VISION OF THE DEPARTMENT:

To educate students with conceptual knowledge and technical skills in the field of Information Technology with moral and ethical values to achieve excellence in academic, industry and research centric environments.

MISSION OF THE DEPARTMENT:

1. To inculcate in students a firm foundation in theory and practice of IT skills coupled with the thought process for disruptive innovation and research methodologies, to keep pace with emerging technologies.

2. To provide a conducive environment for all academic, administrative, and interdisciplinary research activities using state-of-the-art technologies.

3. To stimulate the growth of graduates and doctorates, who will enter the workforce as productive IT engineers, researchers, and entrepreneurs with necessary soft skills, and continue higher professional education with competence in the global market.

4. To enable seamless collaboration with the IT industry and Government for consultancy and sponsored research.

5. To cater to cross-cultural, multinational, and demographic diversity of students.

6. To educate the students on the social, ethical, and moral values needed to make significant contributions to society.
PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

Graduates can

- Utilize their proficiencies in the fundamental knowledge of basic sciences, mathematics, Artificial Intelligence, data science and statistics to build systems that require management and analysis of large volumes of data.
- Advance their technical skills to pursue pioneering research in the field of AI and Data Science and create disruptive and sustainable solutions for the welfare of ecosystems.
- Think logically, pursue lifelong learning and collaborate with an ethical attitude in a multidisciplinary team.
- Design and model AI based solutions to critical problem domains in the real world.
- Exhibit innovative thoughts and creative ideas for effective contribution towards economy building.

PROGRAMME OUTCOMES (POs):

After going through the four years of study, our Information Technology Graduates will exhibit ability to:

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<tr>
<th>PO#</th>
<th>Graduate Attribute</th>
<th>Programme Outcome</th>
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<tr>
<td>1</td>
<td>Engineering knowledge</td>
<td>Apply knowledge of mathematics, basic science and engineering science.</td>
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<td>2</td>
<td>Problem analysis</td>
<td>Identify, formulate and solve engineering problems.</td>
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<td>Design/development of solutions</td>
<td>Design a system or process to improve its performance, satisfying its constraints.</td>
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<td>4</td>
<td>Conduct investigations of complex problems</td>
<td>Conduct experiments &amp; collect, analyze and interpret the data.</td>
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<td>Modern tool usage</td>
<td>Apply various tools and techniques to improve the efficiency of the system.</td>
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<td>6</td>
<td>The Engineer and society</td>
<td>Conduct themselves to uphold the professional and social obligations.</td>
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<td>Environment and sustainability</td>
<td>Design the system with environment consciousness and sustainable development.</td>
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<td>8</td>
<td>Ethics</td>
<td>Interact in industry, business and society in a professional and ethical manner.</td>
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<td>Individual and team work</td>
<td>Function in a multidisciplinary team.</td>
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<td>Communication</td>
<td>Proficiency in oral and written communication.</td>
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<td>Project management and finance</td>
<td>Implement cost effective and improved system.</td>
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<td>12</td>
<td>Life-long learning</td>
<td>Continue professional development and learning as a life-long activity.</td>
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**PROGRAM SPECIFIC OUTCOMES (PSOs):**
Graduates should be able to:

1. Apply the theoretical knowledge of AI and Data Science for effective decision making in business and governance domains.
2. Develop the skills in data analytics and data visualization, pertaining to knowledge acquisition, knowledge representation and knowledge engineering, and hence capable of coordinating complex projects.
3. Accomplish research to cater the critical needs of the society through cutting edge technologies of AI.
### ANNA UNIVERSITY, CHENNAI
UNIVERSITY DEPARTMENTS
B. TECH. ARTIFICIAL INTELLIGENCE AND DATA SCIENCE
REGULATIONS – 2019
CHOICE BASED CREDIT SYSTEM
I - VIII SEMESTER CURRICULA AND I AND II SYLLABI
(Applicable to Students admitted from the Academic Year 2022 – 2023 onwards)

**SEMIESTER I**

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$ Skill Based Courses

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$ Skill Based Courses
OBJECTIVES

- To build lexical competency and accuracy that will help learners to use language effectively.
- To learn various reading strategies that will enable learners to comprehend the different modes of reading materials of varied levels of complexity.
- To comprehend the linguistic aspects of various rhetorical structures and functions of Technical English and use them effectively in writing.

