.
• To induce the students to familiarize with electroanalytical techniques such as, pHmetry, potentiometry and conductometry in the determination of impurities in aqueous solutions.
• To estimate the corrosion resistance of metals by weight loss method and molecular weight of polymer by viscometry.

LIST OF EXPERIMENTS:
1. Estimation of HCl using Na₂CO₃ as primary standard
2. Determination of alkalinity in water sample.
3. Determination of hardness of water by EDTA method.
4. Determination of DO content of water sample by Winkler’s method.
5. Determination of chloride content of water sample by Argentometric method.
6. Estimation of copper content of the given solution by iodometry.
7. Determination of strength of given hydrochloric acid using pH meter.
8. Determination of strength of acids in a mixture of acids using conductivity meter.
9. Estimation of iron content of the given solution using potentiometer.
10. Estimation of iron content of the water sample using spectrophotometer (1, 10-Phenanthroline/thiocyanate method).
11. Estimation of sodium and potassium present in water using flame photometer.
13. Determination of Glass transition temperature of a polymer
14. Phase change in a solid.
15. Corrosion experiment-weight loss method.

TOTAL: 30 PERIODS

OUTCOMES:
After completion of the laboratory course, the student will be able to –
CO1: analyse the water quality parameters for domestic and industrial purposes.
CO2: determine the amount of metal ions by spectroscopic techniques
CO3: select a suitable polymer for industrial applications.
CO4: quantitatively analyse the impurities in solution by electroanalytical techniques.
CO5: predict the choice of metals for industrial purposes using corrosion studies.

TEXTBOOKS:

CO - PO Mapping

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GE3161 ENGINEERING PRACTICES LABORATORY
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COURSE OBJECTIVE:
To provide exposure to the students with hands-on experience on various Basic Engineering Practices in Civil, Mechanical, Electrical and Electronics Engineering.

GROUP – A (CIVIL & ELECTRICAL)

1. CIVIL ENGINEERING PRACTICES

PLUMBING:
Basic pipe connections involving the fittings like valves, taps, coupling, unions, reducers, elbows and other components used in household fittings. Preparation of plumbing line sketches.
   a) Laying pipe connection to the suction side of a pump
   b) Laying pipe connection to the delivery side of a pump.
   c) Practice in connecting pipes of different materials: Metal, plastic and flexible pipes used in household appliances.

WOOD WORK:
Sawing, planing and making joints like T-Joint, Mortise and Tenon joint and Dovetail joint.

STUDY EXCERISES
   a) Study of joints in door panels and wooden furniture
b) Study of common industrial trusses using models.

2. ELECTRICAL ENGINEERING PRACTICES
   15
   a) Basic household wiring using Switches, Fuse, Indicator and Lamp etc.,
   b) Stair case light wiring
   c) Tube – light wiring
   d) Preparation of wiring diagrams for a given situation.
   e) Study of Iron-Box, Fan Regulator and Emergency Lamp

GROUP – B (MECHANICAL AND ELECTRONICS)

3. MECHANICAL ENGINEERING PRACTICES
   15
   WELDING
   a) Arc welding of Butt Joints, Lap Joints, and Tee Joints
   b) Gas welding demonstration.
   c) Basic Machining - Simple turning, drilling and tapping operations.
   d) Study and assembling of the following: Centrifugal pump, Mixer, Air-conditioner

SHEET METAL PRACTICE: Making of a square tray

DEMONSTRATION ON FOUNDRY OPERATIONS.

4. ELECTRONIC ENGINEERING PRACTICES
   15
   a) Soldering simple electronic circuits and checking continuity.
   b) Assembling electronic components on a small PCB and Testing.
   c) Study of Telephone, FM radio and Low Voltage Power supplies.

TOTAL: 60 PERIODS

COURSE OUTCOMES:
CO1. Ability to make common joints in carpentry and pipe connections with fittings used in plumbing works.
CO2. Ability to do electrical wiring for household applications.
CO3. Ability to weld the steel the structures and soldering of electronical connections and testing of PCBs

CO-PO & PSO MAPPING

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1’ = Low; ‘2’ = Medium; ‘3’ = High
OBJECTIVES

- To comprehend visual material and transcode it into a verbal content using appropriate register and communicate it precisely.
- To identify varied group discussion skills and apply them to take part in effective discussions in professional context.
- To use language effectively in a formal presentation.

UNIT I  INTERVIEW IN SOCIAL CONTEXT  
Asking questions and answering - Conducting an interview (of an achiever / survivor) – Role play

UNIT II  PERSUASIVE SKILLS
Speaking about specifications of a product (Eg. Home appliances) – Persuasive Talk – Role play activity.

UNIT III  CASE STUDY
Discussions on Case Study to find solution for problems in professional context.

UNIT IV  VISUAL INTERPRETATION
Describing a visual content (Pictures/Table/Chart) using appropriate descriptive language and making appropriate inferences.

UNIT V  PRESENTATION
Making presentation with a visual component (ppt) (job interview / project / Innovative product presentation)

TOTAL = 30 PERIODS

Assessment
Internals – 100%
- Picture / Graphical description and Interpretation
- Formal Presentation with visual tool (like PPT)

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

CO1: Comprehend and transcode visual content appropriately.
CO2: Participate effectively in formal group discussions.
CO3: Make presentation on a given topic in a formal context.

CO-PO & PSO MAPPING

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