MOOGAMBIGAI CHARITABLE AND EDUCATIONAL TRUST

Rajarajeswari College of Engineering

(An Autonomous Institution under Visvesvaraya Technological University, Belagavi)
#14, Ramohalli Cross, Kumbalagodu, Mysore Road, Bengaluru–560074

Bachelor of Computer Applications

II Semester Scheme and Syllabus

(2025 Scheme)

VISION

To empower young minds through technology, research and innovation, to produce technically competent and socially responsible professionals in higher education.

MISSION

1. To deliver excellence in education through innovative teaching, impactful research, and continuous skill development, preparing students to meet global challenges with technical expertise and ethical responsibility.
2. To foster a transformative learning environment that integrates technology, research and practical experience, empowering students to become skilled professionals and socially conscious leaders.
3. To cultivate a culture of lifelong learning and professional excellence by encouraging creativity, research, and community engagement, equipping students with the skills to thrive in a dynamic world.
4. To provide a holistic educational experience that combines advanced technology, hands-on research, and community-focused learning, shaping students into competent, ethical professionals who contribute positively to society.

QUALITY POLICY

Rajarajeswari College of Engineering is committed to imparting quality technical education that nurtures competent, ethical professionals with global relevance. We ensure academic excellence through a dynamic, outcome-based curriculum, experienced faculty, and cutting-edge infrastructure. Continuous improvement is driven by innovation, research and strong industry collaboration. We foster holistic development and a progressive environment that supports lifelong learning, teamwork, and professional growth.

CORE VALUES

Academic Excellence, Integrity, Innovation, Global Competence, Continuous Improvement.

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MOOGAMBIGAI CHARITABLE AND EDUCATIONAL TRUST

Rajarajeswari College of Engineering

(An Autonomous Institution under Visvesvaraya Technological University, Belagavi)

Bachelor of Computer Applications

Scheme of Teaching and Examinations – 2025

Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the Academic Year 2025-26)

Semester: II

S. No	Course Category and Course Code		Course Title	TD / PSB	Teaching Hours / Week & Credits				Examination			
					Lecture	Tutoria l / SDA	Practical / Seminar	Credits	CIE Marks	SEE Duration Hrs	SEE Marks	Total Marks
					L	T/S	P					
1.	PCC	B25BCA201	Discrete Mathematical Structures	BCA	3	0	0	3	50	3	50	100
2.	PCC	B25BCA202	Fundamentals of Data Structures	BCA	3	0	0	3	50	3	50	100
3.	PCC	B25BCA203	Unix and Shell Scripting	BCA	3	0	0	3	50	3	50	100
4.	AEC	B25BCA204	Communicative English (MCQ)	BCA	2	0	0	2	50	1	50	100
5.	AEC	B25BCA205	Introduction to Scripting Language	BCA	3	0	0	3	50	3	50	100
6.	SEC	B25BCA206	Fundamentals of Fintech (MCQ)	BCA	0	2	0	1	50	1	50	100
7.	PCCL	B25BCAL207	Unix and Shell Scripting Laboratory	BCA	1	0	2	2	50	3	50	100
8.	PCCL	B25BCAL208	Data Structures Using C Laboratory	BCA	1	0	2	2	50	3	50	100
9.	VAC	B25BCA209	Constitution of India (MCQ)	Humanities	1	0	0	1	50	1	50	100
							TOTAL	20	450		450	900

BSC: Basic Science Course, HSMC: Humanity, Social sciences including Management courses, PCC: Professional Core Course, PCCL: Professional Core Course laboratory, AEC: Ability Enhancement Course, SEC: Skill Enhancement Course, L: Lecture, T: Tutorial, P: Practical S:SDA- Skill Development Activity, CIE: Continuous Internal Evaluation, SEE: Semester End Evaluation

Dean-Academics **Principal**

SEMESTER-II					
DISCRETE MATHEMATICAL STRUCTURES **Category: PCC**					
Course Code	:	B25BCA201	CIE	:	50 Marks
Teaching Hours L:T:P	:	3:0:0	SEE	:	50 Marks
Total Hours	:	45	Total	:	100 Marks
Credits	:	3	SEE Duration	:	3 Hrs

Course Objectives	
1.	The objective of this course is to better understanding on the concepts of Sets, Relations and Functions, Laplace transformations and multiple integrals.

Module – 1	**No. of Hours**
PROPOSITIONAL LOGICS: Propositional Logic, Applications of Propositional Logic, Propositional Equivalences, Predicates and Quantifiers, Nested Quantifiers, Rules of Inferences, Introduction to Proofs, Proof methods and Strategy.	9
Module – 2	**No. of Hours**
SETS, RELATIONS AND FUNCTIONS: Operations on sets, power set, Venn diagram, Cartesian product, Relations and their properties, Closures of Relations, Equivalence Relations, Partial Orderings. Functions, Types of Functions, Inverse and Compositions, The Graphs of Functions.	9
Module – 3	**No. of Hours**
INDUCTION AND RECURSION: Mathematical Induction, Strong Induction and Well Ordering, Recursive Definitions and Structural Induction, Recursive Algorithms, Program Correctness.	9
Module – 4	**No. of Hours**
COUNTING: The Basics of Counting, The Pigeonhole Principle, Permutations and Combinations, Binomial Coefficients and Identities.	9
Module – 5	**No. of Hours**
GRAPHS: Graphs and Graph Models, Graph Terminology and Special Types of Graphs, Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest Path Problems, Planar Graphs, Graph Coloring.	9