UNIT I  INTRODUCING ONESELF  9
Theory:
Reading: Descriptive passages (From Newspapers / Magazines) – Writing: Writing a coherent paragraph (Native Place, School Life) – Grammar: Simple present tense, Present continuous tense – Vocabulary development: One word substitution.

UNIT II  DIALOGUE WRITING  9
Theory:
Reading: Reading a print interview (Comprehension and inference questions) - Writing: Writing a checklist - Dialogue writing – Grammar: Simple past tense – Question formation (Wh-Questions, ‘Yes’ or ‘No’ Questions, Tag Questions) – Vocabulary Development: Lexical items relevant to the theme of the given unit.

UNIT III  FORMAL LETTER WRITING  9
Theory:

UNIT IV  WRITING LETTERS OF COMPLAINT  9
Theory:

UNIT V  WRITING DEFINITIONS AND PRODUCT DESCRIPTION  9
Theory:

TOTAL : 45 PERIODS

LEARNING OUTCOMES:
On completion of the course, the students will be able to:
- Use appropriate language structures and lexical items in authentic contexts.
- Read both general and technical texts and comprehend their denotative and connotative meanings.
- Write different kinds of formal documents with grammatical and lexical appropriacy.

Assessment Pattern
- Two written internal assessments to test learner’s progress in grammar, vocabulary, reading
and writing skills.

- End Semester exam to be tested in two parts: Theory exam for three hours and listening and speaking skills for two hours.

MA5158 ENGINEERING MATHEMATICS – I
(Common to all branches of B.E. / B.Tech. Programmes in I Semester) 3 1 0 4

OBJECTIVES:

- To develop the use of matrix algebra techniques that is needed by engineers for practical applications.
- To familiarize the students with differential calculus.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To make the students understand various techniques of integration.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications.

UNIT I MATRICES

UNIT II DIFFERENTIAL CALCULUS

UNIT III FUNCTIONS OF SEVERAL VARIABLES

UNIT IV INTEGRAL CALCULUS
Definite and Indefinite Integrals – Substitution Rule – Techniques of Integration – Integration by Parts, Trigonometric Integrals, Trigonometric Substitutions, Integration of Rational Functions by Partial Fraction, Integration of Irrational Functions – Improper Integrals.

UNIT V MULTIPLE INTEGRALS
Double Integrals – Change of Order of Integration – Double Integrals in Polar Coordinates – Area

TOTAL : 60 PERIODS

OUTCOMES:
On completion of the course, the students will be able to:
1. Use the matrix algebra methods for solving practical problems.
2. Apply differential calculus tools in solving various application problems.
3. Able to use differential calculus ideas on several variable functions.
4. Apply different methods of integration in solving practical problems.
5. Apply multiple integral ideas in solving areas, volumes and other practical problems.

TEXTBOOKS:

REFERENCES:

PH5151 ENGINEERING PHYSICS (Common to all branches of B.E / B.Tech programmes) 3 0 0 3

OBJECTIVE
- To make the students in understanding the importance of mechanics.
- To equip the students on the knowledge of electromagnetic waves.
- To introduce the basics of oscillations, optics and lasers.
To enable the students in understanding the importance of quantum physics.
To elucidate the application of quantum mechanics towards the formation of energy bands in crystalline materials.

UNIT I  MECHANICS  9

UNIT II  ELECTROMAGNETIC WAVES  9

UNIT III  OSCILLATIONS, OPTICS AND LASERS  9

UNIT IV  BASIC QUANTUM MECHANICS  9

UNIT V  APPLIED QUANTUM MECHANICS  9

TOTAL: 45 PERIODS

OUTCOMES:
On completion of the course, the students will be able to:
1. Understanding the importance of mechanics.
2. Express the knowledge of electromagnetic waves.
3. Know the basics of oscillations, optics and lasers.
4. Understanding the importance of quantum physics.
5. Apply quantum mechanical principles towards the formation of energy bands in crystalline materials.
TEXT BOOKS

REFERENCES:

CY5151 ENGINEERING CHEMISTRY
(L COMMON TO ALL BRANCHES)

OBJECTIVES:
• 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 the laws of photochemistry, photoprocesses and instrumentation & applications of spectroscopic techniques.
• 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

UNIT II NANOCHMISTRY

UNIT III PHOTOCHEMISTRY AND SPECTROSCOPY

UNIT IV ENERGY CONVERSIONS AND STORAGE

UNIT V WATER TECHNOLOGY

TOTAL: 45 PERIODS

OUTCOMES:
On completion of the course, the students will be able to:
1. Recognize and apply basic knowledge on different types of polymeric materials, their general preparation methods and applications to futuristic material fabrication needs.
2. Identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.
3. Identify and apply suitable spectroscopic technique for material analysis and study different forms of photochemical reactions.
4. Recognize different forms of energy resources and apply them for suitable applications in energy sectors.
5. Demonstrate the knowledge of water and their quality in using at different industries.

