VISION
To develop educational avenues for the students to emerge as disciplined researchers, technocrats and entrepreneurs making transformative impact on establishing a world class society in the domain of Production Engineering and Automation.

MISSION
1. To impart students with knowledge on modern manufacturing and automated systems by incorporating critical thinking, leadership qualities, communication with interpersonal skills.
2. To create a conducive environment for exchange of multidisciplinary ideas towards research, creativity, innovation and entrepreneurship to meet the societal needs with optimal solutions.
3. To follow the values of integrity and honesty through curricular, co-curricular and extracurricular activities.

PROGRAMME EDUCATIONAL OBJECTIVES
1. Demonstrate the competency in the field of Robotics and Automation serve the technological needs of Industry and Society.
2. Exhibit leadership, team skills and entrepreneurship skills to provide optimal solutions to real world problems
3. Continuously uplift the knowledge, skills, attitude, self-learning, and to practice the ethical values and protect the eco systems.

PROGRAMME OUTCOMES
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.

**PROGRAMME SPECIFIC OUTCOMES**

**PSO1:** Graduates shall capable to design and develop robot and automation system by applying fundamentals of mechanics of materials and machines, thermal, mechatronics and production engineering.

**PSO2:** Graduates shall capable to opt appropriate sensor technologies, control systems, electrical and electronic circuits, drives and actuators for the Robotics and automation applications in various field.

**PSO3:** Graduates shall demonstrate competency on multidisciplinary integration in developing robot and automation system with intelligence.
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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
ENGLISH FOR COMMUNICATION – I

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

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

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

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

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

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

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4
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

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:
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PH3151

ENGINEERING PHYSICS

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:

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CY3151 ENGINEERING CHEMISTRY

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

UNIT II NANOCHEMISTRY

UNIT III CORROSION SCIENCE
Electrochemical cell, redox reaction, electrode potential - oxidation and reduction potential. Measurement and its application Introduction to corrosion - chemical and electrochemical corrosions-mechanism of electrochemical and galvanic corrosions-concentration cell corrosion-passivity-soil, pitting, inter-granular, water line, stress and microbiological corrosions-galvanic series-factors influencing corrosion-measurement of corrosion rate. Corrosion control-material selection and design-electrochemical protection- sacrificial anodic protection and impressed current cathodic

**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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1' = Low; '2' = Medium; '3' = High
COURSE OBJECTIVES: The main learning objective of this course is to prepare the students for:

1. determining the resultant forces acting on a particle in 2D and 3D and for applying methods of equilibrium on a particle in 2D and 3D.
2. evaluating the reaction forces for bodies under equilibrium, for determining the moment of a force, moment of a couple, for resolving force into a force-couple system and for analyzing trusses.
3. assessing the centroids of 2D sections / center of gravity of volumes and for calculating area moments of inertia for the sections and mass moment of inertia of solids.
4. evaluating the frictional forces acting at the contact surfaces of various engineering systems and for applying the work-energy principles on a particle.
5. determining kinetic and kinematic parameters of the rigid bodies subjected to concurrent coplanar forces.

UNIT I  STATICS OF PARTICLES  9+3

UNIT II  EQUILIBRIUM OF RIGID BODIES AND TRUSSES  9+3

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

UNIT IV  FRICTION AND WORK PRINCIPLES  9+3

UNIT V  DYNAMICS OF PARTICLES AND RIGID BODIES  9+3

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

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

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

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

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

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

TEXTBOOKS:

REFERENCES:

CO-PO & PSO MAPPING

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1-low, 2-medium, 3-high
COURSE OBJECTIVE:
The learning objectives of this course is to develop in students, the engineering graphic skills for communication of concepts, ideas and design of engineering products and expose them to existing national standards related to technical drawings.

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

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

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

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

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

UNIT V  ISOMETRIC AND PERSPECTIVE PROJECTIONS
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:

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.

