OUR VISION
To unveil the leadership qualities in students of mining engineering and impart knowledge of latest trends in mining and related industries to meet the present and future requirements of the industry embracing sustainability of the environment in order to produce well communicative, socially responsible and ethical mining engineers. To inculcate the habit of continuous learning, working in groups, safety at work, etc. for the overall development of the society in general, mining and related industries in particular adopting ethical means of profession.

OUR MISSION
- To improve the academic as well as co-curricular activities of the students.
- To organize activities for students in order to develop their soft skills which would aid them in their career prospects.
- To increase awareness of the students on the current state of affairs of the mining industry and to help them keep pace with the latest and emerging trends in the industry.
- To organize guest lectures by prominent personalities to update students constantly on the basic and latest terminologies related to mining and general issues.
- To promote active participation of students in sports activities for physical and mental fitness.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

I. The graduates acquire ability to create model, design, synthesize and analyze essential mining operational skills, mechanism and automation system.
II. The graduates use their talent, self-confidence, knowledge and engineering practice which facilitate them to presume position of scientific and/or managerial leadership in their career paths.
III. The graduates apply their consciousness of moral, professional responsibilities and motivation to practice life-long learning in a team work environment.
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<th>PO#</th>
<th>Graduate Attribute</th>
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<tbody>
<tr>
<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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<tr>
<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><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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<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><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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<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>
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<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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<td>12</td>
<td><strong>Life-long learning</strong>: 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.</td>
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**PROGRAMME SPECIFIC OUTCOMES (PSOs)**

I. Function ethically in a variety of professional roles such as mines manager, mine planner, production manager, mineral processing engineer, technical support representative and regulatory specialist and lead the organization competitively.

II. Find gainful employment and advance in their careers, in mining and related service sectors, consultant and provide mining solutions as well as pursue advanced degrees in mining-related.

III. Demonstrate an understanding of the critical role mining engineers play in society with respect to health, safety and the environment for ensuring sustainable development.
PEO's – PO's & PSO's MAPPING:

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## ANNA UNIVERSITY, CHENNAI
### UNIVERSITY DEPARTMENTS
#### REGULATIONS 2023
#### B. E. MINING ENGINEERING
#### CHOICE BASED CREDIT SYSTEM
#### CURRICULUM AND SYLLABI FOR SEMESTERS I AND II

### SEMESTER I

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<tr>
<th>S. NO.</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
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$ Skill Based Course

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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
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

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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

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:

CO-PO Mapping

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- ‘1’ = Low; ‘2’ = Medium; ‘3’ = High
UNIT I  MECHANICS OF MATERIALS  9
Rigid Body – Centre of mass – Rotational Energy - Moment of inertia (M.I)- Moment of Inertia for
uniform objects with various geometrical shapes. Elasticity –Hooke’s law - Poisson’s ratio - stress-
strain diagram for ductile and brittle materials – uses- Bending of beams – Cantilever - Simply
supported beams - uniform and non-uniform bending - Young’s modulus determination - I shaped

UNIT II  OSCILLATIONS, SOUND AND THERMAL PHYSICS  9
Simple harmonic motion - Torsional pendulum — Damped oscillations –Shock Absorber -Forced
oscillations and Resonance –Applications of resonance.- Waves and Energy Transport –Sound
waves – Intensity level – Standing Waves - Doppler effect and its applications - Speed of blood
flow. Ultrasound – applications - Echolocation and Medical Imaging. Thermal Expansion –
Expansion joints – Bimetallic strip – Seebeck effect – thermocouple -Heat Transfer Rate –
Conduction – Convection and Radiation.

UNIT III  OPTICS AND LASERS  9
Interference - Thin film interference - Air wedge- Applications -Interferometers–Michelson
Interferometer --- Diffraction - CD as diffraction grating – Diffraction by crystals -Polarization -
polarizers --- Laser – characteristics – Spontaneous and Stimulated emission- population –
inversion - Metastable states - optical feedback - Nd-YAG laser, CO₂ laser, Semiconductor laser -
Industrial and medical applications - Optical Fibers – Total internal reflection – Numerical aperture
and acceptance angle – Fiber optic communication – Fiber sensors – Fiber lasers.