Course Outcomes: At the end of the course, the students will be able to	
CO1	Understand and Apply Propositional Logic: Grasp the fundamentals of propositional logic, including logical connectives, equivalences, and proof methods.
CO2	Analyze Sets and Relations: Perform operations on sets, visualize relationships using Venn diagrams, and explore various types of relations and functions.
CO3	Develop skills in mathematical induction, recursive definitions, and algorithms, ensuring program correctness
CO4	Apply counting principles, permutations, combinations, and binomial coefficients to solve combinatorial problems.
CO5	Study graph models, terminology, connectivity, and algorithms for paths, planarity, and coloring.

Text Books	
1.	Discrete mathematics and its applications / Kenneth H. Rosen, Monmouth University (and formerly AT&T Laboratories).

Reference Text Books	
1.	J.K Sharma “Discrete Mathematics”, Mac Millian Publishers India, 3rd edition,2011.

Web links and Video lectures (e-Resources)
• https://onlinecourses.nptel.ac.in/noc20_cs82/preview • https://www.nitt.edu/home/academics/departments/cse/programmes/mtech/curriculum/semester_2/mathematical_foundations_for_com/

ASSESSMENT STRUCTURE:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage. To qualify and become eligible to appear for SEE, in the CIE, a student must score at least 40% of 50 marks, i.e., 20 marks. To pass the SEE, a student must score at least 35% of 50 marks, i.e., 18 marks. Notwithstanding the above, a student is considered to have passed the course, provided the combined total of CIE and SEE is at least 40 out of 100 marks.

CONTINUOUS INTERNAL EVALUATION (CIE):

Component	Type of Assessment	Max. Marks	Max. Marks Scaling Down to	Total Marks
Theory	**Internal Assessment1**	**50**	**40**	**50**
	Internal Assessment2	**50**		
	Internal Assessment3	**50**	**(Average of Best Two Assessments)**	
Self Learning	**Two Assignments**	**20**	**10**	
SEE	**Semester End Examination**	**100**	**50**	**50**
Grand Total				**100**

SEMESTER END EXAMINATION (SEE):

1. The Question paper for each course contains two parts, Part – A and Part – B.
2. Part – A consists of **Short Answer Questions** (2 Marks/1 mark) for 20 marks covering the complete syllabus and it is compulsory. Multiple Choice Questions are not allowed.
3. Part – B consists of 10 questions, two questions of 16 marks (with max. of 3 sub questions) from each module with internal choice. Students shall answer five full questions, selecting one full question from each module.

CO-PO Mapping:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	2	1	3	-	1	-	1	-	-
CO2	2	3	3	-	2	-	2	-	1	-	-
CO3	2	2	2	-	3	1	1	-	-	2	-
CO4	3	3	3	-	2	-	2	-	1	-	-
CO5	3	2	2	1	2	1	1	-	1	-	-

Level 3 - High, Level 2 - Moderate, Level 1 - Low

SEMESTER-II					
FUNDAMENTALS OF DATA STRUCTURES **Category: PCC**					
Course Code	:	B25BCA202	CIE	:	50 Marks
Teaching Hours L:T:P	:	3:0:0	SEE	:	50 Marks
Total Hours	:	45	Total	:	100 Marks
Credits	:	3	SEE Duration	:	3 Hrs

Course Objectives	
1.	Fundamentals of data structures
2.	Basic concepts related to stacks, queues, linked list
3.	Fundamentals of trees and binary tree traversals

Module – 1	**No. of Hours**
INTRODUCTION TO DATA STRUCTURES: Definition; Types of data structures - Primitive &Non primitive, Linear and Non-linear; Operations on data structures. Dynamic memory allocation: Static & Dynamic memory allocation; Memory allocation and de-allocation functions - malloc, calloc, realloc and free. Algorithm Specification, Performance Analysis, Performance Measurement Recursion: Definition; Types of recursions; Recursion Technique Examples - GCD, Factorial, Binomial coefficient nCr, Towers of Hanoi; Comparison between iterative and recursive functions.	9
Module – 2	**No. of Hours**
ARRAYS: Operations on arrays; Arrays as abstract data types (ADT); Representation of Linear Arrays in memory. Traversing linear arrays; Inserting and deleting elements; Sorting – Selection sort, Bubble sort, Quick sort, Merge sort, Insertion sort; Searching - Sequential Search, Binary search; Iterative and Recursive searching;	9
Module – 3	**No. of Hours**
STACKS: Basic Concepts – Definition and Representation of stacks; Operations on stacks; Applications of stacks; Infix, postfix and prefix notations; Conversion from infix to postfix using stack; Evaluation of postfix expression using stack; Application of stack in function calls. QUEUES: Basic Concepts – Definition and Representation of queues; Types of queues – Simple queues, Circular queues, Double ended queues, Priority queues; Operations on Simple queues	9
Module – 4	**No. of Hours**
LINKED LIST: Basic Concepts – Definition and Representation of linked list, Types of linked lists-Singly linked list, doubly liked list, Circular linked list, doubly circular linked list; Representation of Linked list in Memory; Operations on Singly linked lists – Traversing, Searching, Insertion, Deletion;	9
Module – 5	**No. of Hours**
TREES: Definition; Tree terminologies –node, root node, parent node, ancestors of a node, siblings, terminal & non-terminal nodes, degree of a node, level, edge, path, depth. BINARY TREE: Type of binary trees - strict binary tree, complete binary tree, binary search tree and heap tree; Array representation of binary tree. Traversal of binary tree; preorder, in order and post order traversal.	9