CO-PO & PSO MAPPING

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1-low, 2-medium, 3-high
TEXT-CUM-REFERENCE BOOKS

1. Social Life of the Tamils (Dr. S. S. Singhavelu) (Published by: International Institute of Tamil Studies.)
2. Social Life of the Tamils: The Classical Period (Dr. S. Jeyakumar) (Published by: International Institute of Tamil Studies.)
3. Social Life of the Tamils (Dr. K. K. Pillay) (Published by: TNTB & ESC and RMRL) (in print)
4. Historical Heritage of the Tamils (Dr. S. V. Subatamanian, Dr. K. D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies.)

TOTAL: 15 PERIODS
GE3154

HERITAGE OF TAMILS

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UNIT I

LANGUAGE AND LITERATURE


UNIT II

HERITAGE - ROCK ART PAINTINGS TO MODERN ART - SCULPTURE


UNIT III

FOLK AND MARTIAL ARTS

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

UNIT IV

THINAI CONCEPT OF TAMILS

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

1. கல்வியுடன் வருவது - மாத்திரம் பல்வேனம் - 1993. பிரிவை (வெளியில்: கல்வியுடன் வருவது - மாத்திரம் பல்வேனம்),
2. கல்வியுடன் வருவது - மாத்திரம் பல்வேனம். (வெளியில் பிரிவை).
3. கல்வியுடன் வருவது - மாத்திரம் பல்வேனம் - முன்வையும் பல்வேனம் (வெளியில் பிரிவை).
4. கல்வியுடன் - மாத்திரம் பல்வேனம். (வெளியில் பிரிவை).
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.Sigaravelu) (Published by: International Institute of Tamil Studies).
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukarasu) (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: International Institute of Tamil Studies).
GE3161  ENGINEERING PRACTICES LABORATORY

COURSE OBJECTIVE:
To provide exposure to the students with hands on experience on various basic engineering practices in civil, mechanical, electrical and electronics engineering.

GROUP – A (CIVIL & ELECTRICAL)

PART I  CIVIL ENGINEERING PRACTICES  15

PLUMBING WORK:
a) Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers, elbows and other components which are commonly used in household.
b) Preparing plumbing line sketches.
c) Laying pipe connection to the suction side of a pump
d) Laying pipe connection to the delivery side of a pump.
e) Connecting pipes of different materials: Metal, plastic and flexible pipes used in household appliances.

WOOD WORK:
a) Sawing,
b) Planing and
c) Making joints like T-Joint, Mortise joint and Tenon joint and Dovetail joint.

Wood Work Study:
a) Studying joints in door panels and wooden furniture
b) Studying common industrial trusses using models.

PART II  ELECTRICAL ENGINEERING PRACTICES  15

WIRING WORK:
a) Wiring Switches, Fuse, Indicator and Lamp etc. such as in basic household,
b) Wiring Stair case light.
c) Wiring tube – light.
d) Preparing wiring diagrams for a given situation.

Wiring Study:
a) Studying an Iron-Box wiring.
b) Studying a Fan Regulator wiring.
c) Studying an Emergency Lamp wiring.

GROUP – B (MECHANICAL AND ELECTRONICS)

PART III  MECHANICAL ENGINEERING PRACTICES  15

WELDING WORK:
a) Welding of Butt Joints, Lap Joints, and Tee Joints using arc welding.
b) Demonstration of gas welding.

**BASIC MACHINING WORK:**

a) (simple) Turning.
b) (simple) Drilling.
c) (simple) Tapping.

**ASSEMBLY WORK:**

a) Assembling a centrifugal pump.
b) Assembling a household mixer.
c) Assembling an air conditioner.

**SHEET METAL WORK:**

a) Making of a square tray

**FOUNDRY WORK:**

a) Demonstrating basic foundry operations.

**PART IV ELECTRONIC ENGINEERING PRACTICES**

**SOLDERING WORK:**

a) Soldering simple electronic circuits and checking continuity.

**ELECTRONIC ASSEMBLY AND TESTING WORK:**

a) Assembling and testing electronic components on a small PCB.

**ELECTRONIC EQUIPMENT STUDY:**

a) Studying a FM radio.
b) Studying an electronic telephone.

