



# R.M.K. COLLEGE OF ENGINEERING AND TECHNOLOGY

(An Autonomous Institution)

RSM Nagar, Pudukkottai- 601206, Gummidipoondi (T.K), Thiruvallur (D.T), Tamil Nadu

Approved by AICTE, New Delhi/ Affiliated to Anna University, Chennai

Accredited by NBA (All Eligible Courses) / NAAC with "A" GRADE

An ISO 21001:2018 Certified Institution



## B.E. – COMPUTER SCIENCE AND ENGINEERING (CYBER SECURITY)

CHOICE BASED CREDIT SYSTEM - R 2024

### FIRST YEAR CURRICULUM AND SYLLABI

## SEMESTER – I

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	24MA101	Matrices and Calculus	BSC	4	3	1	0	4
2.	24PH201	Physics for Information Science (Lab Integrated)	BSC	5	3	0	2	4
3.	24CS101	Programming in C++ (Lab Integrated)	ESC	6	3	0	3	4.5
4.	24CS102	Software Development Practices (Lab Integrated)	ESC	6	3	0	3	4.5
5.	24EC101	Digital Principles and System Design (Lab Integrated)	ESC	5	3	0	2	4
6.	24GE101	Heritage of Tamils	HSMC	1	1	0	0	1
7.	24HS101	Interpersonal skills, Psychometric Analysis and Career Development	EEC	2	0	0	2	1
8.	24EC111	Idea Lab I (Non Credit)	EEC	1	0	0	1	0
9.	24CH102	Environmental Science & Sustainability (Non Credit)	MC	2	2	0	0	0
10.	24MC101	Students Induction Programme (Non Credit)	MC	3 Weeks				
<b>TOTAL</b>				<b>32</b>	<b>18</b>	<b>1</b>	<b>13</b>	<b>23</b>

<b>Course Code</b>	<b>MATRICES AND CALCULUS</b> Theory Course (Common to All I Semester B.E./B.Tech Programmes)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
24MA101		3	1	0	4

## OBJECTIVES:

The course will enable the learners to:

- Explain the concepts of matrix algebra techniques.
- Understand various techniques to solve second and higher order differential equations.
- Demonstrate simple applications of functions of several variables.
- Comprehend the basic concepts of multiple integrals.
- Illustrate elementary ideas of vector calculus.

### UNIT I MATRICES 12

Eigenvalues and Eigenvectors of a real matrix – Properties of eigenvalues and eigenvectors – Statement and applications of Cayley-Hamilton Theorem – Diagonalization of matrices by orthogonal transformation (excluding similarity transformation) – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms.

### UNIT II DIFFERENTIAL EQUATIONS 12

Second and Higher order linear differential equations with constant coefficients - Method of variation of parameters – Homogeneous equation of Euler’s and Legendre’s type – System of simultaneous linear differential equations with constant coefficients.

### UNIT III FUNCTIONS OF SEVERAL VARIABLES 12

Total derivative – Differentiation of implicit functions – Jacobians and properties – Taylor’s series for functions of two variables – Maxima and minima of functions of two variables– Lagrange’s method of undetermined multipliers.

### UNIT IV MULTIPLE INTEGRALS 12

Double integrals – Change of order of integration – Area enclosed by Cartesian Coordinates (excluding polar coordinates) – Triple integrals (excluding spherical and cylindrical coordinates) – Volume of solids (Cartesian Coordinates only).

### UNIT V VECTOR CALCULUS 12

Gradient, divergence and curl (excluding vector identities) – Directional derivative – Irrotational and Solenoidal vector fields – Green’s theorem in a plane, Stoke’s theorem and Gauss divergence theorem (Statement only) - Simple applications involving cubes and rectangular parallelepipeds.

**TOTAL: 60 PERIODS**

## **COURSE OUTCOMES:**

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

CO1: Compute the matrix inverse and their higher powers.

CO2: Solve the second and higher order differential equations.

CO3: Determine the maxima and minima of functions of two variables.

CO4: Determine the volume and surface area using multiple integrals.

CO5: Evaluate integrals using the concept of vector calculus.

CO6: Apply matrix algebra techniques to diagonalize the matrix.

## **TEXT BOOKS:**

1. Erwin Kreyszig, “Advanced Engineering Mathematics”, John Wiley and Sons, 10<sup>th</sup> Edition, New Delhi, 2016.
2. B.S. Grewal, “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 44<sup>th</sup> Edition, 2021.

## **REFERENCES:**

1. James Stewart, “Calculus: Early Transcendentals”, Cengage Learning, 7<sup>th</sup> Edition, New Delhi, 2015.
2. M. K. Venkataraman, “Engineering Mathematics”, Volume I, 4<sup>th</sup> Edition, The National Publication Company, Chennai, 2003.
3. Sivaramakrishna Dass, C. Vijayakumari, “Engineering Mathematics”, Pearson Education India, 4<sup>th</sup> Edition 2019.
4. H. K. Dass, and Er. Rajnish Verma, “Higher Engineering Mathematics”, S. Chand Private Limited, 3<sup>rd</sup> Edition 2014.
5. B.V. Ramana, “Higher Engineering Mathematics”, Tata McGraw Hill Publishing Company, 6<sup>th</sup> Edition, New Delhi, 2008.
6. NPTEL course on "Engineering Mathematics - I", by Prof. Jitendra Kumar, IIT Kharagpur:  
[https://onlinecourses.nptel.ac.in/noc21\\_ma58/preview](https://onlinecourses.nptel.ac.in/noc21_ma58/preview)

<b>Course Code</b>	<b>PHYSICS FOR INFORMATION SCIENCE</b> Theory Course with Laboratory Component [Common to II Semester B.E. CSE, AI&DS & I Semester CSE(CS)]	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
24PH201		3	0	2	4

**OBJECTIVES:**

**The course will enable the learners to:**

- Understand the classical free electron theory and Fermi distribution function
- Relate the theory of laser with its applications in optical fibres
- Solve the Schrodinger's wave equation in one dimensional and three dimensional box
- Gain the basic knowledge in quantum operators and quantum gates
- Comprehend the behavior of semiconductor diodes in various electron devices and nano electronic devices

**UNIT I ELECTRICAL PROPERTIES OF MATERIALS**

15

Classical free electron theory - Expression for electrical conductivity and thermal conductivity - thermal conductivity of a bad conductor- Lee's disc method -Effect of temperature on Fermi function - Density of energy states and average energy of an electron at 0 K- Effective mass of electron - Concept of hole.

Semiconductors - Direct and Indirect bandgap semiconductors - Intrinsic Carrier Concentration - Bandgap Determination.

(Theory -9)

1. Determination of Thermal conductivity of a bad conductor - Lee's Disc Method
2. Bandgap determination of intrinsic semiconductor

(Laboratory- 6)

**UNIT II LASER**

18

Characteristics of Laser, Spatial and Temporal Coherence - Population inversion - Relation between Einstein's A and B coefficients - Components of Laser - Optical amplification (qualitative) - Semiconductor lasers: Homojunction and Heterojunction- Application: Engineering applications of lasers in data storage (qualitative), Principle of Fiber optics- Fiber optic communication system - Fiber optic sensors (pressure and displacement).

(Theory 9)

1. Determination of divergence of the laser beam
2. Determination of acceptance angle and numerical aperture of an optical fiber
3. Determination of wavelength of semiconductor laser

(Laboratory 9)

### UNIT III QUANTUM THEORY

15

Introduction- Blackbody Radiation - Newton's law of cooling - Planck's quantum theory- matter waves, de-Broglie wavelength, Heisenberg's Uncertainty principle, Time independent and Time-dependent Schrödinger's wave equations, Physical significance of wave function, Particle in a one-dimensional potential box - Particle in a three-dimensional box (qualitative) - degenerate and non-degenerate energy levels- Quantum tunneling - Scanning Tunneling Microscope (STM).

(Theory -9)

1. Determination of emissivity (Newton's law of cooling)
2. Determination of Planck's constant

(Laboratory- 6)

### UNIT IV BASICS OF QUANTUM COMPUTING

12

**Quantum Operators:** Linear vector spaces - inner product space - Hilbert space - examples  
**Vectors and Tensors:** Scalars and vectors, Dirac notations of Bra-Ket notation-Matrix representation of observables and states.

**Quantum Computing:** Quantum states - classical bits - quantum bits or qubits - Entanglement and superposition - multiple qubits - Bloch sphere - quantum gates - CNOT gate - Advantages of quantum computing over classical computing.

(Theory -9)

1. Truth table verification of CNOT gate through Virtual Laboratory

(Laboratory-3)

### UNIT V NANOELECTRONIC DEVICES

15

Introduction to Nano materials – synthesis by sol gel method, properties - Quantum confinement - Quantum structures: Density of energy states of quantum wells, quantum wires and quantum dots - band gap of nanomaterials - Quantum dot laser- Single electron phenomena -single electron transistor - Quantum system for information processing.

(Theory -12)

1. Synthesis of Nano-powders by sol-gel method

(Laboratory- 3)

**TOTAL: 75 PERIODS**

## **COURSE OUTCOMES**

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

CO1: Derive electrical and thermal conductivities using classical free electron theory

CO2: Calculate the electrical conductivity and bandgap in Intrinsic semiconductors

CO3: Associate the basic principles of working of laser and their applications in fiber optics

CO4: Calculate the energy eigen value and eigen function for a particle in a one- dimensional and three dimensional box using Schrodinger wave equations

CO5: Use quantum operators to frame equations for logic gates in Quantum computing

CO6: Relate the quantum properties of nanoscale materials with their applications

## **TEXTBOOKS:**

1. Neil W Ashcroft and N David Mermin, Solid State Physics, Harcourt College Publishers,1976
2. M.N. Avadhanulu and P.G. Kshirsagar, A textbook of Engineering Physics, S. Chand and Company, New Delhi, 2014.
3. David J. Griffiths, Introduction to Quantum Mechanics, 2nd Edition, Pearson Prentice-Hall (2004).
4. Thomas G. Wong, Introduction to Classical and Quantum Computing, Rooted Grove (2022).

## **REFERENCES:**

1. R. A. Serway and J.W. Jewett, Physics for Scientists and Engineers, Ninth Edition, Cengage Learning, 2014.
2. Marikani, Materials Science, PHI Learning Private Limited, Eastern Economy Edition, 2017.
3. R. Wolfson, Essential University Physics, Volume 1 and 2 with Mastering Physics, Global Edition,3rd Edition, Pearson 2017.
4. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning India, 2012.
5. Scott Aaronson, Quantum Computing Since Democritus, Cambridge University Press (2014).
6. Mermin, N. David, Making better sense of quantum mechanics. Reports on Progress in Physics 82.1 (2018): 012002.
7. Michael Nielsen, L. Isaac Chuang, Quantum Computation and Quantum Information, Cambridge University Press (2010).