Course Outcomes: At the end of the course, the students will be able to	
CO1	Know the types of data structure. Describe the implementation of dynamic memory allocation and recursion
CO2	Describe the implementation of various methods of searching and sorting elements using array.
CO3	Describe the concepts and implement stack and queue. Understand basic operations involved, types and applications.
CO4	Describe basic concepts of linked list. Understand types of linked list and implement basic operations on singly linked list.
CO5	Describe the concepts of tree data structure and traversal techniques on binary tree.

Text Books	
1.	Ellis Horowitz and SartajSahni: Fundamentals of Data Structures
2.	Tanenbaum: Data structures using C (Pearson Education)

Reference Text Books	
1.	Y. Kanitkar: Data Structures Using C (BPB)

Web links and Video lectures (e-Resources)
• NPTEL https://www.nitt.edu/home/academics/departments/cse/programmes
• Introduction to Data Structures - GeeksforGeeks

ASSESSMENT STRUCTURE:

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CONTINUOUS INTERNAL EVALUATION (CIE):

Component	Type of Assessment	Max. Marks	Max. Marks Scaling Down to	Total Marks
Theory	**Internal Assessment1**	**50**	**40**	**50**
	Internal Assessment2	**50**		
	Internal Assessment3	**50**	**(Average of Best Two Assessments)**	
Self Learning	**Two Assignments**	**20**	**10**	
SEE	**Semester End Examination**	**100**	**50**	**50**
Grand Total				**100**

SEMESTER END EXAMINATION (SEE):

1. The Question paper for each course contains two parts, Part – A and Part – B.
2. Part – A consists of **Short Answer Questions** (2 Marks/1 mark) for 20 marks covering the complete syllabus and it is compulsory. Multiple Choice Questions are not allowed.
3. Part – B consists of 10 questions, two questions of 16 marks (with max. of 3 sub questions) from each module with internal choice. Students shall answer five full questions, selecting one full question from each module.

CO-PO Mapping:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	2	-	1	-	1	-	1	-	-
CO2	1	1	1	-	2	-	2	-	1	-	-
CO3	2	2	2	1	1	-	1	-	-	2	-
CO4	3	1	1	-	2	-	2	-	1	-	-
CO5	2	2	1	1	2	1	1	-	-	-	-

Level 3 - High, Level 2 - Moderate, Level 1 - Low

SEMESTER-II					
UNIX AND SHELL SCRIPTING **Category: PCC**					
Course Code	:	B25BCA203	CIE	:	50 Marks
Teaching Hours L:T:P	:	3:0:0	SEE	:	50 Marks
Total Hours	:	45	Total	:	100 Marks
Credits	:	3	SEE Duration	:	3 Hrs

Course Objectives	
1.	To provide introduction to UNIX Operating System and its File System
2.	To gain an understanding of important aspects related to the SHELL and the process
3.	To develop the ability to formulate regular expressions and use them for patternmatching
4.	To provide a comprehensive introduction to SHELL programming, services and utilities

Module – 1	**No. of Hours**
Introduction of UNIX - Introduction, History, Architecture, Experience the Unix environment, Basic commands ls, cat, cal, date, calendar, who, printf, tty, sty, uname, passwd, echo, tput, and bc	9
Module – 2	**No. of Hours**
UNIX File System- The file, what's in a filename? The parent-child relationship, pwd, the Homedirectory, absolute pathnames, using absolute pathnames for a command, cd, mkdir, rmdir, Relativepathnames, The UNIX files system.	9
Module – 3	**No. of Hours**
Basic File Attributes - ls – l, the –d option, File Permissions, chmod, Security and File Permission, users and groups, security level, changing permission, user masks, changing ownership and group, File Attributes, More file attributes: hard link, symbolic link, umask, find.	9
Module – 4	**No. of Hours**
Introduction to the Shell Scripting - Introduction to Shell Scripting, Shell Scripts, read, Command Line Arguments, Exit Status of a Command, The Logical Operators && and ||, exit, if, and case conditions, expr, sleep and wait, while, until, for, $, @, redirection. The here document, set, trap, Sample Validation and Data Entry Scripts	9
Module – 5	**No. of Hours**
Introduction to UNIX System process: Mechanism of process creation. Parent and child process. Theps command with its options. Executing a command at a specified point of time: at command. Executing a command periodically: cron command and the crontab file Signals	9

Course Outcomes: At the end of the course, the students will be able to	
CO1	To help the students to understand effective use of Unix concepts, commands and terminology.
CO2	Understand the UNIX file system.
CO3	Understand UNIX command syntax and semantics and identify, access, and evaluate file permissions.
CO4	Ability to read and understand specifications, scripts and programs
CO5	Analyze Facility with UNIX Process

Text Books	
1.	Unix Concepts & Applications 4rth Edition, Sumitabha Das, Tata McGraw Hill References
2.	Introduction to Unix Shell Programming by M. G. Venkateshmurthy, Pearson.
3.	Unix Shell Programming, Yashwant Kanetkar

Reference Text Books	
1.	Unix and shell programming by B.M. Harwani, OXFORD university press.

