Vision:

The Department of Biotechnology is committed to evolve as a world class science and technology centre by integrating quality and ethics in teaching and research.

Mission:

The mission of the department is

- Empowering students with an unique multidisciplinary learning experience and fostering the young minds to develop as a researcher, entrepreneur, etc.
- Enhancing academic and industrial collaborative research initiatives for the development of biotechnological, food and therapeutic products.
- Emphasizing and equipping the students towards innovative industrial and research developments.
- Serving the society with utmost commitment, integrity, enthusiasm, and dedication.
PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)
The Food Technology curriculum is designed to prepare graduates having knowledge with high ethical values and industrial preparedness to

1. Understand the concepts of basic sciences, Engineering, and technology for their application in the area of Food Technology.
2. Identify and analyze to solve problems for the development of products, processes, techniques to meet the demands of the society.
3. Apply the learnt theory and practical skills in Food Technology for industry, R&D and entrepreneurship.

PROGRAMME OUTCOMES (POs)
After completion of four years of study, the Food technology Graduates will be able to

<table>
<thead>
<tr>
<th>Graduate Attribute</th>
<th>Programme Outcomes</th>
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<tbody>
<tr>
<td>PO1 Engineering Knowledge</td>
<td>Apply knowledge of mathematics, basic science and engineering.</td>
</tr>
<tr>
<td>PO2 Problem Analysis</td>
<td>Identify, formulate and solve problems in the area of Food Technology.</td>
</tr>
<tr>
<td>PO3 Design/ development of solutions</td>
<td>Design new processes/ modifying the existing system to improve the performance and to satisfy the constraints.</td>
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<tr>
<td>PO4 Conduct investigations of complex problems</td>
<td>Perform experiments, analyze and interpret the data.</td>
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<tr>
<td>PO5 Modern tool usage</td>
<td>Apply various food analytical tools and techniques to improve the efficiency of the process and product.</td>
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<td>PO6 The Engineer and society</td>
<td>Conduct themselves to uphold the professional and social obligations.</td>
</tr>
<tr>
<td>PO7 Environment and sustainability</td>
<td>Design the system with environment consciousness and sustainable development.</td>
</tr>
<tr>
<td>PO8 Ethics</td>
<td>Interact with industry, business and society in a professional and ethical manner.</td>
</tr>
<tr>
<td>PO9 Individual and team work</td>
<td>Ability to work in a multidisciplinary team.</td>
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<tr>
<td>PO10 Communication</td>
<td>Proficiency in oral and written communication.</td>
</tr>
<tr>
<td>PO11 Project management and finance</td>
<td>Implementation of cost effective projects and improve system.</td>
</tr>
<tr>
<td>PO12 Life-long learning</td>
<td>Continue professional development and learning as a life-long activity.</td>
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</table>
PROGRAMME SPECIFIC OUTCOMES (PSOs)

By the completion of B. Tech Food Technology programme the student will be able to

1. Apply the knowledge of hurdle technology for the shelf life enhancement of food preservation and Engineering, knowledge for the scale-up of industrial nutritional food products.

2. Employ technology for product development by innovative food processing and preservation techniques for solving practical and real world problems.

3. Demonstrate professional and ethical competency with effective communication and managerial skills to emerge as a responsible leader or entrepreneur in the food sector.

MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVE WITH PROGRAMME OUTCOMES

<table>
<thead>
<tr>
<th>PEO</th>
<th>PROGRAMME OUTCOMES</th>
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#### Practicals

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**TOTAL 16 1 10 27 22**

§ Skill Based Course

### Semester II

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#### Practicals

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**TOTAL 14 1 12 27 21**

§ Skill Based Course.

# NCC Credit Course level 1 is offered for NCC students only. Other students may enroll for NSS/NSO/YRC activity. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA.
OBJECTIVE

- To build lexical competency and accuracy that will help learners to use language effectively.
- To comprehend the nuances of spoken and written communication in different contexts.
- To learn and use various language functions required for effective communication.
- To read and write different types of texts and comprehend their connotative and denotative meanings.
- To enhance students' listening skills by using different types of audio materials and help them extract necessary information from those materials.

UNIT I  BASICS OF COMMUNICATION

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

OUTCOME

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:
REFERENCES
4. www.uefap.com

CO-PO & PSO MAPPING

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

Note: The average value of this course to be used for program articulation matrix.

MA3151 MATRICES AND CALCULUS

OBJECTIVE
- To develop the use of matrix algebra techniques in solving practical problems.
- To familiarize the student with functions of several variables.
- To solving integrals by using Beta and Gamma functions.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals.
- To acquaint the students with the concepts of vector calculus which naturally arises in many engineering problems.