8. NPTEL course on “Introduction to LASER” by Prof. M. R. Shenoy, IIT Delhi : [https://onlinecourses.nptel.ac.in/noc24\\_ph45/preview](https://onlinecourses.nptel.ac.in/noc24_ph45/preview)
9. NPTEL course on “Introduction to Quantum Computing: Quantum Algorithms and Qiskit” by Prof. Prabha Mandayam, Prof. Anupama Ray, Prof. Sheshashayee Raghunathan, IIT Madras, IBM Research, IBM Systems : [https://onlinecourses.nptel.ac.in/noc24\\_cs67/preview](https://onlinecourses.nptel.ac.in/noc24_cs67/preview)
10. NPTEL course on “Introduction to Semiconductor Devices” by Prof. Naresh Kumar Emani, IIT Hyderabad : [https://onlinecourses.nptel.ac.in/noc24\\_ee99/preview](https://onlinecourses.nptel.ac.in/noc24_ee99/preview)
11. Physics for Computer Science and Information Technology Laboratory Manual, R.M.K. College of Engineering and Technology, 2022.

#### **LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS**

<b>S. No.</b>	<b>Description of Equipment</b>	<b>Quantity</b>
1.	Semiconductor Laser Apparatus	6 Nos.
2.	Determination of optical fiber parameters	6 Nos.
3.	Lee’s disc apparatus	6 Nos.
4.	Bandgap determination set-up	6 Nos.
5.	Sol-gel synthesis of Nano-powders	6 Nos.
6.	Planck’s constant apparatus	6 Nos.
7.	Emissivity Determination Apparatus	6 Nos.

24CS101	PROGRAMMING IN C++ (Common to All Branches)	L	T	P	C
		3	0	3	4.5
<b>OBJECTIVES:</b>					
<b>The Course will enable learners:</b>					
<ul style="list-style-type: none"> <li>• To learn problem solving and programming fundamentals.</li> <li>• To gain knowledge on pointers and functions.</li> <li>• To apply the principles of object orientated programming.</li> <li>• To understand operator overloading, inheritance and polymorphism.</li> <li>• To use the functionalities of I/O operations, files build C++ programs using exceptions.</li> </ul>					
<b>UNIT I</b>	<b>PROGRAMMING FUNDAMENTALS</b>				<b>9+9</b>
Types of computer programming languages - Genesis of C++ - Program Life Cycle - Structure of C++ program - Identifiers - Variables - Keywords - Number System -Binary Number System -Octal Number System- Decimal Number System -Hexadecimal Number System - Data types - Constants - Errors – Operators- Expressions - Type Conversions - Control-Flow Statements - Conditional Statements - Iterative Statements - Unconditional Control Statements - Arrays - One-Dimensional Arrays - Two-Dimensional Arrays - Multi -Dimensional Arrays - Strings - String Manipulation Functions - Array of Strings.					
<b>List of Exercise/Experiments:</b>					
1. Write C++ programs for the following:					
a. Find the sum of individual digits of a positive integer.					
b. Compute the GCD of two numbers.					
c. Find the roots of a number (Newton 's method)					
2. Write C++ programs using arrays:					
a. Find the maximum of an array of numbers.					
b. Remove duplicates from an array of numbers.					
c. Print the numbers in an array after removing even numbers.					
3. Write C++ programs using strings:					
a. Checking for palindrome.					
b. Count the occurrences of each character in a given word.					
<b>UNIT II</b>	<b>POINTERS AND FUNCTIONS</b>				<b>9+9</b>
Pointers - Pointer Variables - Pointer Operators & Expressions -Pointers with Arrays - Functions - Scope Rules -Function Arguments -return Statement - Function Variables - Storage Classes - Types of storage classes - Create Header Files - User-Defined Functions - Inline Functions - Function Overloading -Recursion - Namespaces.					
<b>List of Exercise/Experiments:</b>					
1. Generate salary slip of employees using structures and pointers. Create a structure Employee with the following members:EID, Ename, Designation, DOB, DOJ, Basic pay Note that DOB and DOJ should be implemented using structure within structure.					
2. Compute internal marks of students for five different subjects using structures and functions.					
<b>UNIT III</b>	<b>CLASSES AND OBJECTS</b>				<b>9+9</b>
Concepts of Object Oriented Programming – Benefits of OOP – Simple C++ program - Classes and Objects - Member functions - Nesting of member functions - Private member					



functions - Memory Allocation for Objects - Static Data Members - Static Member functions - Array of Objects - Objects as function arguments - Returning objects - friend functions – Const Member functions - Constructors – Destructors.

**List of Exercise/Experiments:**

1. Write a program Illustrating Class Declarations, Definition, and Accessing Class Members.
2. Program to illustrate default constructor, parameterized constructor and copy constructors.

**Practice Questions & Scenario Based Questions:**

1. Imagine you are working as a software engineer at a tech company. Your team is developing a mathematical software library that will be used in various applications across the company. One of the features that your team lead has asked you to implement is a function that calculates the number of trailing zeros in the factorial of a number.

The team lead has emphasized the importance of encapsulation in your implementation.

2. Create a C++ class Calculator representing a simple calculator. The class should have the following attributes and methods:

Attributes: Two operands and an operation (+, -, \*, /)

Methods: Perform the operation and return the result

Implement constructors to initialize the calculator with default values (0,0) and with specified values. Also, implement a destructor to perform any necessary cleanup.

<b>UNIT IV</b>	<b>OPERATOR OVERLOADING, INHERITANCE AND POLYMORPHISM</b>	<b>9+9</b>
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Operator Overloading - Overloading Using Friend functions – Inheritance – Types of inheritance – Virtual Base Class - Abstract Class – Constructors in Derived Classes - member class: nesting of classes.

Pointer to objects – this pointer- Pointer to derived Class - Virtual functions – Pure Virtual Functions – Polymorphism.

**List of Exercise/Experiments:**

1. Write a Program to Demonstrate the i) Operator Overloading. ii) Function Overloading.
2. Write a Program to Demonstrate Friend Function and Friend Class.
3. Program to demonstrate inline functions.
4. Program for Overriding of member functions.
5. Write C++ programs that illustrate how the following forms of inheritance are supported:
  - a) Single inheritance b) Multiple inheritance c) Multi level inheritance d) Hierarchical inheritance.

**Practice Questions & Scenario Based Questions:**

1. Joy is a software developer at a 3D modeling company. The company is developing a new software tool that will be used by architects and engineers to design and analyze 3D models of various structures. One of the features that her project manager has asked is to implement a function that calculates the volume of basic 3D shapes like cylinders and cuboids. The project manager has emphasized the importance of using function overloading in her implementation..
2. Imagine you are a software developer tasked with creating a utility program for a school that handles student scores. The school wants a simple program where teachers can enter the scores of students for a particular test, and the program will then provide the highest and lowest scores among them. This will help the teachers quickly identify the top performer and the student who might need extra help.  
Your task is to write program that satisfies the above scenario using **inline function**
3. Develop a software system to manage part-time worker students at a university. These students have unique attributes such as their name, student ID, hourly wage, and hours worked per week. Your goal is to create a C++ program that models this system.
- 3 Ramu is a software developer at a company specializing in developing software solutions for geometric shapes. Recently, a client approached with a request to create a program to calculate the areas of rectangles and triangles.

**UNIT V****I/O, FILES AND EXCEPTIONS****9+9**

C++ Streams – Unformatted I/O - Formatted Console I/O – Opening and Closing File – File modes - File pointers and their manipulations – Templates – Class Templates – Function Templates - Exception handling.

**List of Exercise/Experiments:**

1. Program to demonstrate pure virtual function implementation.
2. Count the number of account holders whose balance is less than the minimum balance using sequential access file.
3. Write a Program to Demonstrate the Catching of all Exceptions.

**Practice Questions & Scenario Based Questions:**

1. Develop a simple library management system. Create a base class Book representing a book in the library. The class should have attributes such as title, author, and ISBN (International Standard Book Number). Implement a virtual function displayDetails() to display information about the book.
2. A software developer working on a banking application. One of the requirements is to analyze account holders' balances based on a minimum balance threshold. The application should read account information from a sequential access file, where each line represents an account record in the format: account\_holder\_name, balance.
3. The financial company is developing a new software tool that will be used by financial analysts to perform various calculations. One of the features of that project is to implement is a function that performs division of two numbers.  
Write a program that takes two integer inputs, numerator and denominator, from the user. Implement error handling to check if the denominator is zero. If the denominator is zero, display the message "Division by zero is not allowed!" using an exception. If the denominator is not zero, calculate the result of the division and display it.
4. Mini project.

**TOTAL: 45+45 = 90 PERIODS**

**OUTCOMES:**

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

- CO1:** Solve problems using basic constructs in C++.
- CO2:** Implement C++ programs using pointers and functions.
- CO3:** Apply object-oriented concepts and solve real world problems.
- CO4:** Develop C++ programs using operator overloading and polymorphism.
- CO5:** Implement C++ programs using Files and exceptions.
- CO6:** Develop applications using C++ concepts

**TEXT BOOKS:**

1. Herbert Schildt, "The Complete Reference C++", 4th edition, MH, 2015. (Unit 1 & 2)
2. E Balagurusamy, "Object Oriented Programming with C++", 4th Edition, Tata McGraw-Hill Education, 2008. (Unit 3, 4 & 5)

**REFERENCES:**

1. Karl Beecher, "Computational Thinking: A beginner's guide to problem-solving and programming", BCS Learning & Development Ltd, 2017. (Unit 1)
2. Nell Dale, Chip Weems, "Programming and Problem Solving with C++", 5<sup>th</sup> Edition, Jones and Barklett Publishers, 2010.
3. John Hubbard, "Schaum's Outline of Programming with C++", MH, 2016.
4. Yashavant P. Kanetkar, "Let us C++", BPB Publications, 2020
5. ISRD Group, "Introduction to Object-oriented Programming and C++", Tata McGraw-Hill Publishing Company Ltd., 2007.
6. D. S. Malik, "C++ Programming: From Problem Analysis to Program Design", Third Edition, Thomson Course Technology, 2007.
7. [https://infyspringboard.onwingspan.com/web/en/app/toc/lex\\_auth\\_01297200240671948837\\_shared/overview](https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01297200240671948837_shared/overview)

