VISION:
To be a leader in textile and apparel technology education, research and innovation to benefit the society.

MISSION:
The mission of the Department of Textile Technology, Anna University is

- To maintain and upgrade the ambience that expands the frontiers of knowledge in textile, apparel and technical textiles.
- To develop the highest quality textile and apparel technologists with societal values.
- To carry out cutting-edge research and develop innovative technology for the benefit of society.
PROGRAM EDUCATIONAL OBJECTIVES (PEOs)
Bachelor of Textile Technology curriculum is designed to prepare the undergraduates to
I. Have appropriate knowledge, skill and attitude for the successful professional career with ethical values.
II. Have strong foundation in basic sciences, engineering, mathematics, computational knowledge and in-depth knowledge in textile technology to pursue higher studies and research.
III. Foster critical thinking, creativity and collaborative skill to embark on innovation and entrepreneurship.

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)**

The Textile Technology Graduates will have the ability to

1. Apply the technical knowledge to optimize and control textile manufacturing process.
2. Lead the textile and allied industries.
3. Evaluate and develop new textile materials, products & processes.

**Mapping of Programme Educational Objective with Programme Outcomes**

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### SEMESTER I

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§ Skill Based Course

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#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  9
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  9
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  9
Listening – Conversation, Radio/TV advertisement; Reading – A tourist brochure and planning an itinerary, descriptive article / excerpt from literature; Writing – Definitions, Descriptive writing, Checklists; Grammar – Future tense, Perfect tenses, Preposition; Vocabulary – Adjectives and Adverbs

UNIT IV  CLASSIFICATION  9
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  9
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.

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

TOTAL : 45 PERIODS

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

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MA3151 MATRICES AND CALCULUS L T P C

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 FUNCTIONS OF SEVERAL VARIABLES (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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- 1' = Low; 2' = Medium; 3' = High

PH3151 ENGINEERING PHYSICS

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.
- 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: 45 PERIODS**

**COURSE OUTCOMES:**

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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- 1’ = Low; ‘2’ = Medium; ‘3’ = High
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

TOTAL: 45 PERIODS
COURSE 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.
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:
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  9
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  9

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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**TEXT BOOKS:**

**REFERENCES:**
UNIT IV 3


TEXT-CUM-REFERENCE BOOKS

1. Tamil Sangam - Bharathiya NR Prasad - Dr K.K. Pillay (Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).
2. Tamil Civilization - S. Sundararajan - Dr. K. Thirunavukkarasu (Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).
3. Tamil Language and Literature - Dr. K. K. Pillay (TNTB & ESC and RMRL).
4. Social Life of Tamils (Dr. K. K. Pillay) A joint publication of TNTB & ESC and RMRL - (in print).
5. Social Life of the Tamils - The Classical Period (Dr. S. Singaravelu) (Published by: International Institute of Tamil Studies).
6. Historical Heritage of the Tamils (Dr. S. V. Subatamanian, Dr. K. D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
7. The Contributions of the Tamils to Indian Culture (Dr. M. Valarmathi) (Published by: International Institute of Tamil Studies).
8. 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).
9. Studies in the History of India with Special Reference to Tamil Nadu (Dr. K. K. Pillay) (Published by: The Author).
10. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).
11. Journey of Civilization Indus to Vaigai (R. Balakrishnan) (Published by: RMRL) - Reference Book.

GE3154 HERITAGE OF TAMILS L T P C
1 0 0 1

UNIT I LANGUAGE AND LITERATURE

UNIT II HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE 3

UNIT III FOLK AND MARTIAL ARTS 3
Therukoothu, Karagattam, VilluPattu, Kaniyan Koothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

UNIT IV THINAICONCEPTOF TAMILS 3
Flora and Fauna of Tamils & Ahamand 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. தமிழக வரலை மக்களும் பணைப்பொடும் – கக பிளளள (தவளியீடு: தமிழ்நொடு பொடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கல்விசொறியுடன் கவியம் – பழமையான கவியம். (சிவ்வாண்டெஸ் பிரசுரம்).
3. சிறிய கதைகளிற்கான காதல் முறை சிறிய கதைகள் (தாக்னிதினீல் துளற்றவளியீடு).
4. பானையுடன் ஆர்வத்தக தாக்கைகள். (தாக்னிதினீல் வெட்டிய துளற்றவளியீடு).
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).
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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 Book and Educational Services Corporation, Tamil Nadu)
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

COURSE 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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1 - low, 2 - medium, 3 - high, '-' - no correlation
GE3161  ENGINEERING PRACTICES LABORATORY  LT PC
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GROUP – A (CIVIL & ELECTRICAL)

1. CIVIL ENGINEERING PRACTICES  15

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 EXCERSISES
   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, '-'- no correlation

GE3162 ENGLISH LABORATORY – I

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

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.