Web links and Video lectures (e-Resources)
• https://www.geeksforgeeks.org/introduction-linux-shell-shell-scripting/

- https://www.tutorialspoint.com/unix/shell_scripting.htm
- https://www.shellscript.sh/first.html

ASSESSMENT STRUCTURE:

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CONTINUOUS INTERNAL EVALUATION (CIE):

Component	Type of Assessment	Max. Marks	Max. Marks Scaling Down to	Total Marks
Theory	**Internal Assessment1**	**50**	**40**	**50**
	Internal Assessment2	**50**		
	Internal Assessment3	**50**	**(Average of Best Two Assessments)**	
Self Learning	**Two Assignments**	**20**	**10**	
SEE	**Semester End Examination**	**100**	**50**	**50**
Grand Total				**100**

SEMESTER END EXAMINATION (SEE):

1. The Question paper for each course contains two parts, Part – A and Part – B.
2. Part – A consists of **Short Answer Questions** (2 Marks/1 mark) for 20 marks covering the complete syllabus and it is compulsory. Multiple Choice Questions are not allowed.
3. Part – B consists of 10 questions, two questions of 16 marks (with max. of 3 sub questions) from each module with internal choice. Students shall answer five full questions, selecting one full question from each module.

CO-PO Mapping:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	1	2	-	3	-	1	-	1	-	-
CO2	2	2	1	-	2	-	2	-	1	-	-
CO3	2	2	1	-	3	-	1	-	-	2	-
CO4	3	1	3	-	2	-	2	-	1	-	-
CO5	2	1	1	-	1	-	1	-	1	-	1

Level 3 - High, Level 2 - Moderate, Level 1 - Low

SEMESTER-II					
COMMUNICATIVE ENGLISH **Category: AEC**					
Course Code	:	B25BCA204	CIE	:	50 Marks
Teaching Hours L:T:P	:	2:0:0	SEE	:	50 Marks
Total Hours	:	30	Total	:	100 Marks
Credits	:	2	SEE Duration	:	1 Hr

Course Objectives	
1.	To know about Fundamentals of Communicative English and Communication Skills in general.
2.	To train to identify the nuances of phonetics, intonation and enhance pronunciation skills for better Communication skills.
3.	To impart basic English grammar and essentials of important language skills.
4.	To enhance with English vocabulary and language proficiency for better communication skills.
5.	To learn about Techniques of Information Transfer through presentation

Module – 1	**No. of Hours**
Introduction to Communicative English: Communicative English, Fundamentals of Communicative English, Process of Communication, Barriers to Effective Communicative English, Different styles and levels in Communicative English. Interpersonal and Intrapersonal Communication Skills	6
Module – 2	**No. of Hours**
Introduction to Phonetics: Phonetic Transcription, English Pronunciation, Pronunciation Guidelines to consonants and vowels, Sounds Mispronounced, Silent and Non silent Letters, Syllables and Structure. Word Accent, Stress Shift and Intonation, Spelling Rules and Words often Misspelt. Common Errors in Pronunciation	6
Module – 3	**No. of Hours**
Basic English Communicative Grammar and Vocabulary PART - I: Grammar: Basic English Grammar and Parts of Speech, Articles and Preposition. Question Tags, One Word Substitutes, Strong and Weak forms of words, Introduction to Vocabulary, All Types of Vocabulary – Exercises on it.	6
Module – 4	**No. of Hours**
Basic English Communicative Grammar and Vocabulary PART - II: Words formation – Prefixes and Suffixes, Contractions and Abbreviations. Word Pairs (Minimal Pairs) – Exercises, Tense and Types of tenses, The Sequence of Tenses (Rules in use of Tenses) and Exercises on it.	6
Module – 5	**No. of Hours**
Communication Skills for Employment: Information Transfer: Oral Presentation and its Practice. Difference between Extempore/Public Speaking, Communication Guidelines. Mother Tongue Influence (MTI), Various Techniques for Neutralization of Mother Tongue Influence. Reading and Listening Comprehensions – Exercises.	6

Course Outcomes: At the end of the course, the students will be able to	
CO1	Understand and apply the Fundamentals of Communication Skills in their communication skills
CO2	Identify the nuances of phonetics, intonation and enhance pronunciation skills.
CO3	To impart basic English grammar and essentials of language skills as per present requirement.
CO4	Understand and use all types of English vocabulary and language proficiency.
CO5	Adopt the Techniques of Information Transfer through presentation

Text Books	
1.	Communication Skills by Sanjay Kumar & PushpLata, Oxford University Press India PvtLtd - 2019
2.	A Textbook of English Language Communication Skills, (ISBN-978-81-955465-2-7), Published by Infinite learning Solutions, Bengaluru - 2022.