**LIST OF EQUIPMENTS:**

1. Standalone desktops with C/C++ compiler (or) Server with C/C++ compiler.

24CS102	SOFTWARE DEVELOPMENT PRACTICES (Common to All Branches)	L	T	P	C
		3	0	3	4.5
<b>OBJECTIVES:</b>					
<b>The Course will enable learners to:</b>					
<ul style="list-style-type: none"> <li>To discuss the essence of agile development methods.</li> <li>To set up and create a GitHub repository.</li> <li>To create interactive websites using HTML</li> <li>To design interactive websites using CSS.</li> <li>To develop dynamic web page using Java script.</li> </ul>					
<b>UNIT I</b>	<b>AGILE SOFTWARE DEVELOPMENT AND Git and GitHub</b>				<b>9+9</b>
<p>Software Engineering Practices – Waterfall Model - Agility – Agile Process – Extreme Programming - Agile Process Models – Adaptive Software Development – Scrum – Dynamic Systems Development Method – Crystal – Feature Driven Development – Lean Software Development – Agile Modeling – Agile Unified Process – Tool set for Agile Process.</p> <p>Introduction to Git –Setting up a Git Repository - Recording Changes to the Repository - Viewing the Commit History - Undoing Things - Working with Remotes -Tagging - Git Aliases - Git Branching - Branches in a Nutshell - Basic Branching and Merging - Branch Management - Branching Workflows - Remote Branches - Rebasing.</p> <p>Introduction to GitHub – Set up and Configuration - Contribution to Projects, Maintaining a Project – Scripting GitHub.</p>					
<b>List of Exercise/Experiments:</b>					
<ol style="list-style-type: none"> <li>Form a Team, Decide on a project: <ol style="list-style-type: none"> <li>Create a repository in GitHub for the team.</li> <li>Choose and follow a Git workflow <ul style="list-style-type: none"> <li>Each team member can create a StudentName.txt file with contents about themselves and the team project</li> <li>Each team member can create a branch, commit the file with a proper commit message and push the branch to remote GitHub repository.</li> <li>Team members can now create a Pull request to merge the branch to master branch or main development branch.</li> <li>The Pull request can have two reviewers, one peer team member and one faculty. Reviewers can give at least one comment for Pull Request updating.</li> <li>Once pull request is reviewed and merged, the master or main development branch will have files created by all team members.</li> </ul> </li> </ol> </li> <li>Create a web page with at least three links to different web pages. Each of the web pages is to be designed by a team member. Follow Git workflow, pull request and peer reviews.</li> </ol>					
<b>UNIT II</b>	<b>HTML</b>				<b>9+9</b>
<p>Introduction – Web Basics – Multitier Application Architecture – Cline-Side Scripting versus Server-side Scripting – HTML5 – Headings – Linking – Images – Special Characters and Horizontal Rules – Lists – Tables – Forms – Internal Linking – meta Elements – Form input Types – input and datalist Elements – Page-Structure Elements.</p>					

**List of Exercise/Experiments:**

1. Create web pages using the following:
  - Tables and Lists
  - Image map
  - Forms and Form elements
  - Frames

**UNIT III****CSS****15**

Inline Styles – Embedded Style Sheets – Conflicting Styles – Linking External Style Sheets – Positioning Elements – Backgrounds – Element Dimensions – Box Model and Text Flow – Media Types and Media Queries – Drop-Down Menus – Text Shadows – Rounded Corners – Colour – Box Shadows – Linear Gradients – Radial Gradients – Multiple Background Images – Image Borders – Animations – Transitions and Transformations – Flexible Box Layout Module – Multicolumn Layout.

**List of Exercise/Experiments:**

1. Apply Cascading style sheets for the web pages created.

**UNIT IV****JAVASCRIPT BASICS****9+9**

Introduction to Scripting – Obtaining user input – Memory Concepts – Arithmetic – Decision Making: Equality and Relational Operators – JavaScript Control Statements – Functions – Program Modules – Programmer-defined functions – Scope rules – functions – Recursion – Arrays – Declaring and Allocating Arrays – References and Reference Parameters – Passing Arrays to Functions – Multidimensional arrays.

**List of Exercise/Experiments:**

1. Form Validation (Date, Email, User name, Password and Number validation) using JavaScript.

**UNIT V****JAVASCRIPT OBJECTS****9+9**

Objects – Math, String, and Date, Boolean and Number, document Object – Using JSON to Represent objects – DOM: Objects and Collections – Event Handling.

**List of Exercise/Experiments:**

1. Implement Event Handling in the web pages.

Mini Projects-Develop any one of the following web applications (not limited to one) using above technologies.

- a. Online assessment system
- b. Ticket reservation system
- c. Online shopping
- d. Student management system
- e. Student result management system
- f. Library management
- g. Hospital management
- h. Attendance management system
- i. Examination automation system
- j. Web based chat application

**TOTAL: 45 (L) + 45 (P) = 90 PERIODS**

**OUTCOMES:**

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

**CO1:** Understand basic software engineering practices effectively.

**CO2:** Apply version control using Git and GitHub, and manage code repositories proficiently.

**CO3:** Design web applications using HTML, CSS, and JavaScript.

**CO4:** Analyze problems and create solutions using CSS for better web page presentation and usability.

**CO5:** Develop interactive web pages using JavaScript with an event-handling mechanism.

**CO6:** Apply the technological changes and improve skills continuously.

**TEXT BOOKS:**

1. Roger S. Pressman, "Software Engineering: A Practitioner's Approach", McGraw Hill International Edition, Ninth Edition, 2020.
2. Scott Chacon, Ben Straub, "Pro GIT", Apress Publisher, 3rd Edition, 2014.
3. Deitel and Deitel and Nieto, "Internet and World Wide Web - How to Program", Pearson, 5th Edition, 2018.

**REFERENCES:**

1. Roman Pichler, "Agile Product Management with Scrum Creating Products that Customers Love", Pearson Education, 1st Edition, 2010.
2. Jeffrey C and Jackson, "Web Technologies A Computer Science Perspective", Pearson Education, 2011.
3. Stephen Wynkoop and John Burke, "Running a Perfect Website", QUE, 2nd Edition, 1999.
4. Chris Bates, "Web Programming – Building Intranet Applications", 3rd Edition, Wiley Publications, 2009.
5. Gopalan N.P. and Akilandeswari J., "Web Technology", Second Edition, Prentice Hall of India, 2014.
6. [https://infyspringboard.onwingspan.com/web/en/app/toc/lex\\_auth\\_013382690411003904735\\_shared/overview](https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013382690411003904735_shared/overview)
7. [https://infyspringboard.onwingspan.com/web/en/app/toc/lex\\_auth\\_0130944214274703362099\\_shared/overview](https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_0130944214274703362099_shared/overview)

**LIST OF EQUIPMENTS:**

1. Systems with either Netbeans or Eclipse
2. Java/JSP/ISP Webserver/Apache
3. Tomcat / MySQL / Dreamweaver or
4. Equivalent/ Eclipse, WAMP/XAMP

	<b>COURSE TITLE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>24EC102</b>	<b>DIGITAL PRINCIPLES AND SYSTEMS DESIGN</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>4</b>

**COURSE OBJECTIVES:**

The Course will enable learners to:

- To acquire the knowledge in Digital fundamentals and its simplification methods.
- To familiarize the design of various combinational digital circuits using logic gates.
- To realize various sequential circuits using flip flops.
- To elucidate various semiconductor memories and related technology.
- To build various logic functions using Programmable Logic Devices

<b>UNIT I</b>	<b>BOOLEAN ALGEBRA AND LOGIC GATES</b>	<b>9</b>
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Review of number systems-representation-conversions, Review of Boolean algebra theorems, sum of product and product of sum simplification, canonical forms, min term and max term, Simplification of Boolean expressions-Karnaugh map, Implementation of Boolean expressions using logic gates and universal gates.

**List of Exercise/Experiments:**

1. Implementation of Boolean expression using logic gates.

<b>UNIT II</b>	<b>COMBINATIONAL LOGIC CIRCUITS</b>	<b>9</b>
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Design of combinational circuits - Half and Full Adders, Half and Full Subtractors, Binary Parallel Adder – Carry look ahead Adder, Magnitude Comparator, Decoder, Encoder, Priority Encoder, Mux/De-mux, Parity Generator/Checker

**List of Exercise/Experiments:**

2. Design of adders
3. Design of subtractors.
4. Design of binary adder using IC7483
5. Design of Multiplexers & Demultiplexers.
6. Design of Encoders and Decoders.
7. Implementation of a boolean function using a multiplexer

<b>UNIT III</b>	<b>SEQUENTIAL CIRCUITS</b>	<b>9</b>
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Flip flops – SR, JK, T, D, Master/Slave FF – operation and excitation tables, Asynchronous and Synchronous Counters Design - Shift registers, Universal Shift Register

**List of Exercise/Experiments:**

8. Design and implementation of 3 bit ripple counters.
9. Design and implementation of 3 bit synchronous counter
10. Design and implementation of shift registers

<b>UNIT IV</b>	<b>SYNCHRONOUS SEQUENTIAL CIRCUITS DESIGN</b>	<b>9</b>
Design of clocked sequential circuits - Moore/Mealy models, state minimization, state assignment, circuit implementation.		
<b>UNIT V</b>	<b>MEMORY AND PROGRAMMABLE LOGIC DEVICES</b>	<b>9</b>
Basic memory structure ROM: PROM – EPROM – EEPROM –RAM – Static and dynamic RAM – Programmable Logic Devices: Programmable Logic Array (PLA) – Programmable Array Logic (PAL) – Implementation of combinational logic circuits using PLA, PAL.		
<b>TOTAL: 45 PERIODS (THEORY) + 30 PERIODS (LAB) = 75 PERIODS</b>		
<b>COURSE OUTCOMES:</b>		
<p>Upon completion of the course, the students will be able to:</p> <p>CO1: Apply Boolean algebra to simplify and implement digital circuits.</p> <p>CO2: Design combinational circuits to meet specific functional requirements using logic gates.</p> <p>CO3: Demonstrate the operation of counters and shift registers using flip-flops in sequential circuits.</p> <p>CO4: Analyze synchronous sequential circuits to determine their behavior and performance characteristics.</p> <p>CO5: Evaluate various types of memory devices, discussing their roles and functionalities in digital systems.</p> <p>CO6: Construct combinational circuits using Programmable Logic Devices (PLDs) to solve complex digital design problems.</p>		
<b>TEXTBOOKS:</b>		
<ol style="list-style-type: none"> <li>1. M. Morris Mano and Michael D. Ciletti, Digital Design, With an Introduction to the Verilog HDL, VHDL, and System Verilog, 6th Edition, Pearson, 2018.</li> <li>2. S.Salivahanan and S.Arivazhagan, Digital Circuits and Design, 5th Edition, Oxford University Press, 2018.</li> </ol>		
<b>REFERENCES:</b>		
<ol style="list-style-type: none"> <li>1. A.Anandkumar, Fundamental of digital circuits, 4th Edition, PHI Publication, 2016.</li> <li>2. William Kleitz, Digital Electronics-A Practical approach to VHDL, Prentice Hall International Inc, 2012.</li> <li>3. Charles H. Roth, Jr. and Larry L. Kinney, Fundamentals of Logic Design, 7th Edition, Thomson Learning, 2014.</li> <li>4. Thomas L. Floyd, Digital Fundamentals, 11th Edition, Pearson Education Inc, 2017.</li> <li>5. John. M Yarbrough, Digital Logic: Applications and Design, 1st Edition, Cengage India, 2006</li> </ol>		
<b>NPTEL LINK:</b>		
<a href="https://nptel.ac.in/courses/108105132">https://nptel.ac.in/courses/108105132</a>		



**LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS**

IC Trainer Kit -15 Nos

ICs each - 30 Nos

7400/ 7404 / 7486 / 7408 / 7432 / 7483 / 7473 / 7411/7474

<b>COURSE CODE</b>	<b>HERITAGE OF TAMILS (Theory Course)</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>24GE101</b>	<b>(Common to All I Semester B.E./B.Tech Programmes)</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>

**OBJECTIVES:**

The course is designed to

- Recognize Tamil literature and its significance in Tamil culture.
- Introduce the Tamils' rich artistic and cultural legacy.
- Familiarize the different types of folk and martial arts that are unique to Tamil Nadu.
- Acquaint the concept of Thinai in Tamil literature and culture.
- Comprehend the significance of Tamil in developing Indian culture.

