OUR VISION:

Department of Civil Engineering, Anna University, shall strive hard to develop and impart technical knowledge and professional skills required for Civil Engineering and Geoinformatics Engineering practice through excellence in teaching, research and consultancy to address sustainable infrastructure development needs at local, national and international levels.

OUR MISSION:

Department of Civil Engineering, Anna University shall contribute to technological and social development by
1. Providing a firm scientific and technological base in Civil Engineering and Geoinformatics Engineering to achieve self-reliance.
2. Providing quality education through innovation in teaching practices at par with global standards.
3. Nurturing leadership and entrepreneurship qualities with ethical values.
4. Developing and disseminating latest knowledge and technologies in emerging areas of Civil Engineering and Geoinformatics Engineering
5. Sharing intellectual resources and infrastructure facilities through collaborative partnership.
6. Ensuring supporting conditions for enhancing the employability skills.
ANNA UNIVERSITY, CHENNAI
UNIVERSITY DEPARTMENTS
REGULATIONS - 2023
CHOICE BASED CREDIT SYSTEM
B.E. CIVIL ENGINEERING (FULL-TIME)

1. PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

Graduates of the programme B.E. Civil Engineering will:

PEO1  Gain knowledge and skills in Civil Engineering which will enable them to have a career and professional accomplishment in the public or private sector organizations.

PEO2  Become consultants on complex real-life Civil Engineering problems related to infrastructure development especially housing, construction, water supply, sewerage, transport and spatial planning.

PEO3  Become entrepreneurs and develop processes and technologies to meet desired infrastructure needs of society and formulate solutions that are technically sound, economically feasible and socially acceptable.

PEO4  Perform investigation for solving Civil Engineering problems by conducting research using modern equipment and software tools.

PEO5  Function in multi-disciplinary teams and advocate policies, systems, processes and equipment to support Civil Engineering.

2. PROGRAMME OUTCOMES (POs):

Graduates of the programme B. E. Civil Engineering will be able to:

PO1  Engineering knowledge  Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2  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.

PO3  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.

PO4  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.

PO5  Modern tool usage  Create, select, and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6  Engineer and Society  Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to Civil Engineering Practice.

PO7  Environment and Sustainability  Understand the Socio economic impact of Civil Engineering solutions for sustainable development.
PO8 Ethics Understand the commitment to professional ethics and responsibilities of Civil Engineers and to contribute to the comprehensive societal development

PO9 Individual and Team work Function effectively as on individual and as member or leader in diverse teams and in multi-disciplinary settings and demonstrating a capacity for self-management and teamwork, decision-making based on open-mindedness, objectivity and rational analysis.

PO10 Communication Communicate effectively with the engineering community and also with society at large, and write reports and make effective presentations.

PO11 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.

PO12 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.

3. PROGRAMME SPECIFIC OUTCOMES (PSOs):

Graduates of the programme B.E. Civil Engineering will be able to:

PSO1 Knowledge of civil engineering discipline Demonstrate in-depth knowledge of Civil Engineering discipline, with an ability to evaluate, analyze and synthesize existing and new knowledge.

PSO2 Critical analysis of civil engineering problems and innovation Critically analyze complex Civil Engineering problems, apply independent judgment for synthesizing information and make innovative advances in a theoretical, practical and policy context.

PSO3 Conceptualization and evaluation of engineering solutions to civil engineering issues Conceptualize and solve Civil Engineering problems, evaluate potential solutions and arrive at technically feasible, economically viable and environmentally sound solutions with due consideration of health, safety, and socio-cultural factors.

PEO / PO & PSO MAPPING:

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1’ = Low; ‘2’ = Medium; ‘3’ = High
### ANNA UNIVERSITY, CHENNAI
### UNIVERSITY DEPARTMENTS
### B.E. CIVIL ENGINEERING (ENGLISH AND TAMIL MEDIUM)
### REGULATIONS - 2023
### CHOICE BASED CREDIT SYSTEM
### CURRICULUM AND SYLLABI FOR SEMESTERS I AND II

#### SEMESTER I

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**TOTAL** 18  1  12  31  25

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#### SEMESTER II

**Skill Based Course**

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**TOTAL** 12  2  8  22  18

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# 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.