Reference Text Books	
1.	Technical Communication by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learning

	India Pvt Limited [Latest Revised Edition] - 2019.
2.	English for Engineers by N.P.Sudharshana and C.Savitha, Cambridge University Press –2018.
3.	English Language Communication Skills – Lab Manual cum Workbook, Cengage learningIndia Pvt Limited [Latest Revised Edition] – (ISBN-978-93-86668-45-5), 2019.
4.	A Course in Technical English – D Praveen Sam, KN Shoba, Cambridge University Press –2020.
5.	Practical English Usage by Michael Swan, Oxford University Press – 2016

ASSESSMENT STRUCTURE:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage. To qualify and become eligible to appear for SEE, in the CIE, a student must score at least 40% of 50 marks, i.e., 20 marks. To pass the SEE, a student must score at least 35% of 50 marks, i.e., 18 marks. Notwithstanding the above, a student is considered to have passed the course, provided the combined total of CIE and SEE is at least 40 out of 100 marks.

CONTINUOUS INTERNAL EVALUATION (CIE):

Component	Type of Assessment	Max. Marks	Max. Marks Scaling Down to	Total Marks
Theory	**Internal Assessment1**	**50**	**40 (Average of Best two Assessments)**	**50**
	Internal Assessment2	**50**		
	Internal Assessment3	**50**		
Self Learning	**Two Assignments**	**10+10**	**10**	
SEE	**Semester End Examination**	**100**	**50**	**50**
Grand Total				**100**

SEMESTER END EXAMINATION (SEE)

SEE paper shall be set for 50 questions, each of the 01 marks. The pattern of the question paper is MCQ (multiple choice questions). The time allotted for SEE is 01 hour.

CO-PO Mapping:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	1	3	1	2	1	2	-	-	-	-	-
CO2	2	1	1	1	2	1	-	-	-	-	-
CO3	1	2	1	1	2	2	-	-	-	1	-
CO4	2	2	1	1	2	1	-	-	-	-	-
CO5	1	2	1	1	2	2	-	-	-	1	-

Level 3 - High, Level 2 - Moderate, Level 1 - Low

SEMESTER-II					
INTRODUCTION TO SCRIPTING LANGUAGE **Category: AEC**					
Course Code	:	B25BCA205	CIE	:	50 Marks
Teaching Hours L:T:P	:	3:0:0	SEE	:	50 Marks
Total Hours	:	45	Total	:	100 Marks
Credits	:	3	SEE Duration	:	3 Hrs

Course Objectives	
1.	To educate students about basic scripting languages.
2.	To provide knowledge about adding interactive elements to websites.
3.	To educate students to create dynamically updating content, control multimedia.

Module – 1	**No. of Hours**
Introduction to HTML and Web Technologies: Overview of Web Technologies: Web browsers, web servers, HTTP, and the basics of the World Wide Web (WWW), What is HTML? Purpose and role of HTML in web development, Structure of an HTML Document:<!DOCTYPE HTML>,<HTML>,<HEAD>,<BODY> tags. Basic HTML Tgs : <HTML>,<HEAD>,<TITLE>,<BODY><H1> TO <H6>, <P>, , <HR>, Hello HTML5, Loose Syntax Returns, Embracing the reality of Web Markup, Presentational Markup Removed and Redefined, HTML5 Document Structure Changes, Adding Semantics, HTML5's Open Media Effort.	9
Module – 2	**No. of Hours**
HTML Tables and Forms and CSS: Table Elements, Formatting a Data Table: Borders, Alignment, and Padding,HTML5 Form Changes, Emerging Elements and Attributes to Support Web Applications, Introduction, CSS Overview, CSS Rules, Example with Type Selectors and the Universal Selector, CSS Syntax and Style, Class Selectors, ID Selectors, span and div Elements, Cascading, style Attribute, style Container, External CSS Files.	9
Module – 3	**No. of Hours**
Introduction to JavaScript: Functions, DOM, Forms: CSS Properties, Color Properties, RGB Values for Color, Opacity Values for Color, HSL and HSLA Values for Color, Font Properties, line height Property, Text Properties, Border Properties, Element Box, padding Property, margin Property, History of JavaScript, Hello World Web Page, Buttons, Functions, Variables, Identifiers, Document Object Model.	9
Module – 4	**No. of Hours**
Introduction to Angular JS: Forms and How They're Processed: Client-Side Versus Server-Side, form Element, Controls, Text Control, Accessing a Form's Control Values, reset and focus Methods , Introduction to Angular JS, Directives, Expressions, Directives, Controllers, Filters	9
Module – 5	**No. of Hours**
Introduction to JQuery, Exploring the Fundamentals of jQuery, Loading and Using jQuery, Using the jQuery Library files, selectors, events, exploring jQuery effects	9

Course Outcomes: At the end of the course, the students will be able to	
CO1	Develop HTML5 documents and adding various semantic markup tags.
CO2	Construct Tables and analyze various attributes, values and types of CSS.
CO3	Implement core constructs and develop HTML5 documents using JavaScript.
CO4	AngularJS directives, expressions, controllers, and filters for building dynamic web applications.
CO5	Explain the use of JQuery concepts.