UNIT IV  QUANTUM MECHANICS  9
Black body radiation (Qualitative) – Planck’s hypothesis – Einstein’s theory of Radiation - Matter
waves–de Broglie hypothesis - Electron microscope – Uncertainty Principle – The Schrodinger Wave
equation (time-independent and time-dependent) – Meaning and Physical significance of wave
function - Normalization - Particle in an infinite potential well-particle in a three-dimensional box -
Degenerate energy states - Barrier penetration and quantum tunneling - Tunneling microscope.

UNIT V  CRYSTAL PHYSICS  9
Crystal Bonding – Ionic – covalent – metallic and van der Walls's/ molecular bonding. Crystal
systems - unit cell, Bravais lattices, Miller indices - Crystal structures - atomic packing density of
BCC, FCC and HCP structures. NaCl, Diamond, Graphite, Graphene, Zincblende and Wurtzite
structures - crystal imperfections- point defects - edge and screw dislocations – grain boundaries.
Crystal Growth – Czochralski method – vapor phase epitaxy – Molecular beam epitaxy-
Introduction to X-Ray Diffractometer.

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:
3. N. Garcia, A. Damask and S. Schwarz, Physics for Computer Science Students,
REFERENCES:

CO-PO & PSO MAPPING

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• 1’ = Low; ’2’ = Medium; ‘3’ = High
UNIT I  POLYMER CHEMISTRY

UNIT II  NANOCHEMISTRY

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:

CO - PO 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).

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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அலகு I  மரபு நூற்றாண்டு: 3

அலகு II  மரபு – பல்கரையான வழியாட்டுகள் மற்றும் வழியாட்டுகள் வழியாட்டு 3

TOTAL : 15 PERIODS
TEXT-CUM-REFERENCE BOOKS
1. தமிழக வரலை – மக்களும் பண பொடும் – தக்குதூ. பிரிட்டன் (தமிழில்: தமிழக வரலை மக்களும் பண பொடும் தக்குதூ. பிரிட்டன்).
2. கோதுமை தமிழ் – முற்றமும் கணவம். (தமிழில்: பிரிட்டன்).
3. தமிழு – செய்தல துறைக்கு பங்கு கொள்ள வகைகள் (தமிழில்: பிரிட்டன்).
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) (Publishedby: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bookand Educational Services Corporation, Tamil Nadu)

GE3154 HERITAGE OF TAMILS

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, 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

1. தமிழக வரலை – மக்களும் பண்பொடும் – க.க. பிள்ளை பணியியல் (வெளிப்புறம்: தமிழ் பதிப்புச் சாலை கல்வியியல் பணியியல் குழு).

2. கணினித் தமிழ் – முமனவர் இல.சுந்தரம். (பிள்ளை புதுக்கும்).

3. தமிழ் – கையாண்டுகள் கல்வியியல் பணியியல் குழு தமிழ் பணியியல் (வெளிப்புறம்: தமிழ் பதிப்புச் சாலை).

4. பொருமந் – சாதிக்குள் கற்றுகள் (வெளிப்புறம்: தமிழ் பதிப்புச் சாலை).

5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)

6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies).

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10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)

11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)

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  15

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.

TOTAL = 60 PERIODS

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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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:

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UNIT I  SELF-INTRODUCTION
Introducing oneself; Telephone conversation, Relaying telephone message – Role play

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

UNIT III  CONVERSATION
Making conversation – formal and informal – Turn taking and Turn giving – Small talk

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

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

Assessment
Internals – 100%
Short Speeches
Group discussion

TOTAL : 30 PERIODS

COURSE OUTCOMES
At the end of the course, students will be able to
CO1. Communicate effectively in formal and informal contexts
CO2. Converse appropriately and confidently with different people
CO3. Express their opinions assertively in group discussions

CO-PO & PSO MAPPING

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* 1’ = Low; ‘2’ = Medium; ‘3’ = High
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, Idioms

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

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- 1′ = Low; ‘2′ = Medium; ‘3′ = High
- **Note:** The average value of this course to be used for program articulation matrix.
MA3251  ORDINARY DIFFERENTIAL EQUATIONS AND TRANSFORM TECHNIQUES

UNIT I  ORDINARY DIFFERENTIAL EQUATIONS

UNIT II  LAPLACE TRANSFORMS

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) – Parseval’s identity.