**COURSE OUTCOMES:** Upon completion of this course, the students will be able to:

CO1: Ability to make common joints in carpentry and pipe connections with fittings used in plumbing works.
2. Ability to weld steel the structures
3. Ability to do electrical wiring and to build electronics circuits.

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TOTAL = 60 PERIODS
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
# 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

| CO | PO | PSO | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
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- '1' = Low; '2' = Medium; '3' = High
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 internship / 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
MA3251  ORDINARY DIFFERENTIAL EQUATIONS AND TRANSFORM TECHNIQUES  

UNIT I  ORDINARY DIFFERENTIAL EQUATIONS  

UNIT II  LAPLACE TRANSFORMS  

UNIT III  FOURIER SERIES  

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

UNIT V  Z – TRANSFORM AND DIFFERENCE EQUATIONS  

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:  

CO-PO MAPPING

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1’ = Low; ‘2’ = Medium; ‘3’ = High

PH3207 APPLIED MATERIAL SCIENCE

COURSEOBJECTIVES:
1. To make the students to understand the basics of crystallography and its importance in studying materials properties.
2. To inculcate the knowledge of phase relationships for the understanding of material properties.
3. To understand the electrical properties of materials including free electron theory, applications of quantum mechanics and magnetic materials.
4. To instil knowledge on physics of semiconductors, determination of charge carriers and device applications.
5. To establish a sound grasp of knowledge on different optical properties of materials, optical displays and applications.

UNIT – I CONSTITUTION OF ALLOYS 9

UNIT – II NON METALLIC MATERIALS AND COMPOSITES 9
Types And Properties of Commodity Polymers and Engineering Polymers - Natural and Synthetic Rubbers – Crystal Structure of Ceramics- Types and Properties of Structural (Al₂O₃, ZrO₂, Si₃N₄, WC, BC, hBN) and Functional Ceramics (SiC, PZT, BaTiO₃, AlN) - Composites and Their Classification and Applications- Carbon-Carbon Composites- Nanomaterials – Quantum Confinement- Typical Property Enhancement- Nanocomposite.

UNIT – III MECHANICAL PROPERTIES OF MATERIALS 9
Factors That Affect Fatigue Life.

UNIT – IV  ELECTRICAL AND ELECTRONIC PROPERTIES OF MATERIALS  9

UNIT – V MAGNETIC AND OPTICAL PROPERTIES OF MATERIALS  9

TOTAL: 45 PERIODS

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

CO1: Distinguish basics of crystallography and its importance for varied materials properties.
CO2: Know the properties of materials through the study of phase relationships.
CO3: Describe on the electrical and magnetic properties of materials and their applications
CO4: Recognise clearly of semiconductor physics and functioning of semiconductor devices
CO5: Comprehend the optical properties of materials and working principles of various optical devices.

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1 – Slight, 2 – Moderate, 3 – Substantial

TEXT BOOKS:
REFERENCES:

EI3151 ELECTRICAL, ELECTRONICS AND MEASUREMENTS ENGINEERING

UNIT – I ELECTRICAL CIRCUITS

UNIT – II ELECTRICAL MACHINES

UNIT – III ANALOG ELECTRONICS

UNIT – IV LINEAR INTEGRATED CIRCUITS

UNIT – V MEASUREMENTS AND INSTRUMENTATION

TOTAL: 45 PERIODS

Laboratory Experiments:

LIST OF EXPERIMENTS:
**ELECTRICAL**
1. Verification of ohms and Kirchhoff’s Laws.
2. Load test on DC Shunt Motor.
3. Load test on Single Phase Transformer.
4. Load test on 3 Phase Induction Motor.

**ELECTRONICS**
1. Half wave and full wave Rectifiers.
2. Application of Zener diode as shunt regulator.
3. Inverting and non-inverting amplifier using operational amplifier.