**HS3251** ENGLISH FOR COMMUNICATION – II

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**UNIT I** CAUSE AND EFFECT

**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 internshlp / Industrial visit); **Grammar** – If conditionals, Imperatives; **Vocabulary** – Cause and effect expressions, Idiom

**UNIT II** COMPARE AND CONTRAST

**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

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

**UNIT IV** REPORTING

**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

**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.

**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

**TOTAL : 45 PERIODS**

**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 to understand the Laplace transforms techniques.
- 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 in solving difference equations.

UNIT I ORDINARY DIFFERENTIAL EQUATIONS (9+3)

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:

REFERENCES:

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- 1-low, 2-medium, 3-high, ‘-‘- no correlation
COURSE OBJECTIVE

- The students will be imparted the knowledge on Boiler feed water requirements, water treatment techniques, Applications of oil and its properties, principles of different chemical analysis and students also be provided with the knowledge on important dyes and their applications, they will be taught to prepare bleaching powder, sodium hypochlorite and hydrogen peroxide for the bleaching of fabrics in industries.

UNIT I WATER TECHNOLOGY 9

UNIT II OILS, FATS, SOAPS & LUBRICANTS 9
Chemical constitution, chemical analysis of oils and fats – free acid, saponification and iodine values, definitions, determinations and significance. Soaps and detergents – cleaning action of soap. Lubricants - definition, characteristics, types and properties – viscosity, viscosity index, carbon residue, oxidation stability, flash and fire points, cloud and pour points, aniline point. Solid lubricants – graphite and molybdenum disulphide.

UNIT III CHEMICAL ANALYSIS – AN ANALYTICAL INSIGHT 9

UNIT IV DYE CHEMISTRY 9
Witt’s theory and modern theory of colors – synthesis of methyl red, methyl orange, congo red, malachite green, p-rosaniline, phenolphthalein, fluorescence, eosin dyes.

UNIT V CHEMICALS AND AUXILIARIES 9

TOTAL: 45 PERIODS

COURSE OUTCOME

After completion of this course, the student is expected to

CO1. Analyze the boiler feed water and assess the method of purification techniques.
CO2. Classify oil, fat and soap and its properties and gain the knowledge about lubricants
CO3. Understand the principles of different chemical analysis and to estimate the amount of nitrogen and aniline
CO4. Classify the dyes and to prepare various dyes used in textile industries.
CO5. Explain and prepare the chemical auxiliaries required for dyeing

TEXT BOOKS

REFERENCE BOOKS
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
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
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:

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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  4 + 12
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  6 + 12
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  6 + 12
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  6 + 12
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).

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 orthogonal 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:
GE3151

ENGINEERING MECHANICS

UNIT I
STATICS OF PARTICLES


UNIT II
EQUILIBRIUM OF RIGID BODIES AND TRUSSES

Principle of Transmissibility, Equivalent Forces, Vector Product of Two Vectors, Moment of a Force about a Point, Varignon's Theorem, Rectangular Components of the Moment of a Force, Scalar Product of Two Vectors, Mixed Triple Product of Three Vectors, Moment of a Force about an Axis, Couple - Moment of a Couple, Equivalent Couples, Addition of Couples, Resolution of a Given Force into a Force -Couple system, Further Reduction of a System of
Forces, Equilibrium in Two and Three Dimensions - Reactions at Supports and Connections – Analysis of Trusses – Method of Joints and Method of Sections.

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

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:

REFERENCES:
CO-PO & PSO MAPPING

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GE3251 தமிழ் நுட்பம்

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அலகு I  ஐத்தொழில் நுட்பம்

அலகு II வடிவளம் நுட்பம்

அலகு III உற்பத்தி நுட்பம்

அலகு IV உற்பத்தி நுட்பம்
GE3251 TAMILS AND TECHNOLOGY

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 ofSangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worshipplaces - Temples of Nayaka Period -Type study (Madurai Meenakshi Temple)- ThirumalaiNayakkarMahal -ChettiNaduHouses, Indo-Saracenicarchitecture at Madras duringBritishPeriod.
UNIT III MANUFACTURING TECHNOLOGY

UNIT IV AGRICULTURE AND IRRIGATION TECHNOLOGY
Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries - Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.