UNIT V  Z–TRANSFORM AND DIFFERENCE EQUATIONS

TOTAL: 60 PERIODS

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

TEXT BOOKS:

REFERENCES:

**CO-PO MAPPING**

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- 1' = Low; '2' = Medium; '3' = High
UNIT – I  ELECTRICAL CIRCUITS  

UNIT – II  ELECTRICAL MACHINES  

UNIT – III  ANALOG AND DIGITAL ELECTRONICS  

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

UNIT – V  MEASUREMENTS AND INSTRUMENTATION  

Laboratory Experiments:

LIST OF EXPERIMENTS:

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

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

TOTAL: 30 PERIODS
COURSE OUTCOMES

Upon successful completion of the course, students should be able to:

CO 1: Compute and demonstrate the electric circuit parameters for simple problems.
CO 2: Explain the working principles and characteristics of electrical machines, electronic devices and measuring instruments.
CO 3: Identify general applications of electrical machines, electronic devices and measuring instruments.
CO 4: Analyze and demonstrate the basic electrical and electronic circuits and characteristics of electrical machines.
CO 5: Explain the types and operating principles of sensors and transducers.

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1 – Slight, 2 – Moderate, 3 – Substantial

TEXT BOOKS:

REFERENCES:
Objectives

- To understand basics of problem solving and design solutions for computational problems.
- To apply different control structures in Python programming and solve using functions.
- To apply different data structures in Python.
- To use built-in and user defined modules in Python.
- To develop applications for file manipulation with error and exception handling in Python.

Unit 1 PROGRAMMING BASICS


PRACTICALS:

- Design algorithms for simple computational problems
- Develop Pseudocode and Flow charts for simple computational problems
- Develop Python programs using Input / Output operations
- Develop Python programs using operators and expressions
- Executing simple programs using Python interactive mode

Unit 2 CONTROL STATEMENTS AND FUNCTIONS


Functions - Defining functions – Argument types – Scope and namespaces - Recursive functions – Lambda functions – Functions as arguments

PRACTICALS:

- Write Python programs using simple and nested selective control statements
- Develop Python programs using simple and nested repetitive control statements
- Write Python programs to generate series and patterns using repetitive control statements
- Develop Python programs using simple functions and recursion
- Write Python programs using lambda functions

Unit 3 STRING, LIST, TUPLES


PRACTICALS:

- Write Python programs for operating on Strings
- Design Python programs using Lists, Nested Lists and Lists comprehensions
• Develop Python programs using Tuples, Nested Tuples, Tuple comprehensions, and Sets

Unit 4 SETS & DICTIONARIES, FUNCTIONAL PROGRAMMING 6+12


PRACTICALS:
• Write Python programs creating sets and performing set operations
• Develop Python programs using Dictionary, Nested Dictionary and comprehensions
• Write Python programs by applying functional programming concepts
• Create, import, and use user-defined modules
• Organize python code using Packages

Unit 5 EXCEPTIONS AND FILE HANDLING 6+12


PRACTICALS:
• Design Python programs to handle errors and exceptions
• Write Python programs with multiple handlers for exceptions
• Write Python programs to perform various operations on files
• Write Python programs to read and update text and data files

Total Hours: 90 (30+60)

Course Outcomes
1. Understand algorithmic solutions to simple computational problems.
2. Develop Python programs using conditional statements to solve computational problems.
3. Ability to apply suitable Python data structure(s) for a given problem
4. Design modular Python programs
5. Develop Python programs over files and handle exceptions

TEXT BOOKS

REFERENCE BOOKS
4. Python official documentation and tutorial, https://docs.python.org/3/

**CO’s-PO’s & PSO’s MAPPING**

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1 : low, 2 : medium, 3 : high, '-' : no correlation
GE3151 ENGINEERING MECHANICS

3 1 0 4

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
Fundamental Concepts and Principles, Systems of Units, Method of Problem Solutions, Statics of Particles

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.

TEXT BOOKS:

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அலகு I நொகரிக பராமைச் சுந்தரம்: 3
தற்கால கட்டிடக் கூட்டும் தூத்துக்குளித்தல் - பார்வை நூற்றாண்டில் குருகு திட்டம் பராமைச் சுந்தரம் - பார்வை நூற்றாண்டில் குருகு திட்டம்.

