VISION OF THE DEPARTMENT

The vision of Anna University is to be a world class institution by producing professionals with high technical knowledge, professional skills and ethical values, and remain as a preferred partner to the industry and community for their economic and social development through excellence in teaching, research and consultancy. Anna University shall be recognized as a point of reference, a catalyst, a facilitator, a trend setter and a leader in technical education.

MISSION OF THE DEPARTMENT

a) To produce full-fledged Electrical and Electronics Engineers to cater to the needs of the modern industries and be useful for building the nation.

b) To pursue excellence in scholarly research at the frontiers of power engineering.

c) The department invokes the desire and ability of life-long learning in the students for pursuing successful career in engineering.
1. PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

| I. | Employability in Core Electrical and Electronics Engineering and other allied emerging areas |
| II. | Motivated to take up technical lead position and lead the organization competitively. |
| III. | Pursue higher studies and research |
| IV. | Act as a consultant and provide solutions to the practical problems of core organization. |
| V. | Take up entrepreneurship as career and be part of electrical and electronics product and service industries. |

2. PROGRAM OUTCOMES (POs)

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<th>PO#</th>
<th>Graduate Attribute</th>
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<td>1</td>
<td><strong>Engineering knowledge</strong>: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.</td>
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<tr>
<td>2</td>
<td><strong>Problem analysis</strong>: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.</td>
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<td>3</td>
<td><strong>Design/development of solutions</strong>: 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.</td>
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<td>4</td>
<td><strong>Conduct investigations of complex problems</strong>: 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.</td>
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<tr>
<td>5</td>
<td><strong>Modern tool usage</strong>: 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.</td>
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<td>6</td>
<td><strong>The engineer and society</strong>: 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.</td>
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<td>7</td>
<td><strong>Environment and sustainability</strong>: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.</td>
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<tr>
<td>8</td>
<td><strong>Ethics</strong>: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.</td>
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<td>9</td>
<td><strong>Individual and team work</strong>: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.</td>
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<tr>
<td>10</td>
<td><strong>Communication</strong>: 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.</td>
</tr>
<tr>
<td>11</td>
<td><strong>Project management and finance</strong>: 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.</td>
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</table>
| 12  | **Life-long learning**: Recognize the need for, and have the preparation and ability to
3. PROGRAM SPECIFIC OUTCOMES (PSOs)
After completion of B.E – EEE, the students would have,

1. The ability to understand, model, analyse, electrical circuits, equipment, Power system under steady state and transient conditions.

2. The ability to formulate and design electrical systems for sustainable energy technologies.

3. Ability for lifelong learning in electrical applications to societal problems.

4. Ability to use knowledge in various domains to identify research gaps and hence to provide solution leading to new ideas and innovations.

‘1’ = Low; ‘2’ = Medium; ‘3’ = High;
ANNA UNIVERSITY, CHENNAI
UNIVERSITY DEPARTMENTS
B.E. ELECTRICAL AND ELECTRONICS ENGINEERING
REGULATIONS - 2023
CHOICE BASED CREDIT SYSTEM
CURRICULUM AND SYLLABI FOR SEMESTERS I AND II

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$^*$Skill Based Course

$^*$ NCC Credit Course level 1 is offered for NCC students only. 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
SEMESTER I

HS3151 ENGLISH FOR COMMUNICATION - I L T P C 3 0 0 3

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

MAPPING OF COs WITH POs AND PSOs

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- 1-low, 2-medium, 3-high.
UNIT I  MATRICES  
(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  
(Limit, continuity, partial derivatives – Homogeneous functions and Euler’s theorem - Total derivative – Differentiation of implicit functions - Taylor’s formula for two variables - Errors and approximations – Maxima and Minima of functions of two variables – Lagrange’s method of undermined multipliers.

UNIT III  INTEGRAL CALCULUS  
(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  

UNIT V  VECTOR CALCULUS  
(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.

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:

**MAPPING OF COs WITH POs AND PSOs**

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- 1' = Low; '2' = Medium; '3' = High
UNIT I  MECHANICS OF MATERIALS

UNIT II  OSCILLATIONS, SOUND AND THERMAL PHYSICS

UNIT III  OPTICS AND LASERS

UNIT IV  QUANTUM MECHANICS

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:

MAPPING OF COs WITH POs AND PSOs

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- 1’ = Low; ‘2’ = Medium; ‘3’ = High
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:

REFERENCES:

MAPPING OF Cos WITH POs AND PSOs

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- ‘1’ = Low; ‘2’ = Medium; ‘3’ = High
UNIT I  

**BASICS OF C PROGRAMMING**  
6+12

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**  
6+12

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 PERIODS: 90 (30+60)

TEXT BOOKS:

REFERENCES:

MAPPING OF CoS WITH POs AND PSOs

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- 1’ = Low; ‘2’ = Medium; ‘3’ = High
UNIT I
CASTING, FORMING, AND WELDING PROCESSES  6
Sand casting, lathe machine and its parts, lathe machine operations (turning, taper turning, facing, chamfering, etc.), Drilling, forming process – Bulk Deformation (Forging, Rolling), Sheet metal operation (Blanking, punching)

UNIT II
WELDING AND ADDITIVE MANUFACTURING  6
Welding – types, Shielded Metal Arc Welding, gas welding, MIG and TIG welding, Additive manufacturing : Types and its applications

UNIT III
THERMODYNAMICS  6
Basic Terminologies related to Thermodynamics, zeroth Law, First Law of thermodynamics, Second Law of thermodynamics, Third Law of thermodynamics, Vapor compression cycle, Air Conditioner and Refrigerator

UNIT IV
IC ENGINES AND RECENT DEVELOPMENTS  6

UNIT V
POWER PLANT ENGINEERING  6
Coal based power plants- working, advantages & disadvantages, Hydro Electric power plants- working, advantages & disadvantages, nuclear power plants - Types, working, advantages & disadvantages, solar power plant- working, advantages & disadvantages, wind-based power generation- working, advantages & disadvantages

TOTAL :30 PERIODS

COURSE OUTCOMES:
CO1 Discuss the basic concepts of casting, forming, and machining processes
CO2 Explain welding, and Additive manufacturing
CO3 Discuss the basics laws and application of thermodynamics
CO4 Summarize the basics of IC engines, electric vehicles.
CO5 Explain various power generation methods

TEXTBOOKS:
4. A TEXTBOOK OF MANUFACTURING TECHNOLOGY by RK Rajput, December 2007, Panchu Publisher
5. A Text-Book of Production Technology Volume I by O.P.KHANNA, Dhanpat Rai publications

REFERENCES:
MAPPING OF CoS WITH POs AND PSOs

Each course must contain only five units with equal distribution of hours.

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TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS
1. குருது முன்஼றி – மதொல்கொப்பிய மாதானேசு பங்கு. (நோயலுங்கு பங்கு பதிவினால், பெரும் ரியோமது குன்றின்)
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3. குருது முன்஼றிகாலின் சுருக்கங்கள் (நோயலுங்கு பதிவினால், பெரும் ரியோமது குன்றின்)
4. பங்கு பங்கு – முன்ஸியரின் பதிவு. (நோயலுங்கு பதிவினால், பெரும் ரியோமது குன்றின்)
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)


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

UNIT I LANGUAGE AND LITERATURE 3

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

UNIT III FOLK AND MARTIAL ARTS 3

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. தமிழக வரலை – நகரப்பு மகாவரலை – மகாவரலை (மவளியுள்: தமிழ்நொடு பொடநூல்) சக்கரவாரது பூர்வத்தில் பதிக்மு கும்பதியான்.
2. கணினித் தமிழ் – முமனவர் இல.சுந்தர (விகடன் பிரசுர).
3. கீழடி – மவமக நதிக்கமரில் எங்ககொல நகர நொகரியுள் (மதொல்லியல் துமற
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).
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9. Studies in the History of India with Special Reference to Tamil Nadu (Dr. K. K. Pillay) (Publishedby: The Author)
10. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
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.
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
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.

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• 1-low, 2-medium, 3-high
UNIT I  SELF-INTRODUCTION  6
Introducing oneself; Telephone conversation, Relaying telephone message – Role play

UNIT II  NARRATION  6
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  6
Making conversation – formal and informal – Turn taking and Turn giving – Small talk

UNIT IV  SHORT SPEECH  6
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  6
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,
SEMESTER II

HS3251 ENGLISH FOR COMMUNICATION – II L T P C 3 0 0 3

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 Picture description; 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.

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](http://www.uefap.com)

**MAPPING OF Cos WITH POs AND PSOs**

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- 1-low, 2-medium, 3-high
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)

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:

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PH3251
PHYSICS FOR ELECTRICAL SCIENCES
UNIT I
ELECTRICAL PROPERTIES OF MATERIALS

UNIT II
SEMICONDUCTORS AND TRANSPORT PHYSICS

UNIT III
DIELECTRIC AND MAGNETIC PROPERTIES OF MATERIALS

UNIT IV
OPTICAL PROPERTIES OF MATERIALS

UNIT V
NANODEVICES
conductance – Carbon nanotubes: Properties and applications

Transporters – Spintronic devices and application.

TOTAL: 45 PERIODS

COURSE OUTCOMES:
After completing the above subject, students will have

CO1: Knowledge of the electrical properties of materials
CO2: Acquire an adequate understanding of semiconductor physics and the functioning of semiconductor devices
CO3: Come to have firm knowledge of the dielectric and magnetic properties of materials and their applications
CO4: Understand the optical properties of materials and working principles of various optical devices
CO5: Appreciate the importance of nanotechnology, the physics of nanodevices, low-dimensional structures and their applications

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GE3151  ENGINEERING MECHANICS  LT P C  3 1 0 4

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.