**UNIT I LANGUAGE AND LITERATURE 3**

Language Families in India - Dravidian Languages - Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature - Distributive Justice in Sangam Literature Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry- Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.

**UNIT II HERITAGE-ROCK ART PAINTINGS TO MODERN ART - SCULPTURE 3**

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

**UNIT III FOLK AND MARTIAL ARTS 3**

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

**UNIT IV THINAI CONCEPT OF TAMILS 3**

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 3**

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**

## OUTCOMES:

**At the end of the course, the learners will be able to**

CO1: Imbibe the local wisdom and its contribution in the makeup of our general knowledge of universe

CO2: Critically appreciate Tamil literature for its societal ethical principles.

CO3: Explore the essence of heritage and its importance in the present contexts.

CO4: Decipher the relevance of Thirukkural and Sangam literature in contemporary times.

CO5: Analyze, interrogate and redefine the multi-faceted aspects of the heritage of Tamils.

## TEXT - CUM - REFERENCE BOOKS

1. தமிழக வரலாறு – மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)
2. கணினித் தமிழ் -முனைவர் இல.சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருதை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL– (inprint)
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, TamilNadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

**அலகு I மொழி மற்றும் இலக்கியம்:**

இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி - தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமயச் சார்பற்ற தன்மை - சங்க இலக்கியத்தில் பகிர்தல் அறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ்க் காப்பியங்கள், தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

**அலகு II மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை - சிற்பக் கலை:** 3

நடுகல் முதல் நவீக சிற்பங்கள் வரை - ஐம்பொன் சிலைகள் - பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் - தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனையில் திருவள்ளுவர் சிலை - இசைக் கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

**அலகு III நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்:** 3

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஓயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

**அலகு IV தமிழர்களின் திணைக் கோட்பாடுகள்:** 3

தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு - சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் - சங்ககால நகரங்களும் துறை முகங்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.

**அலகு V இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு** 3

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ்ப் புத்தகங்களின் அச்ச வரலாறு.

**TOTAL: 15 PERIODS****TEXT - CUM - REFERENCE BOOKS**

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)
2. கணினித் தமிழ் -முனைவர் இல.சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருறை - ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL - (inprint)
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, TamilNadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

Course Code	<b>INTERPERSONAL SKILLS, PSYCHOMETRIC ANALYSIS AND CAREER DEVELOPMENT</b> (Common to all the branches)	L	T	P	C
24HS111			1	0	0

## OBJECTIVES

**The course will enable the learners to:**

- Evaluate and enhance language proficiency by using SMART Vox to assess communication skills and linguistic abilities.
- Explore future technologies, solve real-time problems, and prepare students for campus recruitment.
- Assess and develop work style, cognitive abilities, emotional intelligence, and work competencies
- Explore placements, internships, higher education options, GATE and CAT exams, and career development.
- Understand career milestones, assess personal skills and personality, and develop effective goal-setting strategies for successful career planning

### UNIT I LANGUAGE PROFICIENCY EVALUATION

**3**

Identification of Strengths and Weaknesses - Assessing Language Skills (Diagnostic tests and interactive exercises) - Measuring Language Competence (Proficiency Levels) - Identifying Support Needs - Developing Individual Learning Plans - Enhancing Student Experience (Building Confidence) – Evaluation using SMART Vox

### UNIT II CAREER GUIDANCE

**3**

Future of Engineering- Various aspects of Technology and its Applications - Future of Technologies – Branch Specific emerging technologies - Problems solving through open source - Campus recruitment process.

### UNIT III PSYCHOMETRIC EVALUATION

**3**

Understanding Behavioural work style (Personality)- Testing of numerical, logical, and verbal reasoning skills (Cognitive Abilities / Aptitude) – Measure of emotional intelligence and interpersonal skills – Determination of Culture Preferences in various workplace scenarios – Evaluation of Work Competencies through targeted games and simulations

### UNIT IV CAREER PREPARATION

**3**

Present Scenario of Engineering - Placement Opportunities - Internship Opportunities - Types of Internships- Higher Education opportunities in India and Abroad - Understanding GATE and CAT Exams - Other Opportunities - Career path development plans.

## **UNIT V CAREER VISION AND PLANNING**

**3**

Introduction to career milestones - Overview of the Vision Assessment and its benefits - Psychometric evaluation - Numeracy, Literacy, Visual Reasoning, Algorithmic Thinking - Introduction to a goal-setting model - Identification career pathways aligned with personality profiles - Evaluate personal skills and abilities in various areas.

### **COURSE OUTCOMES**

**TOTAL: 15 PERIODS**

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

CO1: Assess and improve their English language proficiency using SMART Vox, gaining insights into their communication skills and linguistic competence

CO2: Understand future engineering trends, emerging technologies, importance of solving real-time problems, and the process of campus recruitment.

CO3: Evaluate their behavioral work style, cognitive abilities, emotional intelligence, cultural preferences, and work competencies.

CO 4: Understand the current engineering landscape, placement opportunities, and higher education prospects to develop effective career path plans

CO5: Develop a clear and actionable vision for their future career path.

COURSE CODE	COURSE TITLE	L	T	P	C
24EC111	IDEA LAB –I (Common to all Branches)	0	0	1	0

The students may be grouped into 3 to 4. The device/Machine/system/component are studied by the students and a final presentation to be done by the students about the study of various devices or machinery at the end of the semester.

#### COURSE OBJECTIVES:

**Students completing this course are expected to**

- Understand the functionalities and limitation of various machines/equipment
- Demonstrate various operations that can be performed using various machines

#### LIST OF EXPERIMENTS

1. Study of fundamental operations of 3D Printer and Scanner with Software.
2. Study of Laser cutting machine.
3. Study of CNC Router machine.
4. Study of Fundamentals of basic circuit design, Soldering and Desoldering.
5. Study of PCB Milling Machine.

**TOTAL: 15 PERIODS**

#### COURSE OUTCOMES:

**After successful completion of the course the students will be able to do**

CO1: Describe the working of the machine element.

CO2: Discuss the various applications of engineering materials.

CO3: Describe the process for converting ideas into prototypes.

#### LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

S. No	Equipment Name	Quantity
1	CNC Router	1 No
2	3D Printer	1 No
3	3D Scanner	1 No
4	Laser cutting Machine	1 No
5	Multimeter	5 Nos
6	Solder Stations	5 Sets
7	Desoldering Machine	1 No
8	PCB Milling Machine	1 No



9	Variable Power Supply	1 No
10	Electronic Components like Resistors, Transistors, Diode, Inductor, Capacitor, etc.	10 Sets

<b>Course Code</b>	<b>ENVIRONMENTAL SCIENCE AND SUSTAINABILITY</b> (Common for I semester B.E. – CSE(CS), ECE, EE(VLSI) and II semester B.E. – CSE, B.Tech – AIDS)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
24CH102		2	0	0	MC

## OBJECTIVES:

### The course will enable the learners

- To gain knowledge of the environment and various natural resources.
- To identify the Scientific and Technological solutions to pollution issues and waste management.
- To understand the significance of the conservation of biodiversity.
- To recognize the needs and benefits of sustainability and its management.
- To comprehend the effects of human population on the environment.

## UNIT I NATURAL RESOURCES 7

Definition, scope and importance of environment – need for public awareness. Introduction to natural resources - types - forest resources: use and over-exploitation, deforestation and its impacts, food resources: effects of modern agriculture, organic farming, renewable energy sources - solar, wind, geothermal, tidal, OTE and biomass. field activity -tree plantation

## UNIT II POLLUTION AND WASTE MANAGEMENT 7

Pollution - definition –causes, effects and control measures of (a) air pollution (b) water pollution (c) soil pollution (d) noise pollution (e) nuclear hazards - nuclear accidents and holocaust - role of an individual in prevention of pollution –case studies.

Waste management- municipal solid wastes, E- waste, plastic waste.

Field study – Solid waste management of the institution

## UNIT III BIODIVERSITY AND ITS CONSERVATION 6

Biodiversity: types – values of biodiversity, India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity – endangered and endemic species, extinct, rare, vulnerable species of India – conservation of biodiversity: in-situ and ex-situ method.

Field study – Biodiversity of the institution

## UNIT IV SUSTAINABILITY AND MANAGEMENT 5

Sustainability-concept, needs and challenges- circular economy - sustainable development goals- concept of carbon footprint, environmental impact assessment, clean development mechanism, solutions.

Field study – Alternate energy sources and its impacts

Introduction - population growth, variation among nations, population explosion, environment and human health – endemic/epidemic/pandemic – role of information technology in environment and human health.

Case Study – Pandemics of 21<sup>st</sup> century

**TOTAL: 30 PERIODS**

**COURSE OUTCOMES:**

**Upon completion of the course, the students will be able**

CO1: To investigate and use conservational practices to protect natural resources.

CO2: To identify the causes of pollutants and illustrate suitable methods for pollution abatement.

CO3: To analyze the values of biodiversity and its conservational methods.

CO4: To classify suitable sustainable development practices and apply it in day-to-day life.

CO5: To assess the impacts of human population and suggest suitable solutions.

CO6: To develop innovative solutions and strategies to address sustainability challenges.

**TEXTBOOKS:**

1. Anubha Kaushik and C.P. Kaushik, “Perspectives in environmental studies”, New Age International Publishers, 8<sup>th</sup> edition, 2024.
2. Benny Joseph, Environmental Science and Engineering, McGraw-Hill, 1<sup>st</sup> edition, 2017.
3. Gilbert M. Masters, Introduction to Environmental Engineering and Science, Pearson Education, 3<sup>rd</sup> edition, 2014.
4. Erach Bharuch, Textbook of Environmental Studies for Undergraduate Courses, Universities Press(I) Pvt. Ltd., 3<sup>rd</sup> edition, 2021.

**REFERENCES:**

1. William P. Cunningham and Mary Ann Cunningham Environmental Science: A Global Concern, McGraw Hill, 14<sup>th</sup> edition, 2017.
2. Rajagopalan, R, Environmental Studies-From Crisis to Cure, Oxford University Press, 2015.
3. G. Tyler Miller and Scott E. Spoolman, —Environmental Science, Cengage Learning India Pvt, Ltd., Delhi, 2014.
4. Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall, 2012.
5. Bradley. A.S; Adebayo, A.O. and Maria, P. Engineering applications in sustainable design and development, Cengage learning, 2015.
6. Environment Impact Assessment Guidelines, Notification of Government of India, 2006 and subsequent amendments, 2022

<b>Course Code</b>	<b>Student Induction Program (SIP)</b> (Common to all branches of First Year B.E. / B. Tech)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
24MC101		<b>3 Weeks</b>			

## OBJECTIVES

**The course will enable the learners to:**

- Facilitate the adjustment of new students to the new environment, ensuring they feel comfortable and supported.
- Inculcate the institution's ethos and culture in new students, helping them internalize these values.
- Encourage the building of bonds among students and between students and faculty members.
- Expose students to a sense of larger purpose and guide them in their journey of self-exploration.

The various modules or core areas recommended for the 3-week SIP are

### **Module 1: Universal Human Values I** **18**

Welcome and Introductions - Aspirations and Concerns - Self- Management - Health - Relationships - Society - Natural Environment - Sum Up - Self-evaluation and Closure.