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
- To know the basics of algorithmic problem solving.
- To develop Python programs with conditionals and loops.
- To define Python functions and use function calls.
- To use Python data structures - lists, tuples, dictionaries.
- To do input/output with files in Python.

UNIT I  INTRODUCTION TO COMPUTING AND PROBLEM SOLVING  9

Suggested Activities:
- Developing Pseudocodes and flowcharts for real life activities such as railway ticket booking using IRCTC, admission process to undergraduate course, academic schedules during a semester etc.
- Developing algorithms for basic mathematical expressions using arithmetic operations.
- Installing Python.
- Simple programs on print statements, arithmetic operations.

Suggested Evaluation Methods:
- Assignments on pseudocodes and flowcharts.
- Tutorials on Python programs.

UNIT II  CONDITIONALS AND FUNCTIONS  9

Suggested Activities:
- Simple Python program implementation using Operators, Conditionals, Iterative Constructs and Functions.
- Implementation of a simple calculator.
- Developing simple applications like calendar, phone directory, to-do lists etc.
- Flow charts for GCD, Exponent Functions, Fibonacci Series using conditionals and iterative statements.
External learning - Recursion vs. Iteration.

Suggested Evaluation Methods:
- Tutorials on the above activities.
- Group discussion on external learning.

UNIT III  SIMPLE DATA STRUCTURES IN PYTHON  10
Suggested Activities:
- Implementing Python program using lists, tuples, sets for the following scenario:
  - Simple sorting techniques
  - Student Examination Report
  - Billing Scheme during shopping.
- External learning - List vs. Tuple vs. Set – Implementing any application using all the three data structures.

Suggested Evaluation Methods:
- Tutorials on the above activities.
- Group Discussion on external learning component.

UNIT IV  STRINGS, DICTIONARIES, MODULES  10

Suggested Activities:
- Implementing Python program by importing Time module, Math package etc.
- Creation of any package (student’s choice) and importing into the application.

Suggested Evaluation Methods:
- Tutorials on the above activities.

UNIT V  FILE HANDLING AND EXCEPTION HANDLING  7
Introduction to Files – File Path – Opening and Closing Files – Reading and Writing Files – File Position – Exception: Errors and Exceptions, Exception Handling, Multiple Exceptions.

Suggested Activities:
- Developing modules using Python to handle files and apply various operations on files.
• Usage of exceptions, multiple except blocks - for applications that use delimiters like age, range of numerals etc.
• Implementing Python program to open a non-existent file using exceptions.

Suggested Evaluation Methods:
• Tutorials on the above activities.
• Case Studies.

TOTAL: 45 PERIODS

OUTCOMES:
On completion of the course, students will be able to:
CO1: Develop algorithmic solutions to simple computational problems.
CO2: Develop and execute simple Python programs.
CO3: Write simple Python programs for solving problems.
CO4: Decompose a Python program into functions.
CO5: Represent compound data using Python lists, tuples, dictionaries etc.
CO6: Read and write data from/to files in Python programs.

TEXT BOOKS:

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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. தமிழக வரலோறு – மக்களும் பண்பொடும் – கக்.கக்.பிள்ளள (தவளியீடு:தமிழ்நொடுபொடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் – முளனவர் இல்.சுந்தரம் (விகடன் பிரசுரம்).
3. கீழடி – பழகத் குருத்தகானியாக சங்ககொல நகரிகம் (ததொல்லியல் துளற).
4. பகுதி - குருத்தகானியாக சங்ககொல (ததொல்லியல் துளற)
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)

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BS5161 BASIC SCIENCES LABORATORY

L T P C
0 0 4 2

PHYSICS LABORATORY: (Any Seven Experiments)

OBJECTIVE
- To inculcate experimental skills to test basic understanding of physics of materials including properties of matter, thermal and optical properties.
• To induce the students to familiarize with experimental determination of velocity of ultrasonic waves and band gap determination.

LIST OF EXPERIMENTS:
5. Potentiometer – Determination of thermo e.m.f of a thermocouple.
10. Acoustic grating – Determination of velocity of ultrasonic waves in liquids.
11. Ultrasonic interferometer – determination of the velocity of sound and compressibility of liquids.
15. Michelson Interferometer.
17. Melde’s string experiment.