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GE3155 ENGINEERING DRAWING

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 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).

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:
Special points applicable to University Examinations on Engineering Drawing:
1. There will be five questions, each of either or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets only in the size of A3.
4. The students will be permitted to use appropriate scale to fit the solution within A3 size.
5. The examination will be conducted in appropriate sessions on the same day.

Publication of Bureau of Indian Standards:

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UNIT I  CIVIL ENGINEERING MATERIALS
Traditional materials - Stone, timber, brick, lime, cement - Mortars - Concrete - Metals - Bitumen - Paints - Tiles.

UNIT II  BUILDING CONSTRUCTION
Building elements - Planning - Types of buildings - Super structure - Substructure - Damp proofing.

UNIT III  SURVEYING
Principles of surveying - Classification of surveying - Chain surveying - Compass surveying - Levelling - Theodolite - Total station - GIS - Remote sensing.

UNIT IV  WATER SUPPLY AND SANITATION
Water supply engineering: Sources of water - Quality of water - Treatment.
Sanitary Engineering: Sewage - Sewage disposal - Septic tank - Treatment - Solid waste management.

UNIT V  DISASTER MANAGEMENT
Types of disaster - Earthquake - Wind - Cyclone - Flood - Fire - Precautions to be taken - Disaster management and planning.

TOTAL: 30 PERIODS

COURSE OUTCOMES:
On completion of this course, the student is expected to be able to:

CO1  Identify the civil engineering materials for construction
CO2  Gain knowledge on construction of buildings
CO3  Acquire basic knowledge on various types of surveying
CO4  Get familiarized with the importance of water supply and sanitary engineering
CO5  Gain awareness on various natural disasters and their mitigation

TEXTBOOKS:

REFERENCES:
MAPPING OF Cos WITH POs AND PSOs

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32
TEXT-CUM-REFERENCE BOOKS

1. Classical Tamil Life - Dr. K.K. Pillay (Indian Institute of Tamil Studies)
2. Social Life of Tamils (Dr. K.K. Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
3. Social Life of the Tamils – The Classical Period (Dr. S. Singaravelu) (Published by: International Institute of Tamil Studies)
4. Historical Heritage of the Tamils (Dr. S.V. Subatamanian, Dr. K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies)
5. The Contributions of the Tamils to Indian Culture (Dr. M. Valarmathi) (Published by: International Institute of Tamil Studies)
6. Keeladi – ‘Sangam City Civilization on the banks of river Vaigai’ (Jointly Published by: Indian Institute of Tamil Studies & Tamil Nadu Tourism Board)

TOTAL: 15 PERIODS
GE3251  TAMILS AND TECHNOLOGY  LT P C  1 0 0 1  

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  

UNIT III  MANUFACTURING TECHNOLOGY  3  

UNIT IV  AGRICULTURE AND IRRIGATION TECHNOLOGY  3  

UNIT V  SCIENTIFIC TAMIL & TAMIL COMPUTING  3  

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS
2. குடியரசு குடியரசு – பராயன் திகழ்வுக் கருத்துரு (தமிழ்பொட்டிகள் குடியரசு குடியரசு).
3. நூல் – குறுநூல் பரவலாக்கழகம் தவற்கழகம் தவற்கழகம் (தமிழ்ப்பின் தகுநூல் பரவலாக்கழகம்).
4. பரப்பலுரு – பரப்பலுரு தவற்கழகம் (தமிழ்ப்பின் தகுப்பற்றுரு).
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
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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,
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*  

**LT P C 2002**

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**TOTAL : 30 PERIODS**
NCC Credit Course Level 1

NX3252  (NAVAL WING)  NCC Credit Course Level - I  LT P C  2002

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

NATIONAL INTEGRATION AND AWARENESS
NI 1  National Integration: Importance & Necessity  1
NI 2  Factors Affecting National Integration  1
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  2
PD 2  Communication Skills  3
PD 3  Group Discussion: Stress & Emotions  2

LEADERSHIP
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
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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2002

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**TOTAL : 30 PERIODS**
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 EXCERSISES
a) Study of joints in door panels and wooden furniture
b) Study of common industrial trusses using models.

2. ELECTRICAL ENGINEERING PRACTICES

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

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

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 structures and soldering of electronic connections and testing of PCBs

MAPPING OF Cos WITH POs AND PSOs

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* 1-low, 2-medium, 3-high
LIST OF EXPERIMENTS:
1. Estimation of HCl using Na_2CO_3 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:

MAPPING OF COs WITH POs AND PSOs

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• 1-low, 2-medium, 3-high
UNIT I INTERVIEW IN SOCIAL CONTEXT  6
Asking questions and answering - Conducting an interview (of an achiever / survivor) – Role play activity.

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.

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• 1-low, 2-medium, 3-high