### **Module 2: Physical Health and Related Activities** **6**

Special Lecturers: Happy and Healthy lifestyle - Physical Health -Mental Health - Health and Fitness.

### **Module 3: Familiarization of Department/ Branch and Innovation** **8**

Principal Address - Address by Head of Science and Humanities - Addresses by Respective Department HoDs – Campus Tour – CoE introduction – Introduction of Student Activity Cell (SAC).

### **Module 4: Visit to a Local Area** **4**

Virtual tour: Government Museum - Theosophical Society - Fort St. George - Ripon Building - Kalakshetra Foundation - Anna Centenary Library - Marina Beach - St. Thomas Mount - Vivekananda House.

### **Module 5: Lectures by Eminent People** **10**

Special Lecturers: Academics – industry – Careers – Art - Self-management.

### **Module 6: Proficiency Modules** **30**

Basic Competencies: C Programming, Foundation in Mathematics, Interpersonal Communication.

<b>Module 7: Literature / Literary Activities</b>	<b>7</b>
Literary Debate - Creative Writing Workshop - Literature Circle Discussions - Author Study and Presentation.	
<b>Module 8: Creative Practices</b>	<b>10</b>
Activity: Handicrafts (Painting / Drawing / Pottery / Knitting / Jewellery making, etc.)	
<b>Module 9: Extra Curricular Activities</b>	<b>10</b>
Students Activity Cell: Activities from Coding Club – Math Club -- Language Club - Astronomy Club - ECO Club - Photography Club - Tedx Club -Yoga Club.	
<b>Valedictory and Closing Ceremony</b>	<b>2</b>
<b>TOTAL: 105 PERIODS</b>	

## **COURSE OUTCOMES**

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

- Achieve a smooth transition where students feel comfortable and confident in their new environment.
- Demonstrate a strong understanding and practice of the institution's ethos and culture within the campus community.
- Build meaningful and supportive relationships with peers and faculty members.
- Develop a clear sense of purpose and engage in self-exploration, leading to a deeper understanding of personal goals and aspirations.

## **REFERENCE:**

<https://www.aicte-india.org/sites/default/files/Detailed%20Guide%20on%20Student%20Induction%20program.pdf>

## SEMESTER – II

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	24MA201	Linear Algebra and Applications (Lab Integrated)	BSC	5	3	0	2	4
2.	24CH101	Engineering Chemistry (Lab Integrated)	BSC	5	3	0	2	4
3.	24CS201	Data Structures (Lab Integrated)	ESC	6	3	0	3	4.5
4.	24CS202	Java Programming (Lab Integrated)	ESC	6	3	0	3	4.5
5.	24AI201	Introduction to Artificial Intelligence (Lab Integrated)	ESC	4	2	0	2	3
6.	24GE201	Tamils and Technology	HSMC	1	1	0	0	1
7.	24EC211	Idea Lab II	EEC	2	0	0	2	1
8.	24HS201	Innovation and Creativity Skills Development	EEC	1	1	0	0	1
9.	24MC201	Yoga for Stress Management (Non Credit)	AC	1	0	0	1	0
<b>TOTAL</b>				<b>31</b>	<b>16</b>	<b>1</b>	<b>15</b>	<b>23</b>

<b>Course Code</b>	<b>LINEAR ALGEBRA AND APPLICATIONS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
24MA201	Theory with Laboratory Component (Common to II Semester B.E-CSE, CSE(CS) and B.Tech- AI&DS Branches)	3	0	2	4

## **OBJECTIVES:**

### **The course will enable the learners to:**

- Comprehend the fundamental concepts of matrices.
- Illustrate the basic notions associated with vector spaces and its properties.
- Utilize the Gram-Schmidt ortho normalization process.
- Understand the components and implications for vector spaces by rank-nullity dimension theorem.
- Calculate the eigenvalues and eigenvectors of linear transformations.

## **UNIT I MATRICES AND SYSTEM OF LINEAR EQUATIONS**

**15**

Matrices – Row echelon form – Rank of a matrix – System of linear equations – Consistency – Gauss elimination method – Gauss Jordan method.

### **Experiments using C Language:**

1. Solve the system of equations using Gauss Elimination method.
2. Solve the system of equations using Gauss Jordan method.

## **UNIT II VECTOR SPACES**

**15**

Real and Complex fields – Vector spaces over Real and Complex fields – Subspace – Linear space – Linear independence and dependence (Statement only) – Bases and Dimensions.

### **Experiments using C Language:**

1. Check whether the given vectors are linearly independent or not.
2. Find the basis and dimension for given vectors.

## **UNIT III INNER PRODUCT SPACES**

**15**

Inner product space and norms – Properties – Orthogonal, Orthonormal vectors – Gram- Schmidt ortho normalization process – Least squares approximation.

### **Experiments using C Language:**

1. Find the orthogonal vectors using inner product.
2. Find the orthonormal vectors using inner product.

## **UNIT IV LINEAR TRANSFORMATION**

**15**

Linear transformation – Range and null space – Rank and nullity – Rank nullity Dimension theorem – Matrix representation of linear transformation – Eigenvalues and eigenvectors of linear

transformation.

**Experiments using C Language:**

1. Find the Rank and Nullity of a matrix.
2. Find the eigenvalues and eigenvectors of a matrix.

**UNIT V EIGENVALUE PROBLEMS AND MATRIX DECOMPOSITION 15**

Eigenvalue problems – Power method – Jacobi method – Singular value decomposition – QR decomposition.

**Experiments using C Language:**

1. Solve the system of equations using Jacobi method.
2. Find QR decomposition of a matrix.

**TOTAL: 75 PERIODS**

**COURSE OUTCOMES:**

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

CO1: Solve the system of linear equations using Gauss elimination and Gauss Jordan method.

CO2: Analyze vector spaces to determine their bases and dimensions.

CO3: Apply Gram-Schmidt process to ortho normalize sets of vectors.

CO4: Apply rank nullity theorem to analyse linear transformations.

CO5: Compute the eigenvalues and eigenvectors using singular value decomposition.

CO6: Understand the ideas of least squares approximations and its applications.

**TEXT BOOKS:**

1. A.H. Friedberg, A. J. Insel, and L. Spence, “Linear Algebra”, Prentice Hall of India, 5<sup>th</sup> Edition, New Delhi, 2008.
2. Steven J. Leon, “Linear Algebra with Applications”, Pearson Education International, 9<sup>th</sup> Edition, United States of America, 2015

**REFERENCES:**

1. G. Strang, “Linear Algebra and its applications”, Thomson (Brooks / Cole), 4<sup>th</sup> Edition, New Delhi, 2005.
2. C.F. Gerald and P.O. Wheatley, “Applied Numerical Analysis”, 7<sup>th</sup> Edition, Pearson Education, New Delhi, 2004.
3. Richard Branson, “Matrix Operations”, Schaum's outline series, 1989.
4. Bernard Kolman, R. David R. Hill, “Introductory Linear Algebra”, Pearson Educations, New Delhi, First Reprint, 2009.
5. S. Kumaresan, “Linear Algebra - A geometric approach”, Prentice Hall of India, New Delhi, Reprint, 2010.
6. NPTEL course on "Linear Algebra", by Prof. K. C. Sivakumar, IIT Madras: <https://archive.nptel.ac.in/courses/111/106/111106051/#>



Course Code	<b>ENGINEERING CHEMISTRY</b>	L	T	P	C
24CH101	Theory Course with Laboratory Component (Common for I semester B.E. – CSE, B.Tech – AIDS and II semester B.E. – CSE(CS))	3	0	2	4

## OBJECTIVES:

### The course will enable the learners

- To gain a comprehensive knowledge on polymers utilized in various industrial sectors.
- To knowledge on the fundamental principles of energy storage devices.
- To gain insights into the basic concepts and applications of chemical sensors and cheminformatics.
- To identify the different types of smart materials and explore their applications in Engineering and Technology.
- To assimilate the preparation, properties and applications of nanomaterials in various fields.

## UNIT I INDUSTRIAL POLYMERS

15

Polymers: Terminology – functionality, degree of polymerization, properties – glass transition temperature and molecular weight (weight average method).

Engineering plastics: preparation, properties and application of Polyethylene, Teflon, Polyethylene terephthalate and Epoxy resin- industrial applications of Polyethylene and Polyethylene terephthalate in packaging.

Special polymers: preparation, properties and applications of piezoelectric polymer - Polyvinylidene fluoride, electroactive polymer-Polyacetylene and biodegradable polymer - Polylactic acid .

(Theory-9)

1. Determination of the molecular weight of polymer using viscometer.
2. Determination of degradation of biodegradable polymer using photoreactor.
3. Demonstrate the applications of biodegradable plastic using 3D printing.

(Laboratory-6)

## UNIT II ENERGY STORAGE DEVICES AND GREEN FUEL

15

Introduction to Electrochemical cell and its terminology - electrochemical series and its applications.

Batteries: classification - construction and working principle -primary alkaline battery - secondary battery - Pb-acid battery.

Green fuel – Hydrogen - production (Photo electrocatalytic and photo catalytic water splitting), construction, working principle and applications in H<sub>2</sub> -O<sub>2</sub> fuel cells.

Batteries used in E- vehicle: Ni-metal hydride battery, Li-ion Battery - recycling of Li-ion batteries by direct cycling method; environmental effects of different energy storage devices.

(Theory-9)

1. Construction of electrochemical cell.
2. Determination of discharging state of Pb-acid battery by estimating the strength of the acid correlates with specific gravity.
3. Study of performance of a battery using battery analyzing module.

(Laboratory-6)

### **UNIT III CHEMICAL SENSORS AND CHEMINFORMATICS**

**15**

Introduction: classification of chemical sensors -principle, construction and working of chemical sensors; pH sensor – Glass electrode; Breath analyzer; Industrial sensor – CO<sub>2</sub> sensors- Sensor for health care – Glucose sensor.

Cheminformatics: definition, scope, and significance; applications in the environmental sector – carbon footprint measurements, data analysis and interpretation.

(Theory-9)

1. Determination of the amount of given hydrochloric acid using a pH meter.
2. Calculate the carbon footprint from the provided dataset, analyze the results and draw conclusions.

(Laboratory-6)

### **UNIT IV SMART MATERIALS**

**15**

Shape Memory Alloys: introduction - shape memory effect – functional properties of SMAs – types of SMA - Nitinol (Ni-Ti) alloys and its applications.

Chromogenic materials: introduction – types, applications in chemical and biological detection, display technologies, smart windows and light- modulating devices, biomedical and healthcare.

Smart Hydrogels: Introduction - Super Absorbent Polymers (SAP) - preparation, properties and applications of polyacrylic acid and sodium polyacrylate

(Theory-9)

1. Demonstrate the shape memory effect using Nitinol wire.
2. Determination of pH sensitivity of bromothymol blue.
3. Determination of absorption efficiency of hydrogel by using kinetic study.

(Laboratory-6)

### **UNIT V NANO CHEMISTRY**

**15**

Introduction – synthesis – top-down process (laser ablation, chemical vapor deposition), bottom-up process (precipitation, electrochemical deposition) - properties of nanomaterials – types – nanotubes -carbon nanotubes, applications of CNT - nanocomposites – general applications of nanomaterials

in electronics, information technology, medical and healthcare, energy, environmental remediation, construction and transportation industries.