TOTAL: 30 PERIODS

OUTCOMES:
On completion of the course, the students will be able to:
1. Determine various moduli of elasticity and also various thermal and optical properties of materials.
2. Determine the velocity of ultrasonic waves, band gap determination and viscosity of liquids.

BASIC SCIENCE LABORATORY

CHEMISTRY LABORATORY: (Minimum of 8 experiments to be conducted)

OBJECTIVES:
• To inculcate experimental skills to test basic understanding of water quality parameters, such as, acidity, 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 demonstrate the analysis of metals and polymers by spectroscopy and viscometry methods.
LIST OF EXPERIMENTS:
1. Estimation of HCl using Na2CO3 as primary standard and Determination of alkalinity in water sample.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of DO content of water sample by Winkler”s method.
4. Determination of chloride content of water sample by argentometric method.
5. Estimation of copper content of the given solution by Iodometry.
6. Determination of strength of given hydrochloric acid using pH meter.
7. Determination of strength of acids in a mixture of acids using conductivity meter.
8. Estimation of iron content of the given solution using potentiometer.
9. Estimation of iron content of the water sample using spectrophotometer (1, 10-Phenanthroline / thiocyanate method).
10. Estimation of sodium and potassium present in water using flame photometer.
12. Pseudo first order kinetics-ester hydrolysis.
14. Phase change in a solid.

OUTCOMES:
On completion of the course, the students will be able to:
1. Analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO.
2. Determine the amount of metal ions through volumetric and spectroscopic techniques.
3. Determine the molecular weight of polymers by viscometric method.
4. Quantitatively analyse the impurities in solution by electroanalytical techniques.
5. Design and analyse the kinetics of reactions and corrosion of metals.

TEXT BOOKS:

GE5161 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY

OBJECTIVES:
- To understand the problem solving approaches.
- To learn the basic programming constructs in Python.
To articulate where computing strategies support in providing Python-based solutions to real world problems.
To use Python data structures - lists, tuples, dictionaries.
To do input/output with files in Python.

EXPERIMENTS:
1. Identification and solving of simple real life or scientific or technical problems, and developing flow charts for the same.
2. Python programming using simple statements and expressions.
3. Scientific problems using Conditionals and Iterative loops.
4. Implementing real-time/technical applications using Lists, Tuples.
5. Implementing real-time/technical applications using Sets, Dictionaries.
6. Implementing programs using Functions.
7. Implementing programs using Strings.
9. Implementing real-time/technical applications using File handling.
10. Implementing real-time/technical applications using Exception handling.
12. Developing a game activity using Pygame like bouncing ball, car race etc.

TOTAL: 60 PERIODS

OUTCOMES:
On completion of the course, students will be able to:
CO1: Develop algorithmic solutions to simple computational problems
CO2: Develop and execute simple Python programs.
CO3: Structure simple Python programs for solving problems.
CO4: Decompose a Python program into functions.
CO5: Represent compound data using Python data structures.
CO6: Apply Python features in developing software applications.

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OBJECTIVES:
- To improve the communicative competence of learners
- To help learners use language effectively in academic / work contexts
- To develop various listening strategies to comprehend various types of audio materials like lectures, discussions, videos etc.
- To build on students’ English language skills by engaging them in listening, speaking and grammar learning activities that are relevant to authentic contexts.
- To use language efficiently in expressing their opinions via various media.

UNIT I INTRODUCTION TO FUNDAMENTALS OF COMMUNICATION
Listening for general information-specific details- conversation: Introduction to classmates - Audio / video (formal & informal); Telephone conversation; Listening to voicemail & messages; Listening and filling a form. Speaking - making telephone calls-Self Introduction; Introducing a friend; - politeness strategies- making polite requests, making polite offers, replying to polite requests and offers-understanding basic instructions( filling out a bank application for example).

UNIT II NARRATION AND SUMMATION
Listening - Listening to podcasts, anecdotes / stories / event narration; documentaries and interviews with celebrities. Speaking - Narrating personal experiences / events-Talking about current and temporary situations & permanent and regular situations* - describing experiences and feelings- engaging in small talk- describing requirements and abilities.

UNIT III DESCRIPTION OF A PROCESS / PRODUCT
Listening - Listen to product and process descriptions; a classroom lecture; and advertisements about products. Speaking – Picture description- describing locations in workplaces- Giving instruction to use the product- explaining uses and purposes- Presenting a product- describing shapes and sizes and weights- talking about quantities(large & small)-talking about precautions.