Text Books	
1.	HTML & CSS: Design and Build Websites by Jon Duckett (Free Chapters Available Online)
2.	HTML5 for Web Designers by Jeremy Keith (Free PDF Available)
3.	HTML & CSS: The Complete Reference Thomas A. Powell, Fifth Edition, Tata McGraw Hill
4.	WEB PROGRAMMING with HTML5, CSS and JavaScript, John Dean, Jones & Bartlett Learning, First Edition

5.	AngularJS: Up and Running by ShyamSeshadri and Brad Green (Free PDF Available)
6.	Learning jQuery by Jonathan Chaffer and Karl Swedberg (Free PDF Available)

Web links and Video lectures (e-Resources)
• https://www.youtube.com/watch?v=9b9pLgaSQuI

ASSESSMENT STRUCTURE:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage. To qualify and become eligible to appear for SEE, in the CIE, a student must score at least 40% of 50 marks, i.e., 20 marks. To pass the SEE, a student must score at least 35% of 50 marks, i.e., 18 marks. Notwithstanding the above, a student is considered to have passed the course, provided the combined total of CIE and SEE is at least 40 out of 100 marks.

CONTINUOUS INTERNAL EVALUATION (CIE):

Component	Type of Assessment	Max. Marks	Max. Marks Scaling Down to	Total Marks
Theory	**Internal Assessment1**	**50**	**40**	**50**
	Internal Assessment2	**50**		
	Internal Assessment3	**50**	**(Average of Best two Assessments)**	
Self Learning	**Two Assignments**	**10+10**	**10**	
SEE	**Semester End Examination**	**100**	**50**	**50**
Grand Total				**100**

SEMESTER END EXAMINATION (SEE):

1. The Question paper for each course contains two parts, Part – A and Part – B.
2. Part – A consists of **Short Answer Questions** (2 Marks/1 mark) for 20 marks covering the complete syllabus and it is compulsory. Multiple Choice Questions are not allowed.
3. Part – B consists of 10 questions, two questions of 16 marks (with max. of 3 sub questions) from each module with internal choice. Students shall answer five full questions, selecting one full question from each module.

CO-PO Mapping:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	1	2	-	3	-	1	-	1	-	-
CO2	1	2	1	-	2	-	2	-	1	-	-
CO3	1	2	1	1	1	1	1	-	-	1	-
CO4	2	1	1	1	2	-	1	1	1	1	-
CO5	2	1	1	-	1	-	1	-	1	-	1

Level 3 - High, Level 2 - Moderate, Level 1 - Low

SEMESTER-II					
FUNDAMENTALS OF FINTECH **Category: SEC**					
Course Code	:	B25BCA206	CIE	:	50 Marks
Teaching Hours L:T:P	:	0:2:0	SEE	:	50 Marks
Total Hours	:	15	Total	:	100 Marks
Credits	:	1	SEE Duration	:	1 Hr

Course Objectives	
1.	Understand evolution of FinTech and role in digital payments and mobile banking
2.	Understand blockchain and crypto currency and identify lending and crowd funding platforms
3.	Understand Robo-advisory and their role in wealth management.

Module – 1	**No. of Hours**
Introduction to Financial Technology (FinTech): Overview of Financial Technology (History and evolution of FinTech); Role and importance Fintech in modern finance; Traditional v/s digital financial system; Key FinTech sectors (Payments, Lending, Blockchain, Robo-Advisors, InsurTech, RegTech, etc.)	3
Module – 2	**No. of Hours**
Digital Payments and Mobile Banking: Introduction to digital payments: Types, methods, and platforms ; Mobile payment systems (UPI, PayPal, Google Pay, etc.) ; Cryptography in payment systems Security issues in digital payments ; Regulatory frameworks and compliance (e.g., GDPR, PCI-DS)	3
Module – 3	**No. of Hours**
Blockchain Technology and Crypto currencies: Introduction to Blockchain technology: Concepts and structure ; Blockchain use cases in financial services ; Crypto currencies: Bitcoin, Ethereum, and Altcoins; Crypto currency exchanges and wallets Smart contracts and Decentralized Finance (DeFi) Regulatory challenges and future trends	3
Module – 4	**No. of Hours**
Lending and Crowd funding Platforms: Peer-to-peer (P2P) lending platforms; Crowd funding models (Equity-based, Reward-based, etc.); Alternative credit scoring models; Risk assessment and mitigation in lending ; Role of Artificial Intelligence (AI) and Machine Learning(ML) in lending.	3
Module – 5	**No. of Hours**
Robo-Advisory and Wealth Management: Introduction to Robo-advisors and their role in wealth management; Algorithmic trading and investment strategies; Risk management and portfolio diversification using technology; Regulatory environment for Robo-advisory services; Comparison of traditional v/s digital wealth management; Future of FinTech: Trends, challenges, and opportunities	3

Course Outcomes: At the end of the course, the students will be able to	
CO1	Understanding the key sectors and evolution of FinTech in modern finance.
CO2	Gaining knowledge of digital payment systems, security, and regulatory compliance
CO3	Understanding blockchain applications in finance and the role of cryptocurrencies.
CO4	Learning about alternative lending models and risk assessment in digital lending
CO5	Exploring Robo-advisors and their impact on wealth management and investment strategies

Text Books	
1.	FinTech: The New DNA of Financial Services" by Pranay Gupta and T. Mand
2.	Mastering Blockchain: Unlocking the Power of Cryptocurrencies, Smart Contracts, and Decentralized Applications" by Imran Bashir
3.	Digital Bank: Strategies to Launch or Become a Digital Bank" by Chris Skinne

Web links and Video lectures (e-Resources)
https://www.youtube.com/watch?v=wPp9XYisds4&pp=ygUMI3NvbnVmaW50ZXNo

ASSESSMENT STRUCTURE:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage. To qualify and become eligible to appear for SEE, in the CIE, a student must score at least 40% of 50 marks, i.e., 20 marks. To pass the SEE, a student must score at least 35% of 50 marks, i.e., 18 marks. Notwithstanding the above, a student is considered to have passed the course, provided the combined total of CIE and SEE is at least 40 out of 100 marks.