(Theory-9)

1. Preparation of nano BaSO<sub>4</sub> by precipitation method.
2. Demonstrate the efficiency of nano adsorbents in polluted water.

(Laboratory-6)

**TOTAL: 75 PERIODS**

### **COURSE OUTCOMES:**

**Upon completion of the course, the students will be able**

CO1: To examine the role of polymers in different industrial sectors.

CO2: To identify the suitability of batteries for various fields.

CO3: To apply the fundamental principles of chemical sensors, cheminformatics and their applications across various industries.

CO4: To analyze the types of smart materials used in various engineering fields.

CO5: To explore the applications of nanomaterials in various fields, considering their advantages and limitations.

CO6: To integrate the concepts of chemistry for various engineering applications.

### **TEXTBOOKS:**

1. P. C. Jain and Monika Jain, "Engineering Chemistry", Dhanpat Rai Publishing Company Pvt. Ltd., New Delhi, 19<sup>th</sup> Edition, 2024.
2. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2<sup>nd</sup> reprint, 2012.

### **REFERENCES:**

1. S.S. Dara and S.S. Umare, "A Textbook of Engineering Chemistry", S. Chand & company, New Delhi, 12<sup>th</sup> Edition, 2022.
2. V.R. Gowarikar, Polymer Science, New Age International Publishers, 4th edition, 2021.
3. J. C. Kuriacose and J. Rajaram, "Chemistry in Engineering and Technology", Volume -1 & Volume -2, Tata McGraw-Hill Education Pvt. Ltd., 2010.
4. Barry A. Bunin, Brian Siesel, and J. Bajorath, "Chemoinformatics: Theory, Practice, & Products", Springer, First Edition, 2007.
5. Geoffrey A. Ozin, Andre C. Arsenault and Ludovico Cademartiri, "Nanochemistry: A Chemical Approach to Nanomaterials", RSC publishers, 2<sup>nd</sup> Edition, 2015.
6. J. Mendham, R. C. Denney, J. D. Barnes, M. J. K. Thomas and B. Sivasankar, "Vogel's Quantitative Chemical Analysis", Pearson Education Pvt. Ltd., 6<sup>th</sup> edition, 2019.

7. NPTEL course on “Polymers: concepts, properties, uses and sustainability”  
Prof. Abhijit P Deshpande, IIT-Madras,  
[https://onlinecourses.nptel.ac.in/noc20\\_ch41/preview](https://onlinecourses.nptel.ac.in/noc20_ch41/preview)
8. NPTEL course on “Electrochemical Energy Storage”  
Prof. Subhasish Basu Majumder, IIT Kharagpur,  
[https://onlinecourses.nptel.ac.in/noc21\\_mm34/preview](https://onlinecourses.nptel.ac.in/noc21_mm34/preview)
9. NPTEL course on “Nanotechnology, Science and Applications”  
Prof. Prathap Haridoss, IIT-Madras,  
[https://onlinecourses.nptel.ac.in/noc22\\_mm33/preview](https://onlinecourses.nptel.ac.in/noc22_mm33/preview)

#### LIST OF EQUIPMENTS FOR A BATCH OF 30 STUDENTS

S. No.	Description of Equipment	Quantity
1.	Conductivity meter	12 Nos.
2.	pH meter	12 Nos.
3.	UV-Visible Spectrophotometer	2 Nos.
4.	Potentiometer	12 Nos.
5.	CAN Enabled BMS unit	4 Nos.
6.	Photoreactor	2 Nos.

24CS201	DATA STRUCTURES (Common to CSE, CSE(CS) and ADS)	L	T	P	C
		3	0	3	4.5
<b>OBJECTIVES:</b> <b>The Course will enable learners:</b> <ul style="list-style-type: none"> <li>To understand the concepts of List ADT.</li> <li>To learn linear data structures – stacks and queues ADTs.</li> <li>To understand and apply Tree data structures.</li> <li>To understand and apply Graph structures.</li> <li>To analyze sorting, searching and hashing algorithms.</li> </ul>					
<b>UNIT I</b>	<b>LINEAR DATA STRUCTURES – LIST</b>				<b>9+9</b>
Algorithm analysis - running time calculations - Abstract Data Types (ADTs) – List ADT – array- based implementation – linked list implementation – singly linked lists - circularly linked lists - doubly-linked lists – applications of lists – Polynomial Manipulation – All operations (Insertion, Deletion, Merge, Traversal).  <b>List of Exercise/Experiments:</b> <ul style="list-style-type: none"> <li>Array implementation of List ADTs.</li> <li>Linked list implementation of List ADTs.</li> </ul>					
<b>UNIT II</b>	<b>LINEAR DATA STRUCTURES – STACKS, QUEUES</b>				<b>9+9</b>
Stack ADT – Stack Model - Implementations: Array and Linked list - Applications - Balancing symbols - Evaluating arithmetic expressions - Conversion of Infix to postfix expression - Queue ADT – Queue Model - Implementations: Array and Linked list - applications of queues - Priority Queues – Binary Heap – Applications of Priority Queues.  <b>List of Exercise/Experiments:</b> <ul style="list-style-type: none"> <li>Array implementation of Stack and Queue ADTs.</li> <li>Linked list implementation of Stack and Queue ADTs.</li> <li>Applications of List – Polynomial manipulations</li> <li>Applications of Stack – Infix to postfix conversion and expression evaluation.</li> </ul>					
<b>UNIT III</b>	<b>NON LINEAR DATA STRUCTURES – TREES</b>				<b>9+9</b>
Tree ADT – tree traversals - Binary Tree ADT – expression trees – applications of trees – binary search tree ADT– AVL Tree.  <b>List of Exercise/Experiments:</b> <ul style="list-style-type: none"> <li>Implementation of Binary Trees and operations of Binary Trees.</li> <li>Implementation of Binary Search Trees.</li> <li>Implementation of Heaps using Priority Queues.</li> </ul>					
<b>UNIT IV</b>	<b>NON LINEAR DATA STRUCTURES - GRAPHS</b>				<b>9+9</b>
Definition – Representation of Graph – Types of graph - Breadth-first traversal - Depth-first traversal – Topological Sort – Applications of graphs – BiConnectivity – Euler circuits.  <b>List of Exercise/Experiments:</b> <ul style="list-style-type: none"> <li>Graph representation and Traversal algorithms.</li> </ul>					

<b>UNIT V</b>	<b>SEARCHING, SORTING AND HASHING TECHNIQUES</b>	<b>9+9</b>
Searching- Linear Search - Binary Search - Sorting - Bubble sort - Selection sort - Insertion sort – Hashing - Hash Functions – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing.		
<b>List of Exercise/Experiments:</b> <ul style="list-style-type: none"> <li>• Implement searching and sorting algorithms.</li> </ul>		
		<b>TOTAL: 45+45=90 PERIODS</b>
<b>OUTCOMES:</b> <b>Upon completion of the course, the students will be able to:</b> <b>CO1:</b> Analyze algorithms and abstract data types (ADTs). <b>CO2:</b> Evaluate fundamental data structures. <b>CO3:</b> Implement linked data structures and its application. <b>CO4:</b> Apply advanced tree data structures. <b>CO5:</b> Understand basic graph theory concepts. <b>CO6:</b> Evaluate various searching and sorting algorithms.		
<b>TEXTBOOKS:</b>		
<ol style="list-style-type: none"> <li>1. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C++”, 4th Edition, Pearson Education, 2014.</li> <li>2. Sartaj Sahni, “Data Structures, Algorithms and Applications in C++”, Silicon paper publications, 2004.</li> </ol>		
<b>REFERENCES:</b>		
<ol style="list-style-type: none"> <li>1. Rajesh K. Shukla, “Data Structures using C and C++”, Wiley India Publications, 2009.</li> <li>2. Narasimha Karumanchi, “Data Structure and Algorithmic Thinking with Python: Data Structure and Algorithmic Puzzles”, CareerMonk Publications, 2020.</li> <li>3. Jean-Paul Tremblay and Paul Sorenson, “An Introduction to Data Structures with Application”, McGraw-Hill, 2017.</li> <li>4. Mark Allen Weiss, “Data Structures and Algorithm Analysis in Java”, Third Edition, Pearson Education, 2012.</li> <li>5. Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, “Fundamentals of Data Structures in C”, Second Edition, University Press, 2008.</li> <li>6. Ellis Horowitz, Sartaj Sahni, Dinesh P Mehta, “Fundamentals of Data Structures in C++”, Second Edition, Silicon Press, 2007.</li> <li>7. <a href="https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01350157816505139210584/overview">https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01350157816505139210584/overview</a></li> </ol>		
<b>LIST OF EQUIPMENTS:</b>		
<ol style="list-style-type: none"> <li>1. Systems with Linux/Ubuntu Operating System with gnu C++ compiler</li> </ol>		

24CS202	JAVA PROGRAMMING (Common to All Branches)	L	T	P	C
		3	0	3	4.5
<b>OBJECTIVES:</b>					
<b>The Course will enable learners:</b>					
<ul style="list-style-type: none"> <li>To explain object oriented programming concepts and fundamentals of Java</li> <li>To apply the principles of packages, interfaces and exceptions</li> <li>To develop a Java application with I/O streams, threads and generic programming</li> <li>To build applications using strings and collections.</li> <li>To apply the JDBC concepts</li> </ul>					
<b>UNIT I</b>	<b>JAVA FUNDAMENTALS</b>	<b>9+9</b>			
<p>An Overview of Java - Data Types, Variables, and Arrays – Operators - Control Statements – Class Fundamentals – Declaring objects – Methods – Constructors – this keyword – Overloading methods - Overloading constructors - Access Control – Static – Final</p> <p><b>List of Exercise/Experiments:</b></p> <p>1. Develop a Java application to generate Electricity bill. You must use one super class called EB Bill and must have two sub classes namely Domestic Bill and Commercial Bill. Create a class with the following members: Consumer no., consumer name, previous month reading, current month reading, type of EB connection (i.e domestic or commercial). Compute the bill amount using the following tariff</p> <p>If the type of the EB connection is domestic, calculate the amount to be paid as follows: First 100 units - Rs. 1 per unit 101-200 units - Rs. 2.50 per unit 201 -500 units - Rs. 4 per unit &gt; 501 units - Rs. 6 per unit</p> <p>If the type of the EB connection is commercial, calculate the amount to be paid as follows: First 100 units - Rs. 2 per unit 101-200 units - Rs. 4.50 per unit 201 -500 units - Rs. 6 per unit &gt; 501 units - Rs. 7 per unit</p> <p>2. Arrays Manipulations: (Use Methods for implementing these in a Class)</p> <p>a. Find kth smallest element in an unsorted array</p> <p>b. Find the sub array with given sum</p> <p>c. Matrix manipulations – Addition, Subtraction, Multiplication</p> <p>d. Remove duplicate elements in an Array</p> <p>e. Accept an integer value N and print the Nth digit in the integer sequence 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 and so on till infinity. Example: The 11th digit in the sequence 12345678910111213.... is 0.</p>					
<b>UNIT II</b>	<b>INHERITANCE, INTERFACES AND EXCEPTION HANDLING</b>	<b>9+9</b>			
<p>Inheritance: Inheritance basics, Using super, Method Overriding, Using Abstract Classes, Using final with Inheritance - Package and Interfaces: Packages, Packages and member access, Importing Packages, Interfaces, Static Methods in an Interface – Exception Handling: Exception- Handling Fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, Multiple catch Clauses, Nested try Statements, throw,</p>					

throws, finally, Java's Built-in Exceptions.