UNIT IV CLASSIFICATION AND RECOMMENDATIONS
Listening – Listening to TED Talks; Listening to lectures - and educational videos. Speaking – Small Talk; discussing and making plans-talking about tasks-talking about progress- talking about positions and directions of movement-talking about travel preparations- talking about transportation-

UNIT V EXPRESSION
Listening – Listening to debates/ discussions; different viewpoints on an issue; and panel discussions. Speaking –making predictions- talking about a given topic-giving opinions- understanding a website-describing processes

LEARNING OUTCOMES:
At the end of the course, learners will be able
- To listen and comprehend complex academic texts
- To speak fluently and accurately in formal and informal communicative contexts
- To express their opinions effectively in both oral and written medium of communication

ASSESSMENT PATTERN
- One online / app based assessment to test listening /speaking
- End Semester ONLY listening and speaking will be conducted online.
- Proficiency certification is given on successful completion of listening and speaking internal test and end semester exam.
OBJECTIVES

- To comprehend various reading materials relevant to technical context and understand the main and supporting ideas of the reading materials.
- To write effective job applications along with detailed CV for internship or placements.
- To explore definitions, essay and report writing techniques and practice them in order to develop associated skills.

UNIT I  TECHNICAL COMMUNICATION  6
Theory:
Reading: Reading the Interview of an Achiever and Completing Exercises (Skimming, Scanning and Predicting) – Writing: Writing a Short Biography of an Achiever Based on Given Hints – Grammar: Asking and Answering Questions, Punctuation in Writing, Prepositional Phrases

UNIT II  SUMMARY WRITING  6
Theory:
Reading: Reading Technical Essays/ Articles and Answering Comprehension Questions – Writing: Summary Writing – Grammar: Participle Forms, Relative Clauses

UNIT III  PROCESS DESCRIPTION  6
Theory:
Reading: Reading Instruction Manuals – Writing: Writing Process Descriptions – Writing Instructions – Grammar: Use of Imperatives, Active and Passive Voice, Sequence Words

UNIT IV  REPORT WRITING  6
Theory:
Reading: Reading and Interpreting Charts/Tables and Diagrams – Writing: Interpreting Charts/Tables and Diagrams, Writing a Report – Grammar: Direct into Indirect Speech, Use of Phrases

UNIT V  WRITING JOB APPLICATIONS  6
Theory:
Reading: Reading a Job Interview, SOP, Company Profile and Completing Comprehension Exercises – Writing: Job Applications and Resumes And Sops-Grammar: Present Perfect and Continuous Tenses.

TOTAL: 30 PERIODS

LEARNING OUTCOMES
On completion of the course, the students will be able to:

- Read and comprehend technical texts effortlessly.
- Write technical reports and job application for internship or placement.
- Learn to use language effectively in a professional context.

Assessment Pattern
- Two written internal assessments to test learner’s progress in grammar, reading and writing skills.
- End Semester exam to be tested in two parts: Theory exam for three hours and listening and speaking skills along with vocabulary for two hours.
OBJECTIVES:
- To acquaint the students with the concepts of vector calculus which naturally arises in many engineering problems.
- To develop an understanding of the standard techniques of complex variable theory in particular analytic function and its mapping property.
- To familiarize the students with complex integration techniques and contour integration techniques which can be used in real integrals.
- To acquaint the students with Differential Equations which are significantly used in Engineering problems.
- To make the students appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.

UNIT I  VECTOR CALCULUS

UNIT II  ANALYTIC FUNCTION
Analytic Functions – Necessary and Sufficient Conditions for Analyticity – Properties – Harmonic Conjugates – Construction of Analytic Function - Conformal Mapping – Mapping by Functions – Bilinear Transformation \( w = \frac{c + z}{a}, \frac{1}{z}, \frac{z^2}{a} \).

UNIT III  COMPLEX INTEGRATION

UNIT IV  DIFFERENTIAL EQUATIONS
Method of Variation of Parameters – Method of Undetermined Coefficients – Homogenous Equations of Euler’s and Legendre’s Type – System of Simultaneous Linear Differential Equations with Constant Coefficients.