CONTINUOUS INTERNAL EVALUATION (CIE):

Component	Type of Assessment	Max. Marks	Max. Marks Scaling Down to	Total Marks
Theory	**Internal Assessment1**	**50**	**40**	**50**
	Internal Assessment2	**50**		
	Internal Assessment3	**50**	**(Average of Best two Assessments)**	
Self Learning	**Two Assignments**	**10+10**	**10**	
SEE	**Semester End Examination**	**100**	**50**	**50**
Grand Total				**100**

SEMESTER END EXAMINATION (SEE)

SEE paper shall be set for 50 questions, each of the 01 marks. The pattern of the question paper is MCQ (multiple choice questions). The time allotted for SEE is 01 hour.

CO-PO Mapping:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	1	1	2	-	2	-	1	-	1	-	-
CO2	1	2	1	-	2	-	2	-	1	-	-
CO3	1	1	1	1	1	2	1	-	-	1	-
CO4	1	2	1	2	2	-	2	1	1	1	-
CO5	2	1	1	-	1	-	1	-	1	-	1

Level 3 - High, Level 2 - Moderate, Level 1 - Low

SEMESTER-II					
UNIX AND SHELL SCRIPTING LABORATORY **Category: PCCL**					
Course Code	:	B25BCAL207	CIE	:	50 Marks
Teaching Hours L:T:P	:	1:0:2	SEE	:	50 Marks
Total Hours	:	30	Total	:	100 Marks
Credits	:	2	SEE Duration	:	3 Hrs

Course Objectives	
1.	Learn to write and execute shell scripts for basic decision-making, loops, string manipulation, and file operations.
2.	Apply shell scripting to real-world tasks, such as sorting data, generating sequences, and managing file systems efficiently.

Sl. No	**Experiments**
	PART-A
1.	Write a shell script to check positive or negative number.
2.	Write a shell script to find largest of three numbers.
3.	Write a shell script to generate mark-sheet of a student by reading five subject marks, calculate and display total marks, percentage and Class obtained by the student.
4.	Write a shell script to accept a natural number and check for prime or not.
5.	Write a shell script which will generate first n Fibonacci numbers
6.	Write a shell script to find the factorial of a given number.
	PART-B
1	Write a shell script to read n numbers as command arguments & sort them in ascending order.
2	Write a shell script to display all executable files, directories and zero sized files from current directory.
3	Write a shell script to check entered string is palindrome or not
4	Write a shell script to reverse a given string.
5	Demonstration of shell programming using filters (including grep, egrep, fgrep)
6	Write a shell script to count the number of lines, words, and characters in a file.

Course Outcomes: At the end of the course, the students will be able to	
CO1	Create scripts for checking conditions, like positive/negative numbers and finding the largest number.
CO2	Write scripts for generating Fibonacci sequences, identifying prime number and calculating factorials.
CO3	Perform string operations, including palindrome checks and reversals.
CO4	Develop scripts for identifying file types and counting file contents.
CO5	Create scripts for sorting numbers and handling student mark sheets.

ASSESSMENT STRUCTURE FOR LABORATORY:

- The assessment for each course is equally divided between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each component carrying 50% weightage.
- For both CIE and SEE, the student is required to conduct one experiment each from both Part A and Part B.

- To qualify and become eligible to appear for SEE, in the CIE component, a student must secure a minimum of 40% of 50 marks, i.e., 20 marks.
- In SEE component, Part A must be evaluating as 40% and Part B will be evaluating as 60%.
- To pass the SEE component, a student must secure a minimum of 35% of 50 marks, i.e., 18 marks. A student is deemed to have successfully completed the course if the combined total of CIE and SEE is at least 40 out of 100 marks.

Component	Type of Assessment	Max. Marks	Max. Marks Scaling Down to	Total Marks
Laboratory	**Lab Record & Observation**	**Evaluating each expt. for 10 marks*12 expts.**	**15**	**50**
	Laboratory Test 1: After 6 expts.	**50**	**15**	
	Laboratory Test 2: After 12 expts.	**50**	**20**	
SEE	**Semester End Examination**	**100**	**50**	**50**
Grand Total				**100**

CO-PO Mapping:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	3	2	1	-	-	-	-	-	-
CO2	1	2	1	2	2	-	-	-	-	-	-
CO3	1	2	3	2	2	-	-	-	-	-	-
CO4	3	2	1	2	1	-	-	-	-	-	-
CO5	1	1	1	3	3	-	-	-	-	-	-

Level 3 - High, Level 2 - Moderate, Level 1 - Low

SEMESTER-II					
DATA STRUCTURES USING C LABORATORY **Category: PCCL**					
Course Code	:	B25BCAL208	CIE	:	50 Marks
Teaching Hours L:T:P	:	1:0:2	SEE	:	50 Marks
Total Hours	:	30	Total	:	100 Marks
Credits	:	2	SEE Duration	:	3 Hrs

Course Objectives	
1.	Equip students with the skills to implement and manipulate fundamental data structures like arrays, stacks, queues, and linked lists.
2.	Enable students to solve complex problems using recursion, matrix operations, and tree traversal techniques.