UNIT I MATRICES
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

PH3151 ENGINEERING PHYSICS

OBJECTIVE
- To impart knowledge on Mechanics of Materials.
- To impart knowledge of oscillations, sound and Thermal Physics.
- To facilitate understanding of optics and its applications, different types of Laser and fiber optics.
- To introduce the basics of Quantum Mechanics and its importance.
- To familiarize with crystal structure, bonding and crystal growth.
UNIT I MECHANICS OF MATERIALS

UNIT II OSCILLATIONS, SOUND AND THERMAL PHYSICS

UNIT III OPTICS AND LASERS

UNIT IV QUANTUM MECHANICS

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  L T P C  3 0 0 3

OBJECTIVE
- To introduce the basic concepts of polymers, their properties and some of the important applications.
- To impart knowledge on the basic principles and preparatory methods of nanomaterials.
- To facilitate the understanding of corrosion science and protecting coatings.
- To familiarize the operating principles and applications of energy conversion, its processes and storage devices.
- To inculcate sound understanding of water quality parameters and water treatment techniques.

UNIT I  POLYMER CHEMISTRY  9

UNIT II  NANOCHEMISTRY  9

UNIT III  CORROSION SCIENCE  9

UNIT IV  ENERGY SOURCES  9
Batteries - Characteristics - types of batteries – primary battery (dry cell), secondary battery (lead acid, lithium-ion-battery)- emerging batteries – nickel-metal hydride battery, aluminum air battery, batteries for automobiles and satellites - Fuel cells (Types) – H_2-O_2 fuel cell - Supercapacitors-Types
and Applications, Renewable Energy: Solar- solar cells, DSSC

UNIT V  WATER TECHNOLOGY 9

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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EE3151  BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING  L T P C

UNIT – I  ELECTRICAL CIRCUITS 9

UNIT – II  ELECTRICAL MACHINES 9
Basic Magnetic Circuit - Construction and Working Principle – DC Separately and Self excited

UNIT – III ANALOG AND DIGITAL ELECTRONICS
Operation and Characteristics of electronic devices: PN Junction Diodes, Zener Diode, BJT, JFET and MOSFET– Operational Amplifiers (OPAMPs) : Characteristics and basic application circuits-555 timer IC based astable and monostable multivibrator. Basic switching circuits – Gates and Flip-Flops-Sample and hold circuit- R-2R ladder type DAC-Successive approximation based ADC.

UNIT – IV SENSORS AND 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

TOTAL: 45 PERIODS

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

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

TOTAL: 30 PERIODS

COURSE OUTCOMES
Upon successful completion of the course, students should be able to:
CO 1: Compute and demonstrate the electric circuit parameters for simple problems.
CO 2: Explain the working principles and characteristics of electrical machines, electronic devices and measuring instruments.
CO 3: Identify general applications of electrical machines, electronic devices and measuring instruments.
CO 4: Analyze and demonstrate the basic electrical and electronic circuits and characteristics of electrical machines.
CO 5: Explain the types and operating principles of sensors and transducers.

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1 – Slight, 2 – Moderate, 3 – Substantial
TEXT BOOKS:

REFERENCES:
TEXT-CUM-REFERENCE BOOKS

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

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

UNIT I LANGUAGE AND LITERATURE


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


UNIT III FOLK AND MARTIAL ARTS

Therukoottu, Karagattam, VilluPattu, KaniyanKoothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.
UNIT IV THINAICONCEPTOFTAMILS
Flora and Fauna of Tamils&AhamandPuramConceptfromTholkappiyam 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 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 வரலாறு – மக்களும் பண்பாடும் – தைசுரு பிள்ளள (வவளியீடு: திக்காசுவி பிள்ளளை முதலியை கவுசியின் புரோக்கம்).
2. கணினித் தமிழ் – முளனவர் சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – பலவளகநதிக்களரயில் சங்ககால நகரநாகரிகம் (வதால்லியல் துளறவளியீடு)
4. பவாருளந – ஆற்றங்களரநாகரிகம். (வதால்லியல் துளறவளியீடு)
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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OBJECTIVE
- To inculcate experimental skills to test basic understanding of water quality parameters, such as, alkalinity, hardness, DO, chloride and copper.
- To induce the students to familiarize with electroanalytical techniques such as, pH metry, potentiometry and conductometry in the determination of impurities in aqueous solutions.
- To estimate the corrosion resistance of metals by weight loss method and molecular weight of polymer by viscometry.