UNIT V  LAPLACE TRANSFORMS

TOTAL : 60 PERIODS
OUTCOMES:
On completion of the course, students will be able to:
1. Calculate grad, div and curl and use Gauss, Stokes and Greens theorems to simplify calculations of integrals.
2. Construct analytic functions and use their conformal mapping property in application problems.
3. Evaluate real and complex integrals using the Cauchy’s integral formula and residue theorem.
4. Apply various methods of solving differential equation which arise in many application problems.
5. Apply Laplace transform methods for solving linear differential equations.

TEXTBOOKS:

REFERENCES:

AZ5201 OBJECT ORIENTED PROGRAMMING AND DATA STRUCTURES L T P C
3 0 0 3

OBJECTIVES:
• To understand the Object Oriented Programming(OOP) language concepts.
• To learn and implement different data structures using OOP concepts.
• To learn and use hierarchical data structures and its operations.
• To learn the usage of graphs in real world problems.
• To familiarize the techniques of Sorting, Searching and Hashing.

UNIT I OBJECT ORIENTED PROGRAMMING FUNDAMENTALS
C++ - Data abstraction – encapsulation - Class – objects – Constructors - Static members - constant members - member functions – pointers - string handling - copy constructor - polymorphism – Function overloading – operators overloading Dynamic Memory Allocation.
Suggested Activities:
- Flipped Classroom - Features of OOP, Pointers.
- External learning - Dynamic memory allocation operators and its usage.
- Exploration of examples on static functions and usage of ‘this’ pointer.
- Exploration of the usage of reference variables, pointer to reference and reference to a pointer.
- Application development using Friend functions and function overloading.

Suggested Evaluation Methods:
- Assignments on the usage of dynamic memory allocation operators, Friend functions and reference variables.
- Quizzes on pointers and usage of pointers.
- Demonstration of the application development.

UNIT II  OBJECT ORIENTED PROGRAMMING - ADVANCED FEATURES  8

Suggested Activities:
- Flipped Classroom on basics of exception handling.
- External learning - STL Containers and Iterators.
- Practical - Solve a given problem (such as Vector Manipulation, List Updation) by choosing appropriate functions from STL.
- Exploration on the usage of Virtual Functions and Abstract Classes.
- Application development using exception handling.

Suggested Evaluation Methods:
- Assignments on problem solving using STL.
- Quizzes on exception handling, abstract classes.
- Demonstration for application development.

UNIT III  LINEAR DATA STRUCTURES – LIST, STACK, QUEUE  8

Suggested Activities:
- Flipped classroom on priority queue
- Converting an algorithm from recursive to non-recursive using stack.
- Demonstrating stack for Towers of Hanoi application
- Developing any application using all the linear data structures.

Suggested Evaluation Methods:
- Tutorials on applications of linear data structures.
- Checking output of programs implemented
UNIT IV NON LINEAR DATA STRUCTURES – TREES AND GRAPH


Suggested Activities:
- Flipped classroom on binary search trees and graph traversal application
- External learning - Fibonacci heap
- Exploration of application of trees where trees can be applied for real time problems.
- Exploration of other single source shortest path problems.
- Practical - Design and Implementation of a suitable tree/heap structure for solving a given real time problem such as implementation of syntax trees in compilers

Suggested Evaluation Methods:
- Assignments on Fibonacci Heaps, Real time problem solving using Trees and graph.
- Quizzes on BST, Binary Heap, Graph.
- Demonstration of practical learning component.

UNIT V SORTING, SEARCHING AND HASHING TECHNIQUES


Suggested Activities:
- Flipped classroom on selection sort.
- External learning - External sorting implementation.
- Implementation of all sorting techniques.
- Demonstration of searching techniques under best and worst case inputs.

Suggested Evaluation Methods:
- Tutorials on External sorting.
- Checking output of programs implemented.

TOTAL: 45 PERIODS

OUTCOMES:
Upon the completion of the course the student should be able to
- Implement advanced data structures through ADTs using OOP.
- Select and use appropriate linear/non–linear data structure for solving a given problem.
- Apply suitable hierarchical data structures to solve practical problems.
- Apply the graph data structures for a real world problem.
- Appropriately use sort, search, hash techniques for a given application.

TEXT BOOKS:
REFERENCES:

EE5251  BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING  L T P C
3 0 0 3

OBJECTIVES:
- To understand the basic concepts of electric circuits, magnetic circuits and wiring.
- To understand the operation of AC and DC machines.
- To understand the working principle of electronic devices and circuits.