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<tbody>
<tr>
<td>I</td>
<td>BASICS OF COMMUNICATION</td>
<td><strong>Listening</strong> – Telephone conversation &amp; Writing message, gap filling; <strong>Reading</strong> – Telephone message, bio-note; <strong>Writing</strong> – Personal profile; <strong>Grammar</strong> – Simple present tense, Present continuous tense, Asking questions (wh-questions); <strong>Vocabulary</strong> – One word substitution, Synonyms</td>
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<td>II</td>
<td>NARRATION</td>
<td><strong>Listening</strong> – Travel podcast / Watching a travel documentary; <strong>Reading</strong> – An excerpt from a travelogue, Newspaper Report; <strong>Writing</strong> – Narrative (Event, personal experience etc.); <strong>Grammar</strong> – Subject – verb agreement, Simple past, Past continuous Tenses; <strong>Vocabulary</strong> – Antonyms, Word formation (Prefix and Suffix).</td>
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<td>III</td>
<td>DESCRIPTION</td>
<td><strong>Listening</strong> – Conversation, Radio/TV advertisement; <strong>Reading</strong> – A tourist brochure and planning an itinerary, descriptive article / excerpt from literature; <strong>Writing</strong> – Definitions, Descriptive writing, Checklists; <strong>Grammar</strong> – Future tense, Perfect tenses, Preposition; <strong>Vocabulary</strong> – Adjectives and Adverbs</td>
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<tr>
<td>IV</td>
<td>CLASSIFICATION</td>
<td><strong>Listening</strong> – Announcements and filling a table; <strong>Reading</strong> – An article, social media posts and classifying (channel conversion – text to table); <strong>Writing</strong> – Note making, Note taking and Summarising, a classification paragraph; <strong>Grammar</strong> – Connectives, Transition words; <strong>Vocabulary</strong> – Contextual vocabulary, Words used both as noun and verb, Classification related words.</td>
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<tr>
<td>V</td>
<td>EXPRESSION OF VIEWS</td>
<td><strong>Listening</strong> – Debate / Discussion; <strong>Reading</strong> – Formal letters, Letters to Editor, Opinion articles / Blogs; <strong>Writing</strong> – Letter writing/ Email writing (Enquiry / Permission, Letter to Editor); <strong>Grammar</strong> – Question tags, Indirect questions, Yes / No questions; <strong>Vocabulary</strong> – Compound words, Phrasal verbs.</td>
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**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

CO-PO & PSO MAPPING

<table>
<thead>
<tr>
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1-low, 2-medium, 3-high

MA3151 MATRICES AND CALCULUS

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-

UNIT IV MULTIPLE INTEGRALS
Double integrals – Change of order of integration – Double integrals in polar coordinates – Area
enclosed by plane curves – Triple integrals – Volume of Solids – Change of variables in double and
triple 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.

TOTAL: 60 PERIODS

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

REFERENCES:

CO-PO Mapping

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PH3151  ENGINEERING PHYSICS  L T P C
3         0     0     3

UNIT I  MECHANICS OF MATERIALS  9

UNIT II  OSCILLATIONS, SOUND AND THERMAL PHYSICS  9
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:

CO-PO & PSO MAPPING

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UNIT I POLYMER CHEMISTRY
Engineering Plastics: Polyamides, Polycarbonates and Polyurethanes. Compounding and Fabrication Techniques: Injection, Extrusion, Blow and Calendaring

UNIT II NANO CHEMISTRY

UNIT III CORROSION SCIENCE

UNIT IV ENERGY SOURCES
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

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:

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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
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).

TOTAL : 90 PERIODS

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

TEXTBOOKS:

REFERENCES:

Publication of Bureau of Indian Standards:

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UNIT I  BASIC ELECTRICAL CIRCUITS
DC Circuits: Sources, Ohm’s Law - Kirchhoff’s Laws – Solution of DC circuits with Independent sources only (Steady state)

UNIT II  AC AND DC MACHINES
Magnetic Circuits fundamentals – DC Machines: Construction, Working Principle, Types and Applications of DC Generator and Motor, EMF and Torque equation.