**List of Exercise/Experiments:**

1. Develop a Java application to implement currency converter (Dollar to INR, EURO to INR, Yen to INR and vice versa), distance converter (meter to KM, miles to KM and vice versa), time converter (hours to minutes, seconds and vice versa) using packages.
2. Develop a Java application with Employee class with Emp\_name, Emp\_id, Address, Mail\_id, Mobile\_no as members. Inherit the classes, Programmer, Assistant Professor, Associate Professor and Professor from employee class. Add Basic Pay (BP) as the member of all the inherited classes with 97% of BP as DA, 10 % of BP as HRA, 12% of BP as PF, 0.1% of BP for staff club fund. Generate pay slips for the employees with their gross and net salary.
3. Design a Java interface for ADT Stack. Implement this interface using array and built-in classes. Provide necessary exception handling in both the implementations.
4. Write a Java Program to create an abstract class named Shape that contains two integers and an empty method named print Area(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains the methods print Area () that prints the area of the given shape and Numberofsides() that prints the number of sides of the given shape.
5. Write a Java program to apply built-in and user defined exceptions.

<b>UNIT III</b>	<b>MULTITHREADING, I/O AND GENERIC PROGRAMMING</b>	<b>9+9</b>
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Multithreaded Programming: Creating a Thread, Thread Priorities, Synchronization, Interthread Communication – I/O: I/O Basics, Reading Console Input, Writing Console Output, Reading and Writing Files – Generics: Introduction, Generic class, Bounded Types, Generic Methods, Generic Interfaces, Generic Restrictions.

**List of Exercise/Experiments:**

1. Write a Java program to read and copy the content of one file to other by handling all file related exceptions.

<b>UNIT IV</b>	<b>STRING HANDLING AND COLLECTIONS</b>	<b>9+9</b>
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Lambda Expressions - String Handling – Collections: The Collection Interfaces, The Collection Classes – Iterator – Map - Regular Expression Processing.

**List of Exercise/Experiments:**

1. String Manipulation:
  - a. Reversing a set of words and count the frequency of each letter in the string.
  - b. Pattern Recognition - Find the number of patterns of form 1[0]1 where [0] represents any number of zeroes (minimum requirement is one 0) there should not be any other character except 0 in the [0] sequence in a given binary string.
  - c. Remove all the occurrences of string S2 in string S1 and print the remaining.
  - d. Find the longest repeating sequence in a string
  - e. Print the number of unique string values that can be formed by rearranging the letters in the string S.



2. Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication.
3. Collections:
  - a. Write a program to perform string operations using ArrayList. Write functions for the following
    - i. Append - add at end
    - ii. Insert – add at particular index
    - iii. Search
    - iv. List all string starts with given letter
  - b. Find the frequency of words in a given text.

<b>UNIT V</b>	<b>JDBC CONNECTIVITY</b>
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	<b>9+9</b>
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JDBC – DataSource, Configurations, Connection, Connection Pools, Driver Types, ResultSet, Prepared Statement, Named Parameter, Embedded SQL (Insert, Update, Delete, Join, union etc), ResultSet Navigation, Connection Close and Clean up.

**List of Exercise/Experiments:**

- Mini Project (using JDBC)

**TOTAL: 45+45=90 PERIODS**

**OUTCOMES:**

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

**CO1:** Solve core Java programming concepts.

**CO2:** Utilize object-oriented programming (OOP) principles.

**CO3:** Demonstrate competency in handling exceptions and implementing multithreading.

**CO4:** Develop expertise in input/output (I/O) operations and file handling.

**CO5:** Apply advanced Java programming concepts with generics and lambda expressions.

**CO6:** Implement database connectivity using JDBC.

**TEXTBOOKS:**

1. Herbert Schildt, “Java: The Complete Reference”, 11th Edition, McGraw Hill Education, 2019.

**REFERENCES:**

1. Cay S. Horstmann, Gary Cornell, “Core Java Volume – I Fundamentals”, 11th Edition, Prentice Hall, 2019.
2. Paul Deitel, Harvey Deitel, Java SE 8 for programmers, 3rd Edition, Pearson, 2015.
3. Steven Holzner, Java 2 Black book, Dream tech press, 2011.
4. Timothy Budd, Understanding Object-oriented programming with Java, Third Edition, Pearson Education, 2008.
5. [https://infyspringboard.onwingspan.com/web/en/app/toc/lex\\_29959473947367270000\\_shared/overview](https://infyspringboard.onwingspan.com/web/en/app/toc/lex_29959473947367270000_shared/overview)

**LIST OF EQUIPMENTS:**

1. Java and Eclipse / NetBeans IDE or Equivalent

24AI201	INTRODUCTION TO ARTIFICIAL INTELLIGENCE (Common to all Branches)	L	T	P	C
		2	0	2	3
<b>OBJECTIVES:</b>					
<b>The Course will enable learners to:</b>					
<ul style="list-style-type: none"> <li>• Understand the basics and applications of Artificial Intelligence.</li> <li>• Apply the basics of Python programming.</li> <li>• Use python libraries to solve simple problems.</li> <li>• Understand the different types of Machine Learning algorithms.</li> <li>• Solve real world problems using AI/ML.</li> <li>• Explore the various applications in the field of Artificial Intelligence and Machine Learning.</li> </ul>					
<b>UNIT I</b>	<b>ARTIFICIAL INTELLIGENCE</b>				<b>6+6</b>
Introduction – Types of AI – ANI, AGI, ASI – Narrow, General, Super AI, Examples - AI problems – Production Systems – State space Representation – Applications of AI in various industries.					
<b>List of Exercise:</b>					
1. Build a simple AI model using python.					
<b>UNIT II</b>	<b>BASICS OF PYTHON</b>				<b>6+6</b>
Introduction to Python programming – Arithmetic Operators - values and types - variables, expressions, statements – Functions – Conditionals and Recursion –Iteration.					
Lists: Sequence, Mutable, Traversing, Operations, list slices, list methods - Tuples: Immutable, Tuple Assignment, Tuple as Return Values, Comparing and Sorting.					
<b>List of Exercises:</b>					
1. Compute the GCD of two numbers.					
2. Operations on Tuples: a) finding repeated elements, b) slice a tuple c) reverse a tuple d) replace last value of a tuple.					
<b>UNIT III</b>	<b>PYTHON LIBRARIES</b>				<b>6+6</b>
Introduction to Numpy - Multidimensional Ndarrays – Indexing – Properties – Constants – Data Visualization: Nduarray Creation – Matplotlib - Introduction to Pandas – Series – Dataframes – Visualizing the Data in Dataframes - Pandas Objects – Data Indexing and Selection – Handling missing data – Hierarchical indexing – Combining datasets – Aggregation and Grouping – Joins-Pivot Tables - String operations – Working with time series – High performance Pandas.					
<b>List of Exercises:</b>					
1. Download, install and explore the features of R/Python for data analytics					
<ul style="list-style-type: none"> <li>• Installing Anaconda</li> <li>• Basic Operations in Jupyter Notebook</li> <li>• Basic Data Handling</li> </ul>					
2. Working with Numpy arrays - Creation of numpy array using the tuple, Determine the size, shape and dimension of the array, Manipulation with array Attributes, Creation of Sub array, Perform the reshaping of the array along the row vector and column vector, Create two arrays and perform the concatenation among the arrays.					
3. Working with Pandas data frames - Series, DataFrame , and Index, Implement the Data Selection Operations, Data indexing operations like: loc, iloc, and ix, operations of handling the missing data like None, Nan, Manipulate on the operation of Null Vaues (is					

	<p>null(), not null(), dropna(), fillna()).</p> <ol style="list-style-type: none"> <li>4. Perform the Statistics operation for the data (the sum, product, median, minimum and maximum, quantiles, arg min, arg max etc.).</li> <li>5. Use any data set compute the mean ,standard deviation, Percentile.</li> </ol>	
<b>UNIT IV</b>	<b>MACHINE LEARNING</b>	<b>6+6</b>
<p>Introduction – ML Algorithms Overview – Types – Supervised – Unsupervised – Reinforcement Learning – Introduction to Neural Networks – Working of Deep Learning – Applications of DL – Ethical consideration in AI and ML.</p> <p><b>List of Exercise:</b></p> <ol style="list-style-type: none"> <li>1. Apply any Machine Learning model to predict the sales in a store.</li> </ol>		
<b>UNIT V</b>	<b>CASE STUDIES</b>	<b>6+6</b>
<p>Disease Prediction – Share Price Forecasting – Weather Prediction – Domain Specific Case Studies.</p> <p>List of Domain Specific Case Studies:</p> <ul style="list-style-type: none"> <li>• For CSE &amp; allied: Sentiment analysis of product reviews using machine learning.</li> <li>• For ECE &amp; allied: Smart homes using AI.</li> <li>• For EEE: Forecasting of Renewable energy availability during a specified period using AI.</li> <li>• Civil: Application of ML for crack detection on concrete structures.</li> <li>• Mech: Predictive Maintenance for CNC Machines Using AI and Machine Learning.</li> </ul> <p><b>List of Exercise:</b></p> <ol style="list-style-type: none"> <li>1. Build a machine learning model to solve any real-world problem from your domain.</li> </ol>		
<b>TOTAL: 30(L) + 30(P) = 60 PERIODS</b>		
<b>OUTCOMES:</b>		
<b>Upon completion of the course, the students will be able to:</b>		
<b>CO1:</b> Elaborate the basics and applications of Artificial Intelligence.		
<b>CO2:</b> Apply the basics of Python programming to solve problems.		
<b>CO3:</b> Use python libraries to solve simple ML problems.		
<b>CO4:</b> Outline the different types of Machine Learning algorithms.		
<b>CO5:</b> Use Machine Learning Algorithms to solve real world problems.		
<b>CO6:</b> Outline the recent developments in the field of Artificial Intelligence.		
<b>TEXT BOOKS:</b>		
1. Allen B. Downey, “Think Python: How to Think Like a Computer Scientist”, 2nd edition, Updated for Python 3, Shroff/O’Reilly Publishers, 2016.		
2. Jake VanderPlas, “Python Data Science Handbook – Essential tools for working with data”, O’Reilly, 2017.		
3. Steve Abrams, “Artificial Intelligence and Machine Learning for Beginners: A simple guide to understanding and Applying AI and ML”, Independently published, May 14, 2024.		
<b>REFERENCES:</b>		
1. Vinod Chandra S S, Anand Hareendran S, Artificial Intelligence and Machine Learning, PHI Learning, 2014.		
2. Russell, S. and Norvig, P, Artificial Intelligence: A Modern Approach, Third Edition, Prentice Hall, 2010.		
3. Ethem Alpaydin, Introduction to Machine Learning, Second Edition, the MIT Press, Cambridge, Massachusetts, London, England.		
4. Stephen Marsland, Machine Learning - An Algorithmic Perspective, 2nd Edition, 2015, by Taylor & Francis Group, 2015.		
5. Tom M. Mitchell, Machine Learning, McGraw-Hill Science, ISBN: 0070428077		

<b>COURSE CODE</b>	<b>TAMILS AND TECHNOLOGY (Theory Course)</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>24GE201</b>	<b>(Common to All II Semester B.E./B.Tech Programmes)</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>

**OBJECTIVES:**

The course is designed to

- Recognize the historical significance of weaving and pottery technologies in ancient Tamil civilization.
- Highlight the concepts of design and construction technology during the Sangam age.
- Provide an overview of manufacturing technology and its role in Tamil society.
- Illustrate the agricultural and irrigation techniques employed in ancient Tamil society.
- Promote scientific Tamil and Tamil computing.