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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GE3161 ENGINEERING PRACTICES LABORATORY

GROUP – A (CIVIL & ELECTRICAL)

1. CIVIL ENGINEERING PRACTICES

PLUMBING:
Basic pipe connections involving the fittings like valves, taps, coupling, unions, reducers, elbows
and other components used in household fittings. Preparation of plumbing line sketches.
    a) Laying pipe connection to the suction side of a pump
    b) Laying pipe connection to the delivery side of a pump.
    c) Practice in connecting pipes of different materials: Metal, plastic and flexible pipes used in
       household appliances.

WOOD WORK:
Sawing, planing and making joints like T-Joint, Mortise and Tenon joint and Dovetail joint.

STUDY EXCERSISES
    a) Study of joints in door panels and wooden furniture
b) Study of common industrial trusses using models.

2. **ELECTRICAL ENGINEERING PRACTICES**
   
   a) Basic household wiring using Switches, Fuse, Indicator and Lamp etc.,
   
   b) Stair case light wiring
   
   c) Tube – light wiring
   
   d) Preparation of wiring diagrams for a given situation.
   
   e) Study of Iron-Box, Fan Regulator and Emergency Lamp

**GROUP – B (MECHANICAL AND ELECTRONICS)**

3. **MECHANICAL ENGINEERING PRACTICES**
   
   **WELDING**
   
   a) Arc welding of Butt Joints, Lap Joints, and Tee Joints
   
   b) Gas welding demonstration.
   
   c) Basic Machining - Simple turning, drilling and tapping operations.
   
   d) Study and assembling of the following: Centrifugal pump, Mixer, Air-conditioner

   **SHEET METAL PRACTICE:** Making of a square tray

   **DEMONSTRATION ON FOUNDRY OPERATIONS.**

4. **ELECTRONIC ENGINEERING PRACTICES**
   
   a) Soldering simple electronic circuits and checking continuity.
   
   b) Assembling electronic components on a small PCB and Testing.
   
   c) Study of Telephone, FM radio and Low Voltage Power supplies.

**TOTAL: 60 PERIODS**

**COURSE OUTCOMES:**

**CO1.** Ability to make common joints in carpentry and pipe connections with fittings used in plumbing works.

**CO2.** Ability to do electrical wiring for household applications.

**CO3.** Ability to weld the steel the structures and soldering of electronical connections and testing of PCBs

**CO-PO & PSO MAPPING**

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**Avg**

| 1' = Low; '2' = Medium; '3' = High |
HS3251 ENGLISH FOR COMMUNICATION – II

OBJECTIVE

- To actively listen and collect relevant data from various forms of oral content like presentations, lectures and videos.
- To develop study skills and communication skills in formal and informal situations.
- To comprehend various reading materials relevant to formal context and understand the main and supporting ideas of the reading materials.
- To explore definitions, essay and report writing techniques and practice them in order to develop associated skills.
- To write effective job applications along with detailed CV for internship or placements.
UNIT I  CAUSE AND EFFECT  9
Listening – Radio / TV / Podcast Interview (survivors tale) and framing a set of instructions/Do’s and Don’ts; Reading – Excerpts of Literature (short stories), Journal articles on issues like Global warming; Writing - Instructions; Official letter / email (Request for internship / Industrial visit); Grammar – If conditionals, Imperatives; Vocabulary – Cause and effect expressions, Idiom

UNIT II  COMPARE AND CONTRAST  9
Listening – Product reviews and gap fill exercises, Short Talks (like TED Talks) for specific information; Reading – Graphical content (table / chart / graph) and making inferences; Writing – Compare and Contrast Essay; Grammar – Degrees of Comparison; Mixed Tenses; Vocabulary – Order of Adjectives, Transition words.

UNIT III  PROBLEM AND SOLUTION  9
Listening – Group discussion (case study); Reading – Visual content (Pictures on social issues / natural disasters) for comprehension; Editorial; Writing Picture description; Problem and Solution Essay; Grammar – Modal verbs; Relative pronoun; Vocabulary – Negative prefixes, Signal words for problem and solution.

UNIT IV  REPORTING  9
Listening – Oral news report; Reading – Newspaper report on survey findings – Writing – Survey report, Making recommendations; Grammar – Active and passive voice, Direct and Indirect speech; Vocabulary – Reporting verbs, Numerical adjectives.

UNIT V  PRESENTATION  9
Listening – Job interview, Telephone interview; Reading - Job advertisement and company profile and making inferences; Writing – Job application (cover letter and CV) Grammar – Prepositional phrases; Vocabulary – Fixed expressions, Collocations.