UNIT III  ANALOG AND DIGITAL ELECTRONICS
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 TRANSUDCERS
Solenoids, electro-pneumatic systems, proximity sensors, limit switches, piezoelectric, hall effect, photo sensors, Strain gauge, LVDT, piezo electric crystals, differential pressure transducer, optical and digital transducers, Smart sensors, Thermal Imagers.

UNIT V  MEASUREMENTS AND INSTRUMENTATION

COURSE OUTCOMES
Upon successful completion of the course, students should be able to:
CO1: Compute the electric circuit parameters for simple problems.
CO2: Explain the working principles and characteristics of electrical machines, electronic devices and measuring instruments.
CO3: Identify general applications of electrical machines, electronic devices and measuring instruments.
CO4: Analyze the basic electrical and electronic circuits.
CO5: Explain the types and operating principles of sensors and transducers.

TEXT BOOKS:

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GE3154  தமிழ் மரப்  

அலகு I  பற்ருவ மரபு நிலைப்படி:  

அலகு II  பற்று - பாரு நிலைப்படி மரபு தன்னு சிலங்களாக அலகு III  தானத்துறை மரபு நிலைப்படி:  

அலகு IV  தொன்று சில குறிப்பிட்டும் நிலைப்படி:  

10001
TEXT-CUM-REFERENCE BOOKS

1. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
2. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
3. 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)
4. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
5. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)

UNIT I

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

UNIT III
FOLK AND MARTIAL ARTS
Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.
UNIT IV  THINAI CONCEPT OF TAMILS

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

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

2. கள்ளிலிகள் குப்பை – புரட்சியில் இளை குறுக்கும். (சின்னார் புருங்கும்).
3. சிரது – கோவால் விரித்தித்துடன் கச்சக் குருக்கியம் (தமிழ்நொடு தவளியீடு).
4. பருந்து – கல்லூரியில் தாக்குதல். (தமிழ்நொடு 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: National Institute of Tamil Studies).
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: National Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: National 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) (Publishedby: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bookand Educational Services Corporation, Tamil Nadu)

GE3161  ENGINEERING PRACTICES LABORATORY  L T P C
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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

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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.

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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  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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HS3251  ENGLISH FOR COMMUNICATION – II  L T P C
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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

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](http://www.uefap.com)
CO-PO & PSO MAPPING

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MA3251 ORDINARY DIFFERENTIAL EQUATIONS AND TRANSFORM TECHNIQUES

UNIT I ORDINARY DIFFERENTIAL EQUATIONS
Homogeneous linear ordinary differential equations of second order, linearity principle, general
solution- Particular integral - Operator method - Solution by variation of parameters - Method of
undetermined coefficients - Homogenous equations of Euler–Cauchy and Legendre’s type – System
of simultaneous linear differential equations with constant coefficients.

UNIT II LAPLACE TRANSFORMS
Existence theorem - Transform of standard functions – Transform of Unit step function and Dirac
delta function – Basic properties - Shifting theorems - Transforms of derivatives and integrals –
Transform of periodic functions - Initial and Final value theorem - Inverse Laplace - Convolution
theorem (without proof) – Solving Initial value problems by using Laplace Transform techniques.

UNIT III FOURIER SERIES
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
Fourier integral theorem – Fourier transform pair - Fourier sine and cosine transforms – Properties
– Transform of elementary functions - Convolution theorem (without proof) – Parsevals’s identity.

UNIT V Z – TRANSFORM AND DIFFERENCE EQUATIONS
Z-transform – Elementary properties – Inverse Z-transform – Convolution theorem – Initial and final
value theorems – Formation of difference equation – Solution of difference equation using Z -
transform.