UNIT V SCIENTIFIC TAMIL & TAMIL COMPUTING

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS
1. தமிழக வரலொறு – மக்களும் பண்பொடும் – கக.கக.பிளளள (தவளியீடு: கனினியூல் பாண் மகன் கட்டுப்பாடுகள் பல்கிறங்க குப்பம்).
2. கணினியூல் கத்தியுடன் காண்புகள் (தென்னிந்தியா பிளளள).
3. ஆண்டுதிக் குளியியுறையின் சமயங்கலன் கோட்ட தாக்கினம் (தென்னிந்தியா சுருக்க தொடர்வீடு).
4. பொருளநூல் – ஆற்றங்கள் நொகரிகம் (துளறதொல்லியீடு தவளியீடு)
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 Book and Educational Services Corporation, Tamil Nadu)

NCC Credit Course Level 1*
NX3251 (ARMY WING) NCC Credit Course Level - I

NCC GENERAL
NCC 1 Aims, Objectives & Organization of NCC
NCC 2 Incentives

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TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS
1. தமிழக வரலொறு – மக்களும் பண்பொடும் – கக.கக.பிளளள (தவளியீடு: கனினியூல் பாண் மகன் கட்டுப்பாடுகள் பல்கிறங்க குப்பம்).
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4. பொருளநூல் – ஆற்றங்கள் நொகரிகம் (துளறதொல்லியீடு தவளியீடு)
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### NCC 3
- Duties of NCC Cadet  
  - Period: 1

### NCC 4
- NCC Camps: Types & Conduct  
  - Period: 2

### NATIONAL INTEGRATION AND AWARENESS

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### LEADERSHIP

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### SOCIAL SERVICE AND COMMUNITY DEVELOPMENT

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**TOTAL: 30 PERIODS**

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### NCC Credit Course Level 1*

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**TOTAL : 30 PERIODS**

### NCC Credit Course Level 1*

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<td>NX3253</td>
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### NCC GENERAL

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<tbody>
<tr>
<td>NCC 1</td>
<td>Aims, Objectives &amp; Organization of NCC</td>
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<td>NCC 2</td>
<td>Incentives</td>
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<td>NCC 3</td>
<td>Duties of NCC Cadet</td>
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<td>NCC 4</td>
<td>NCC Camps: Types &amp; Conduct</td>
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### NATIONAL INTEGRATION AND AWARENESS

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<tr>
<td>NI 1</td>
<td>National Integration: Importance &amp; Necessity</td>
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<td>NI 2</td>
<td>Factors Affecting National Integration</td>
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<td>NI 3</td>
<td>Unity in Diversity &amp; Role of NCC in Nation Building</td>
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<td>NI 4</td>
<td>Threats to National Security</td>
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### PERSONALITY DEVELOPMENT

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<tr>
<td>PD 1</td>
<td>Self-Awareness, Empathy, Critical &amp; Creative Thinking, Decision Making and Problem Solving</td>
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<td>PD 2</td>
<td>Communication Skills</td>
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<td>PD 3</td>
<td>Group Discussion: Stress &amp; Emotions</td>
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### LEADERSHIP

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<tr>
<td>L 1</td>
<td>Leadership Capsule: Traits, Indicators, Motivation, Moral Values, Honour Code</td>
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<tr>
<td>L 2</td>
<td>Case Studies: Shivaji, Jhasi Ki Rani</td>
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### SOCIAL SERVICE AND COMMUNITY DEVELOPMENT

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<tr>
<td>SS 1</td>
<td>Basics, Rural Development Programmes, NGOs, Contribution of Youth</td>
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<td>SS 4</td>
<td>Protection of Children and Women Safety</td>
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<td>SS 5</td>
<td>Road / Rail Travel Safety</td>
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<td>SS 6</td>
<td>New Initiatives</td>
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<td>SS 7</td>
<td>Cyber and Mobile Security Awareness</td>
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**TOTAL : 30 PERIODS**
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.
CO-PO & PSO MAPPING

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• 1 = Low; ‘2’ = Medium; ‘3’ = High

GE3261 ENGLISH LABORATORY – II

OBJECTIVES

- To comprehend visual material and transcode it into verbal content using appropriate register.
- 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 6
Asking questions and answering - Conducting an interview (of an achiever / survivor) – Role play

UNIT II PERSUASIVE SKILLS 6
Speaking about specifications of a product (Eg. Home appliances) – Persuasive Talk – Role play activity.

UNIT III CASE STUDY 6
Discussions on Case Study to find solutions for problems in professional contexts – Analytical discussion on various aspects of a given problem.

UNIT IV VISUAL INTERPRETATION 6
Describing visual content (Pictures/Table/Chart) using appropriate descriptive language and making appropriate inferences and giving recommendations.

UNIT V PRESENTATION 6
Making presentation with visual component (PPT slides) (job interview / project / innovative product presentation)

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

TOTAL : 30 PERIODS

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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- 1-low, 2-medium, 3-high, '-' no correlation