Assessment
Two Written Assessments : 35% weightage each
Assignment: 30% weightage
Conducting a survey on specific topic and write a final survey report. End Semester Exam: 3-hour written exam

TOTAL: 45 PERIODS

OUTCOME
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.

TEXTBOOK
2. “English for Engineers and Technologists” by Orient Blackswan, 2022

REFERENCE BOOKS
3. “Advanced Communication Skills” by Mathew Richardson, Charlie Creative Lab, 2020

CO-PO & PSO MAPPING

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MA3251 ORDINARY DIFFERENTIAL EQUATIONS AND TRANSFORM TECHNIQUES

OBJECTIVE

- To acquaint the students with Differential Equations which are significantly used in engineering problems.
- To make the students to understand the Laplace transforms techniques.
- To develop the analytic solutions for partial differential equations used in engineering by Fourier series.
- To acquaint the student with Fourier transform techniques used in wide variety of situations in which the functions used are not periodic.
- To develop Z-transform techniques in solving difference equations.

UNIT I

ORTHODINARY DIFFERENTIAL EQUATIONS

Homogeneous linear ordinary differential equations of second order, linearity principle, general solution Particular integral - Operator method - Solution by variation of parameters

UNIT II

LAPLACE TRANSFORMS

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

UNIT III

FOURIER SERIES

Dirichlet’s conditions - General Fourier series - Odd and even functions - Half-range Sine and Cosine series - Complex form of Fourier series - Parseval’s identity - Harmonic Analysis.

UNIT IV

FOURIER TRANSFORMS

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

UNIT V

Z-TRANSFORM AND DIFFERENCE EQUATIONS

Z-transform - Elementary properties - Inverse Z-transform - Convolution theorem – Initial and final value theorems – Formation of difference equation – Solution of difference equation using Z - transform.

TOTAL: 45 PERIODS

OUTCOME

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.
TEXTBOOK

REFERENCE BOOKS

CO-PO MAPPING

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IB3251 BIOORGANIC CHEMISTRY

OBJECTIVE
The course aims to enable the students to understand the basics concepts of chemical reactions make students understand the kinetics and its reaction mechanism.

UNIT I BONDING AND STEREOCHEMISTRY 9

UNIT II MECHANISMS OF SUBSTITUTION AND ADDITION REACTIONS 9
SN1 and SN2 reactions on tetrahedral carbon- nucleophiles- mechanism steric effects – nucleophilic addition on Acetals and ketals -Aldehyde and ketone groups – reactions of carbonyl group with amines- acid catalyzed ester hydrolysis – Saponification of an ester- hydrolysis of amides. Ester enolates - claisen .condensation – Michael condensation.

UNIT III KINETICS AND MECHANISM 9
UNIT IV CATALYSIS
Reactivity – Coenzymes – Proton transfer – metal ions – Intra molecular reactions – Covalent catalysis – Catalysis by organized aggregates and phases. Inclusion complexation

UNIT V BIOORGANIC REACTIONS
Timing of Bond formation and fission – Acyl group transfer – C-C bond formation and fission – Catalysis of proton transfer reactions – Transfer of hydride ion – Alkyl group. Transfer – Terpene biosynthesis – Merrifield state peptide synthesis – Sanger method for peptide and DNA sequencing

OUTCOME
At the end of the course, the students will be able to:
CO1: define and appraise Bonding and stereochemistry
CO2: classify and solve Mechanisms of substitution and addition reactions
CO3: discuss and formulate the Thermodynamics, kinetics and mechanism
CO4: describe and demonstrate Catalysis
CO5: classify and analyze Bioorganic reactions & mechanisms

TEXTBOOKS

REFERENCES

Course Articulation Matrix

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GE3152 PROBLEM SOLVING AND PYTHON PROGRAMMING

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 I 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 II  CONTROL STATEMENTS AND FUNCTIONS  6+12
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 III  STRING, LIST, TUPLES  6+12
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 IV  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 V  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 : 90 (30+60) PERIODS

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/

GE3155 ENGINEERING DRAWING

OBJECTIVES:
The learning objectives of this course is to develop in students, the engineering graphics 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
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:
3. Parthasarathy, N. S. and Vela Murali, “Engineering Drawing”, Oxford University Press,  
2015.

REFERENCES:
2019.  
an introduction to Interactive Computer Graphics for Design and Production, Eastern  
4. Parthasarathy N. S. and Vela Murali, “Engineering Graphics”, Oxford University,  
Press, New Delhi, 2015.  