UNIT I  BASIC CIRCUITS AND DOMESTIC WIRING
9

UNIT II  THREE PHASE CIRCUITS AND MAGNETIC CIRCUITS
9

UNIT III  ELECTRICAL MACHINES
9

UNIT IV  BASICS OF ELECTRONICS
9

UNIT V  CURRENT CONTROLLED AND VOLTAGE CONTROLLED DEVICES
9
Working Principle and Characteristics – BJT, SCR, JFET, MOSFET.
OUTCOMES:

CO1: To be able to understand the concepts related with electrical circuits and wiring.
CO2: To be able to study the different three phase connections and the concepts of magnetic circuits.
CO3: Capable of understanding the operating principle of AC and DC machines.
CO4: To be able to understand the working principle of electronic devices such as diode and zener diode.
CO5: To be able to understand the characteristics and working of current controlled and voltage controlled devices.

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GE5151    ENGINEERING GRAPHICS    L T P C
                  1 0 4 3

COURSE OBJECTIVES:

- To draw free hand sketches of basic geometrical shapes and multiple views of objects.
- To draw orthographic projections of lines and planes.
- To draw orthographic projections of solids.
- To draw the development of surfaces of objects.
- To draw isometric and perspective views of simple solids.
CONCEPTS AND CONVENTIONS (NOT FOR EXAMINATION)


UNIT I PLANE CURVES AND FREE HANDSKETCHING


UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACES


UNIT III PROJECTION OF SOLIDS

Projection of Simple Solids like Prisms, Pyramids, Cylinder, Cone and Truncated Solids When the Axis is Inclined to Both the Principal Planes by Rotating Object Method and Auxiliary Plane Method.

UNIT IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES

Sectioning of Solids 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.

UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS


COMPUTER AIDED DRAFTING (DEMONSTRATION ONLY)

Introduction to Drafting Packages and Demonstration of Their Use.

TOTAL (L: 15 + P: 60):75 PERIODS

COURSE OUTCOMES:

On completion of this course, the students will be able to:

1. Draw free hand sketching of basic geometrical shapes and multiple views of objects.
2. Draw orthographic projections of lines and planes
3. Draw orthographic projections of solids
4. Draw development of the surfaces of objects
5. Draw isometric and perspective views of simple solids.

TEXT BOOKS:

REFERENCES:

Publication of Bureau of Indian Standards:

Special Points Applicable to University Examinations on Engineering Graphics:
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 of A3 size only.
4. The students will be permitted to use appropriate scale to fit solution within A3 size.
   The examination will be conducted in appropriate sessions on the same day.

GE5252  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 - Saracenic architecture at Madras during British Period.

UNIT III  MANUFACTURING TECHNOLOGY  3
Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting,steel -Copper and gold- Coins as source of history - Minting of Coins – Beads making-industries Stone beads - Glass beads -
Terracotta beads - Shell beads/ bone beats - Archeological evidences - Gem stone types described in Silappathikaram.

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

TEXT-CUM-REFERENCE BOOKS
1. தமிழகவரலொறு–மக்களும் பண் பொடும் – கக்க. கக்க. பிள்ளள (தங்குப்பு: தமிழ்நூல் பொடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணிச்சந்து துரிந்திற்கு பென்னையே விளையாட்டு (மிகக் பிள்ளளப்).
3. சிதறு - தமிழகக் கற்றதாசியின் தக்கத்தல்கள் தக்க நகரிகம் (தங்குப்பு: தக்க தோல்லியல்).
4. பூங்காவிற்கு–அரியங்களுக்கு நகரிகம் (தங்குப்பு: தக்க தோல்லியல்).
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)

TOTAL: 15 PERIODS
அலகு I வன்முகத் தமிழ் மதொழியியல்:
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கல்வி மாணிக்கு நூறு கல்வி - பாடல், விளக்கம், உரைகள் - பாடல், மதொழியியல் - கல்வி திறன் பாடல் கல்வி - பாடல் கல்வியியல் குறிப்பிட்டு பாடல் வழிக் கல்வி.