அலகு II கட்டிடக் கூட்டும் தூத்துக்குளித்தல்: 3
தற்கால கட்டிடக் கூட்டும் தூத்துக்குளித்தல் & காலத்துக்குளித்தல் நூற்றாண்டில் நூற்றாண்டில் குருகு திட்டம் பார்வை நூற்றாண்டில் குருகு திட்டம் - சிற்றமைச் சுந்தரம் பாலும் பாலும் பிரிவுக்கும் - பாலும் முதல் குறிப்பிட்டுவது - தூத்துக்கு பாலும் குறிப்பிட்டுவது - தூத்துக்கு பாலும் குறிப்பிட்டுவது - தூத்துக்கு பாலும் குறிப்பிட்டுவது - தூத்துக்கு பாலும் குறிப்பிட்டுவது - தூத்துக்கு பாலும் குறிப்பிட்டுவது - தூத்துக்கு பாலும் குறிப்பிட்டுவது - தூத்துக்கு பாலும் குறிப்பிட்டுவது - தூத்துக்கு பாலும் குறிப்பிட்டுவது - தூத்துக்கு பாலும் குறிப்பிட்டுவது - தூத்துக்கு பாலும் குறிப்பிட்டுவது.  

அலகு III சுந்தரம் கோலந்துரிகுகள்: 3

அலகு IV வரலொறு வருமானத்தை குறிப்பிட்டுவது: 3

அலகு V குறிப்பிட்டுவது: 3
அரசாமியிலுள்ள மக்கள் - மக்கள் பிரிவுக்கும் - மக்கள் பிரிவுக்கும் - மக்கள் பிரிவுக்கும் - மக்கள் பிரிவுக்கும் - மக்கள் பிரிவுக்கும் - மக்கள் பிரிவுக்கும்.  

TOTAL: 15 PERIODS

TEXT-CUM-REFERENCE BOOKS
1. தூத்துக்கு பற்றிய - மதிப்புப் பார்வை - தூத்துக்கு பற்றிய (உயிரியூடன் - தூத்துக்கு பற்றிய - பார்வைப் பராமைச் சுந்தரம்). 
2. குறிப்பிட்டுவது - பார்வை - தூத்துக்கு - (சூடிய படிகங்கள்).
3. குறிப்பிட்டு - மதிப்பு - பார்வை - பார்வை - பார்வைப் பற்றிய (உயிரியூடன் - தூத்துக்கு - பார்வை).
4. பார்வை - பார்வை - குறிப்பிட்டு (உயிரியூடன் - தூத்து - பார்வை).
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)

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

UNIT III MANUFACTURING TECHNOLOGY 3

UNIT IV AGRICULTURE AND IRRIGATION TECHNOLOGY 3
Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.

UNIT V SCIENTIFIC TAMIL & TAMIL COMPUTING 3

TOTAL: 15 PERIODS

TEXT-CUM-REFERENCE BOOKS
1. கணினி தமிழ் – முமனவர் இல.சுந்தரம் (விகடன் பிரசுரம்).
2. கல்லூரியை கையேற்று – பண்டைய நூறு-தூண் குருநாயகர் (சிவற்றில் பிரசுரம்).
3. சிறை – தமிழர் சிறைப்பாட்டில் தொன்மை கைவண்டை நடந்த விளக்கம் (குற்றசுத்தியுடைய).
4. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
5. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies).
6. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
7. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
8. Keeladi - ‘Sangam City Civilization on the banks of river Vaigai’ (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
9. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
10. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bookand Educational Services Corporation, Tamil Nadu)

NCC Credit Course Level 1*

NX3251 (ARMY WING) NCC Credit Course Level - I

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

### NX3252  (NAVAL WING) NCC Credit Course Level - I

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**TOTAL : 30 PERIODS**

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

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**TOTAL : 30 PERIODS**
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.
10. a) Optical fibre - Determination of Numerical Aperture and acceptance angle.
    b) - Determination of bending loss of fibre.
12. Michelson Interferometer - Determination of wavelength of the monochromatic source of light.
13. Photoelectric effect – Determination of Planck’s constant.
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.

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.

TOTAL: 30 PERIODS
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GE3261 ENGLISH LABORATORY – II

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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