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:
2017.
REFERENCES:

CO-PO MAPPING

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GE3153 PROGRAMMING IN C

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
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

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
GE3151 ENGINEERING MECHANICS

UNIT I STATICS OF PARTICLES 9+3

UNIT II EQUILIBRIUM OF RIGID BODIES AND TRUSSES 9+3

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

UNIT IV FRICTION AND WORK PRINCIPLES 9+3

UNIT V DYNAMICS OF PARTICLES AND RIGID BODIES 9+3

TOTAL : 60 PERIODS
COURSE OUTCOMES: Upon completion of this course, the students will be able to:

CO1 To determine the resultant forces acting on a particle in 2D and 3D and to apply methods of equilibrium on a particle in 2D and 3D.

CO2 Evaluate the reaction forces for bodies under equilibrium, to determine moment of a force, moment of a couple, to resolve force into a force-couple system and to analyze trusses.

CO3 Assess the centroids of 2D sections / center of gravity of volumes and to calculate area moments of inertia for the sections and mass moment of inertia of solids.

CO4 Evaluate the frictional forces acting at the contact surfaces of various engineering systems and apply the work-energy principles on a particle. Evaluate the kinetic and kinematic parameters of a particle.

CO5 Determine kinetic and kinematic parameters of the rigid bodies subjected to concurrent coplanar forces.

TEXTBOOKS:

REFERENCES:

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NCC Credit Course Level 1*

NX3251 (ARMY WING) NCC Credit Course Level - I

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NATIONAL INTEGRATION AND AWARENESS

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PERSONALITY DEVELOPMENT

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<td>PD 2 Communication Skills</td>
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<td>PD 3 Group Discussion: Stress &amp; Emotions</td>
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LEADERSHIP

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<td>L 2 Case Studies: Shivaji, Jhasi Ki Rani</td>
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SOCIAL SERVICE AND COMMUNITY DEVELOPMENT

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<td>SS 4 Protection of Children and Women Safety</td>
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<td>SS 5 Road / Rail Travel Safety</td>
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<td>SS 6 New Initiatives</td>
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<td>SS 7 Cyber and Mobile Security Awareness</td>
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TOTAL: 30 PERIODS

NCC Credit Course Level 1*

NX3252 (NAVAL WING) NCC Credit Course Level - I

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NATIONAL INTEGRATION AND AWARENESS

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

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

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

TOTAL : 30 PERIODS

NCC Credit Course Level 1*

NX3253  (AIR FORCE WING) NCC Credit Course Level - I  L  T  P  C
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NCC GENERAL 6
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 4
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 7
PD 1  Self-Awareness, Empathy, Critical & Creative Thinking, Decision Making and Problem Solving 2
PD 2  Communication Skills 3
PD 3  Group Discussion: Stress & Emotions 2

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

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

TOTAL : 30 PERIODS
TEXT-CUM-REFERENCE BOOKS

1. தமிழ் வரலைசு மற்றும் பணங்கள் (தமிழ்நூல் பொடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).

2. கொழும்பு கவலை – பணங்களின் கல் குறிப்பிட்டும் (கிலை பிரச்சனை).

3. மீனவியல் கவலைப்பின் காண்கூடக் குறிப்பிட்டும் (தமிழில் குறிப்பிட்டும்).

4. தமிழ்வகுத்து – அரங்குரை மற்றும் உரையிலான (தமிழில் பிரச்சனை).

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)
12. Journey of Civilization Indus to Vaigai (R. Balakrishnan) (Published by: RMRL – Reference Book.)

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

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
1. தமிழக வரலொறு – மக்களும் பண் பொடும் – மக.மக.பிள்மள (தவளியீடு:தமிழ்நொடு பொடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. மாணவர் கையடி – புனையனித் தை.தேவகைய (விகடன் பிரசுரம்).
3. சுந்தரம் கையடி – கீழடி மாணவர் புனையனித் தேவகைய (தவளியீடு:தமிழ்நொடு பொடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)
4. மாணவர் – அம்கூரியாக நங்கள் புனையனித் தேவகைய (தவளியீடு:தமிழ்நொடு பொடநூல் மற்றும் கல்வியியல் பணிகள்)
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11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)

PH3161

PHYSICS LABORATORY

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
19. Hall effect determination of Hall parameters.
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*

GE3261 ENGLISH LABORATORY – II L T P C 0 0 2 1

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.

CO-PO & PSO MAPPING

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