**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 beads – 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**

Development of Scientific Tamil – Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.

**TOTAL: 15 PERIODS**

## **OUTCOMES:**

**At the end of the course, the learners will be able to**

CO1: Analyze the technological advancements of Tamils in weaving and ceramics.

CO2: Explore the architectural superiority of Tamils through inscriptions and structural designs of temples and palaces.

CO3: Examine the manufacturing culture of Tamils before and during Sangam period through various sources.

CO4: Critically appreciate the agricultural and food processing techniques of Tamils.

CO5: Demonstrate adequate information on the Scientific Tamil and Tamil Computing.

## **TEXT CUM – REFERENCE –BOOKS**

1. தமிழக வரலாறு – மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)
2. கணினித் தமிழ் -முனைவர் இல.சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருளை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.L.L.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 of Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Achaeology & Tamil Nadu text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

**அலகு I நெசவு மற்றும் பாணைத் தொழில்நுட்பம்: 3**

சங்க காலத்தில் நெசவுத் தொழில் - பாணைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - பாண்டங்கள் - பாண்டங்களில் கீறல் குறியீடுகள்.

**அலகு II வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்: 3**

சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு - சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரச்சிற்பங்களும், கோவில்களும் - சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் - நாயக்கர் காலக் கோயில்கள் - மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டிநாட்டு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ - சாரோசெனிக் கட்டிடக் கலை.

**அலகு III உற்பத்தித் தொழில் நுட்பம்: 3**

கப்பல் கட்டும் கலை - உலோகவியல் - இரும்புத் தொழிற்சாலை - இரும்பை உருக்குதல், எஃகு - வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள் - எலும்புத்துண்டுகள் - தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

**அலகு IV வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நுட்பம்: 3**

அணை, ஏரி, குளங்கள், மதகு - சோழர்காலக் குழுழித் தூம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு - கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன்வளம் - முத்து மற்றும் முத்துக்குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார் சமூகம்.

**அலகு V அறிவியல் தமிழ் மற்றும் கணித்தமிழ்: 3**

அறிவியல் தமிழின் வளர்ச்சி -கணித்தமிழ் வளர்ச்சி-தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக்கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம்.

**TOTAL: 15 PERIODS****TEXT –CUM – REFERENCE BOOKS**

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)
2. கணினித் தமிழ் -முனைவர் இல.சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருளை - ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)

5. Social Life of Tamils (Dr.L.L.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 of Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Achaeology & Tamil Nadu text Book and Educational Services Corporation, Tamil Nadu)  
Journey of civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

COURSE CODE	COURSE TITLE	L	T	P	C
24EC211	<b>IDEA LAB –II</b> (Common to all Branches)	0	0	2	1

The students may be grouped into 3 to 4. The device/Machine/system/component are studied by the students and a final presentation to be done by the students about the study of various devices or machinery at the end of the semester.

### COURSE OBJECTIVES:

#### Students completing this course are expected to

- Develop hands-on experience and practical application of theoretical knowledge.
- Access to technology, software, prototyping materials, and other resources necessary for innovation.
- Develop their ability to explain the process involved.

### LIST OF EXPERIMENTS

1. Printing of a 3D part.
2. Scanning of a 3D part.
3. Design and fabrication of press fit object using laser cutting machine.
4. Design and fabrication of 3D part using CNC Router.
5. Design and fabrication of simple PCB.
6. Soldering and desoldering of given electronic circuit.

**TOTAL: 15 PERIODS**

### COURSE OUTCOMES:

#### After successful completion of the course the students will be able to do

- CO1: Analyze the latest manufacturing methods in advancements and technologies related to their field.
- CO2: Develop technical proficiency and problem-solving abilities, making more competent and confident in their field.
- CO3: Develop themselves with the skills needed to address industry-specific problems.

### LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

S. No	Equipment Name	Quantity
1	CNC Router	1 No
2	3D Printer	1 No
3	3D Scanner	1 No
4	Laser cutting Machine	1 No



5	Multimeter	5 Nos
6	Solder Stations	5 Sets
7	Desoldering Machine	1 No
8	PCB Milling Machine	1 No
9	Variable Power Supply	1 No
10	Electronic Components like Resistors, Transistors, Diode, Inductor, Capacitor, etc.	10 Sets

**PLAN FOR THE COMING PRODUCT DEVELOPMENT  
LAB FROM SEM 3 TO 6.**

Product Development lab -1 - Literature review

Product Development lab -2 - Prepare the design concepts for an identified literature gap.

Product Development lab -3 - Create a methodology and Implementation of Design Process.

Product Development lab -4 - Develop a prototype

<b>Course Code</b>	<b>INNOVATION AND CREATIVITY SKILLS AND DEVELOPMENT</b> (Common to all the branches)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
24HS211		1	0	0	1

## OBJECTIVES

### The course will enable the learners to:

- Understand study plans, co-curricular activities, programming skills, recruitment test patterns, and hiring strategies through national qualifiers and hackathons.
- Equip students with strategies for higher education, resume enhancement, project management, and securing internships
- understand entrepreneurship fundamentals, including key differences, global hubs, business ideas, and scalability.
- develop essential entrepreneurial skills such as opportunity recognition, patience, risk management, communication, persistence, and leadership
- Understand life, success, self-confidence, health, scientific heritage, personal counseling, and cybercrime awareness

### **UNIT I STEPPING STONE – ENGINEERING CAREERS AND SKILL DEVELOPMENT 3**

Study Plans and Resources - Identification of key resources and job opportunities - career prospects and academic growth through co-curricular activities - importance of programming/coding skills - Overview of test patterns and essential skills for popular campus recruiters - Comparison of IT Services, Dream, and Super Dream offers and their recruitment processes - National Qualifier Tests and their impact on hiring processes – Overview of Corporate contests and hackathons (e.g., TCS Codevita, HackerRank)

### **UNIT II STEPPING STONE – HIGHER EDUCATION AND CAREER DEVELOPMENT 3**

Overview of higher education opportunities: GATE, GRE, GMAT, XAT, CAT, MAT - Exam formats, preparation strategies, and timelines - Resume Enhancement Strategies - Project Management - Steps to develop projects from proposal to prototype - Internship Pathways - Strategies for maximizing internship experiences for career advancement

### **UNIT III FUNDAMENTALS OF ENTREPRENEURSHIP: FROM IDEAS TO VENTURES 3**

Introduction to Entrepreneurship – Intrapreneur vs. entrepreneur - Roles and Contributions - Global Entrepreneurship Hubs - Overview of Key Global Locations - Idea vs. Commercial Value - Transforming Ideas into Viable Business Models - Characteristics of Successful Business Ideas - Understanding Market Competition - Basics of Copyrights and Intellectual Property - Scalability in Business Ventures - Strategies for Scaling a Business

### **UNIT IV HUMAN SKILLS FOR ENTREPRENEURSHIP 3**

Identifying and capitalizing on business opportunities - Case studies and anecdotes - Patience and

Risk Management - The role of patience in entrepreneurial success and decision-making - Effective Communication - Techniques for clear and persuasive communication - Importance of communication in building and leading teams - Leadership qualities and their impact on entrepreneurial ventures - Analyzing success and failure stories

#### **UNIT V FOUNDATIONS OF PERSONAL DEVELOPMENT AND WELL-BEING 3**

Understanding Life and Success - Self-Confidence and Fear - Practical strategies for enhancing self-esteem - Adolescent Issues - Health Management - Basics of a balanced diet - Benefits of physical activity - Scientific Heritage of India - Overview of India's scientific achievements and contributions - Cyber Crime Awareness - Types and prevention strategies.

**TOTAL: 15 PERIODS**

#### **COURSE OUTCOMES**

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

CO1: Create study plans, value co-curricular activities, develop programming skills, and navigate for career advancement

CO2: Understand about higher education options, resume enhancement, project management, and securing internships

CO3: Learn entrepreneurship skills and strategies to develop successful business ideas. CO4: Develop key entrepreneurial skills like opportunity recognition, risk management, and leadership through real-world examples

CO5: Explore personal development, health management, scientific heritage, and cybercrime awareness.

Course Code	Yoga for Stress Management	L	T	P	C
24MC201	(Common to all branches of First Year B.E. / B. Tech)	0	0	1	0

## OBJECTIVES:

### The course will enable the learners to:

- Understanding the different types of stress and managing stress.
- Develop an understanding of practicing yoga
- Learning to do asanas, including sitting, standing and lying postures

### Unit I: Stress Management

3

Definition of Stress - Stress in Daily Life - Impact of Stress on Life - Identifying the Causes of Stress - Symptoms of Stress - Managing Stress (Habits, Tools, Training, Professional Help) - Complications of Stress Mismanagement - The Importance of Sleep for Mental Wellness - Connection Between Sleep and Digestion.

### Unit II: Introduction to Yoga

3

Meaning and Definition of Yoga - Aims and Objectives of Yoga - Guidelines for Practicing Asanas - Benefits of Yoga

### Unit III: Different Asanas

3

Methods of Performing Asanas - Pranayama - Suryanamaskar Asanas - Sitting Postures: Uttanpadasana, Paschimottanasana ,Janu Sirsasana , Baddha Konasana - Shishupal Asana - Vajrasana

### Unit IV: Standing Postures

3

Uttanasana -Trikonasana -Vrikshasana -Tadasana - Superbrain asana

### Unit 5: Lying Postures

3

Pavana Muktasana - Pada Sanchalanasana – Jhulana Lurhakanasana -Dhanurasana – Marjaryasana. BitilasanaDictionaries – Sorkuvai Project.

**TOTAL: 15 PERIODS**

## COURSE OUTCOMES:

### Upon completion of the course, the students will be able to:

- CO1: relieve stress and achieve mental wellness.
- CO2: experience the benefits of yoga
- CO3: keep self and body healthy

## **REFERENCE BOOK:**

1. Iyengar, Bellur Krishnamukar Sundara. "Light on yoga." (1965).
2. Desikachar, Tirumalai Krishnamacharya Venkata. The heart of yoga: Developing a personal practice. Simon and Schuster, 1999.
3. Davis, Martha, Elizabeth Robbins Eshelman, and Matthew McKay. The relaxation and stress reduction workbook. New Harbinger Publications, 2008.
4. Krishnamacharya, Tirumalai, et al. "Yoga makaranda: The nectar of yoga." Swathi Soft (2013).