Publication of Bureau of Indian Standards:  
1. IS10711 — 2001: Technical products Documentation — Size and layout of drawing  
sheets.  

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**அதன் மேற்பட்ட புரோஸ்டியா மதிப்புகள்:**

3

**அதன் மேற்பட்ட பாதுகாப்பு நூலகம்:**

3

**அதன் மேற்பட்ட கட்டுரைகள்:**

3

**TEXT-CUM-REFERENCE BOOKS**
1. நாயக்கர் பாதுகாப்பு - கொழும்பு பாதுகாப்பு (வல்லுண்டு: கணினியியல் பாதுகாப்பு காலையியல் குழும்பு).
2. Civilization – Development of Tamil Nadu, (Tamil Nadu Text Book Corporation).
5. Ge3251 TAMILS AND TECHNOLOGY

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<td>Designing and Structural construction House &amp; 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 - Saracenic architecture at Madras during British Period.</td>
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**TOTAL 15 HOURS**

**TEXT-CUM-REFERENCE BOOKS**
1. கதாக்கச் சொல்லும் – பக்தாகம் பத்யாயம் – இல.இல. பிள்ளளும் (இலங்கைப் புண்டை: பாடநூல் பாடும்)
2. கணினித் தமிழ் – முளனவர் இலசு.சுந்தரம். (விகடன் பிரசுரம்).

3. கீழடி - பளவளகநதிக்களரயில் சங்ககால நாகரிகம் (வதால்லியல் துளறவவளியீடு).

4. பலார்சந – ஆண்டாமாண்டா சங்ககாலம். (வதால்லியல் துளறவவளியீடு).

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)


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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**NATIONAL INTEGRATION AND AWARENESS**

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**PERSONALITY DEVELOPMENT**

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**LEADERSHIP**

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**SOCIAL SERVICE AND COMMUNITY DEVELOPMENT**

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**TOTAL : 30 PERIODS**

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### NCC Credit Course Level 1*

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

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<td>NCC Camps: Types &amp; Conduct</td>
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**NATIONAL INTEGRATION AND AWARENESS**

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<td>National Integration: Importance &amp; Necessity</td>
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**PERSONALITY DEVELOPMENT**

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PH3161 PHYSICS LABORATORY

L T P C
0 0 2 1

OBJECTIVES:

- To inculcate experimental skills to test basic materials' properties including materials mechanical, thermal and optical properties.
- To induce the students to familiarize themselves with the properties of sound waves and ultrasonic waves.
- To impart practical skills and to understand the characteristics of mechanical vibrations and logic operation.
- To elucidate to understand the electric and magnetic parameters of materials and semiconductors devices and sensors

Any SEVEN Experiments

1. Torsional Pendulum-Determination of rigidity modulus of wire and moment of inertia of the disc.
2. Non-uniform bending - Determination of Young’s modulus of the material of the beam.
3. Uniform bending – Determination of Young’s modulus of the material of the beam.
4. Lee’s Disc Experiment - Determination of thermal conductivity of bad conductors.
5. Viscosity of Liquids.
6. Acoustic grating - Determination of the velocity of ultrasonic waves in liquids.
7. Ultrasonic interferometer – determination of sound velocity and liquids compressibility
8. Laser - Determination of the wavelength of the laser using grating
   - Determination of the width of the groove of the compact disc using laser.
   - Estimation of laser parameters.
9. Air wedge - Determination of the thickness of a thin sheet/wire
10. a) Optical fibre - Determination of Numerical Aperture and acceptance angle
    c) 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 HOURS

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, '-'- no correlation

GE3261 ENGLISH LABORATORY - II

OBJECTIVES:
- To comprehend visual material and transcode it into verbal content using appropriate register.
- To identify varied group discussion skills and apply them to take part in effective discussions in professional context.
- To use language effectively in a formal presentation.

UNIT I: INTERVIEW IN SOCIAL CONTEXT 6
Asking questions and answering - Conducting an interview (of an achiever / survivor) – Roleplay

UNIT II: PERSUASIVE SKILLS 6
Speaking about specifications of a product (Eg. Home appliances) – Persuasive Talk – Roleplay 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%
OUTCOMES:
At the end of the course, students will be able to
- Comprehend and transcode visual content appropriately.
- Participate effectively in formal group discussions.
- Make presentation on a given topic in a formal context.

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- 1-low, 2-medium, 3-high, ‘-‘ no correlation
- **Note:** The average value of this course to be used for program articulation matrix.