அலகு II செயற்பாட்டுப்பாட்டு கல்வி வழிகாட்டைகள்:
3
சுல்தான் கல்வி சிற்றுட்பட்டுப்பாட்டு மதொழிகள் & சுல்தான் கல்வி முன்னைய பாடல் கல்வியியல் சுல்தான் கல்வி முன்னைய பாடல் கல்வியியல் - கல்வி சிற்றுட்பட்டுப்பாட்டு முன்னைய பாடல் கல்வியியல் - சுல்தான் கல்வி முன்னைய பாடல் கல்வியியல் - சுல்தான் கல்வி முன்னைய பாடல் கல்வியியல் - சுல்தான் கல்வி முன்னைய பாடல் கல்வியியல் - சுல்தான் கல்வி முன்னைய பாடல் கல்வியியல் - சுல்தான் கல்வி முன்னைய பாடல் கல்வியியல்.
AZ5211 DATA STRUCTURES LABORATORY L T P C
0 0 4 2

OBJECTIVES:
- To understand the concepts of Object Oriented Programming.
- To use standard template library in the implementation of standard data structures.
- To learn the data structures using Object Oriented Programming (OOP) language.
- To explore linear and non-linear structures using OOP concepts.
- To understand various sorting, searching algorithms using OOP concepts.

LIST OF EXPERIMENTS: Implement the following exercises using C++:

1. Practice of C++ Programming on real world/technical applications using statements, expressions, decision making constructs, iterative and branching constructs, structures, arrays, functions, pointers.
2. Implementation of Stack and queue using Arrays and Linked List.
3. Implementation of Binary Search Tree, AVL.
4. Implementation of Insertion sort, Quick Sort, Merge Sort.
5. Implementation of an Application (such as Library Management System) using Classes, Objects, Constructors, Destructors and String Handling.
7. Implementation of an Application such as Student Information System using Inheritance, Virtual Functions and Abstract Classes.
8. Implementation of a Heap tree using Templates.
10. Implementation of List, Stack and Queue Data Structures using STL Concepts.
11. Mini Project

OUTCOMES:
On completion of the course, the students will be able to:
- Implement the basic and advanced concepts of object-oriented programming.
- Solve the given problem using object-oriented concepts.
- Implement linear and non-linear data structures through ADTs using OOP.
- Analyze and apply the sorting, searching and hashing techniques for a real world problem.
- Design and develop real-time applications by applying suitable data structures and associated operations.

EE5261 ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY

OBJECTIVES
- To impart hands-on experience in verification of circuit laws and measurement of circuit parameters.
- To train the students in performing various tests on electrical motors.
- To give practical exposure to the usage of CRO, power sources & function generators.

LIST OF EXPERIMENTS
1. Verification of Kirchhoff’s Law.
2. Steady state response of AC and DC circuits (Mesh, Node Analysis).
3. Frequency response of RLC circuits.
5. Regulation of single phase transformer.
6. Performance characteristics of DC shunt generator.
7. Performance characteristics of single phase induction motor.
10. Half wave and full wave Rectifiers.
11. Application of Zener diode as shunt regulator.
12. Characteristics of BJT and JFET.

OUTCOMES:
On completion of the course, the students will be able to:
1. Become familiar with the basic circuit components and know how to connect them to make a real electrical circuit.
2. Perform speed characteristic of different electrical machines.
3. Use logic gates and Flip flops.
OBJECTIVES

- To identify varied group discussion skills and apply them to take part in effective discussions in a professional context.
- To be able to communicate effectively through writing.

UNIT I
Speaking: Role Play Exercises Based on Workplace Contexts, talking about competition- discussing progress toward goals- talking about experiences- talking about events in life- discussing past events-
Writing: writing emails (formal & semi-formal).

UNIT II
Speaking: discussing news stories- talking about frequency- talking about travel problems- discussing travel procedures- talking about travel problems- making arrangements- describing arrangements- discussing plans and decisions- discussing purposes and reasons- understanding common technology terms
Writing: writing different types of emails.

UNIT III
Speaking: discussing predictions- describing the climate- discussing forecasts and scenarios- talking about purchasing- discussing advantages and disadvantages- making comparisons- discussing likes and dislikes- discussing feelings about experiences- discussing imaginary scenarios
Writing: short essays and reports (formal/semi-formal letters).

UNIT IV
Speaking: discussing the natural environment- describing systems- describing position and movement- explaining rules-(example- discussing rental arrangements)- understanding technical instructions
Writing: writing instructions- writing a short article.

UNIT V
Speaking: describing things relatively- describing clothing- discussing safety issues (making recommendations)- talking about electrical devices- describing controlling actions- Writing: job application (Cover letter + Curriculum vitae)- writing recommendations.

TOTAL: 60 PERIODS

LEARNING OUTCOMES

- Speak effectively in group discussions held in a formal/semi-formal contexts.
- Write emails and effective job applications.

Assessment Pattern

- One online/app based assessment to test speaking and writing skills
- Proficiency certification is given on successful completion of speaking and writing.