**TOTAL: 30 PERIODS**

**COURSE OUTCOMES**
Upon successful completion of the course, students should be able to:
CO 1: Explain the working principle and applications of electrical machines, electronic elements and measurement instruments. (L2)
CO 2: Demonstrate the basic concepts of electrical, electronic circuits and measurement devices. (L1)
CO 3: Analyze the electrical and electronic circuits. (L4)
CO 4: Select the electric, electronic circuit, electrical machines and instruments for the applications. (L3)
CO 5: Interpret the characteristics of electrical machines and instruments. (L5)

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<th>Mapping of COs with POs and PSOs</th>
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1 – Slight, 2 – Moderate, 3 – Substantial

**TEXT BOOKS:**

**REFERENCES:**
GE3153 PROGRAMMING IN C

COURSE OBJECTIVES:

• To analyze and develop C Programs using basic programming constructs.
• To solve searching and sorting problem using arrays and strings.
• To apply code reusability with functions and memory management using pointers.
• To compare and develop applications in C using structures and unions.
• To understand the basics of preprocessor directives and file operations.

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  
Preprocessor directives – Simple and Conditional macros with and without parameters -  
Files - Types of file processing: Sequential and Random access – File operations –  
read, write & seek.

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:

REFERENCES:
   2016.
4. Paul Deitel and Harvey Deitel, "C How to Program with an Introduction to C++",  
5. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming  
6. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", 1st  

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Text-Cum-Reference Books

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

GE3251 TAMILS AND TECHNOLOGY L T 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

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS
1. கலையின் வளர்ச்சி – பரவலாக பயமாறியது – சமு.சமு. பிறந்தல் (தொலைபிள்ளி: கலையின் வளர்ச்சி பரவலாக பயமாறியது பல்கலைக்கழகாக உருவானது).
2. கலையின்மை கலையின் – பொதுவரை சிதை. கருநாயக. (சிற்றகாட் புத்தாகம்).
3. சதைமை – தற்போதைய செயல்கருவியிடம் தமிழக தொடர்புகள் (தொலைபிள்ளி: கலையின் வளர்ச்சி பரவலாக உருவானது)
4. மூலானம் – கலையின்மை தொடர்புகள் (தொலைபிள்ளி: கலையின் வளர்ச்சி பரவலாக உருவானது)
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CY3251  ENVIRONMENTAL SCIENCE AND SUSTAINABILITY  L T P C
UNIT I  ENVIRONMENT AND BIODIVERSITY  6

UNIT II  ENVIRONMENTAL POLLUTION  6

UNIT III  RENEWABLE SOURCES OF ENERGY  6
Energy management and conservation, New Energy Sources: Need of new sources. Different types new energy sources. Applications of- Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy.

UNIT IV  SUSTAINABILITY AND MANAGEMENT  6
Development , GDP ,Sustainability- concept, needs and challenges-economic, social and aspects of sustainability-from unsustainability to sustainability-millennium development goals, and
protocols Sustainable Development Goals-targets, indicators and intervention areas Climate change- Global, Regional and local environmental issues and possible solutions-case studies. Concept of Carbon Credit, Carbon Footprint. Environmental management in industry- A case study.

UNIT V SUSTAINABILITY PRACTICES 6


TOTAL : 30 PERIODS

COURSE OUTCOMES:

CO1 To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.

CO2 To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.

CO3 To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.

CO4 To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.

CO5 To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.

TEXTBOOKS:


REFERENCES:


CO - PO Mapping

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*1’ = Low; ‘2’ = Medium; ‘3’ = High*

### NCC Credit Course Level 1*

#### NX3251
**ARMY WING**

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<td>NCC 4</td>
<td>NCC Camps: Types &amp; Conduct</td>
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**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 2 | Protection of Children and Women Safety | 1 |
| SS 3 | Road / Rail Travel Safety | 1 |
| SS 4 | New Initiatives | 2 |
| SS 5 | Cyber and Mobile Security Awareness | 1 |

**Total: 30 Periods**

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### NCC Credit Course Level 1*

#### NX3252
**NAVAL WING**

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**National Integration and Awareness**

| NI 1 | National Integration: Importance & Necessity | 1 |
| NI 2 | Factors Affecting National Integration | 1 |

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### NCC CREDIT COURSE LEVEL 1*  

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PH3161  PHYSICS LABORATORY  
(Common to all branches of B.E. /B.Tech Programmes)  
L T P C  0 0 2 1

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
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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