Sl. No	**Experiments**
	PART-A
1.	Write a program to implement and demonstrate the following operations on an array: Insertion, Deletion, Traversing, and Searching.
2.	Write a recursive program to solve Towers of Hanoi problem for n disks
3.	Write a recursive program to calculate the Greatest Common Divisor (GCD) of two numbers.
4.	Write a recursive program to calculate the factorial of a number.
5.	Write a program to implement linear searching technique on an array.
6.	Write a program to implement binary searching technique on an array.
7.	Write a program to implement a stack using an array. Include the operations Push, Pop, and display the current stack.
	PART-B
1.	Write a program to implement bubble sort technique.
2.	Write a program to implement selection sort technique
3.	Write a program to implement insertion sort technique
4.	Write a program to convert an infix expression to a postfix expression using stack.
5.	Write a program to implement an ordinary queue using an array. Include the operations Enqueue, Dequeue, and Display.
6.	Write a program to create a singly linked list and perform the following operations: Insertion at the beginning, Deletion from the beginning, and Traversal of the linked list.
7.	Write a program to represent a binary tree and implement Preorder, In order, and Post order traversal methods.

Course Outcomes: At the end of the course, the students will be able to	
CO1	Develop programs to perform insertion, deletion, traversing, searching and sortingoperations on arrays.
CO2	Solve problems like Towers of Hanoi, factorial and GCD calculation using recursiveprogramming.
CO3	Implement and manipulate stacks and queues using array
CO4	Represent linked lists and implement insertion and deletion of elements
CO5	Represent binary trees and implement traversal methods such as Preorder, Inorder, andPostorder.

ASSESSMENT STRUCTURE FOR LABORATORY:

- The assessment for each course is equally divided between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each component carrying 50% weightage.
- For both CIE and SEE, the student is required to conduct one experiment each from both Part A and Part B.
- To qualify and become eligible to appear for SEE, in the CIE component, a student must secure a minimum of 40% of 50 marks, i.e., 20 marks.
- In SEE component, Part A must be evaluating as 40% and Part B will be evaluating as 60%.
- To pass the SEE component, a student must secure a minimum of 35% of 50 marks, i.e., 18 marks. A student is deemed to have successfully completed the course if the combined total of CIE and SEE is at least 40 out of 100 marks.

Component	Type of Assessment	Max. Marks	Max. Marks Scaling Down to	Total Marks
Laboratory	**Lab Record & Observation**	**Evaluating each expt. for 10 marks*12 expts.**	**20**	**50**
	Laboratory Test 1: After 6 expts.	**50**	**15**	
	Laboratory Test 2: After 12 expts.	**50**	**15**	
SEE	**Semester End Examination**	**100**	**50**	**50**
Grand Total				**100**

CO-PO Mapping:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	3	2	1	-	-	-	-	-	-
CO2	3	2	1	2	2	-	-	-	-	-	-
CO3	3	1	2	1	2	-	-	-	-	-	-
CO4	3	2	1	3	1	-	-	-	-	-	-
CO5	2	1	2	3	1	-	-	-	-	-	-

Level 3 - High, Level 2 - Moderate, Level 1 - Low

SEMESTER-II					
CONSTITUTION OF INDIA **Category: VAC**					
Course Code	:	B25BCA209	CIE	:	50 Marks
Teaching Hours L:T:P	:	1:0:0	SEE	:	50 Marks
Total Hours	:	15	Total	:	100 Marks
Credits	:	1	SEE Duration	:	1 Hr

Course Objectives	
1.	To know about the basic structure of Indian Constitution
2.	To know the Fundamental Rights (FR's), DPSP's and Fundamental Duties (FD's) of our constitution.
3.	To know about our Union Government, political structure & codes, procedures
4.	To know the State Executive & Elections system of India.
5.	To learn the Amendments and Emergency Provisions, other important provisions given by the constitution

Module – 1	**No. of Hours**
Indian Constitution: Necessity of the Constitution, Societies before and after the Constitution adoption. Introduction to the Indian constitution, Making of the Constitution, Role of the Constituent Assembly.	3
Module – 2	**No. of Hours**
Salient features of India Constitution. Preamble of Indian Constitution & Key concepts of the Preamble. Fundamental Rights (FR's) and its Restriction and limitations in different Complex Situations.	3
Module – 3	**No. of Hours**
Directive Principles of State Policy (DPSP's) and its present relevance in Indian society. Fundamental Duties and its Scope and significance in Nation, Union Executive : Parliamentary System, Union Executive – President, Prime Minister, Union Cabinet.	3
Module – 4	**No. of Hours**
Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Judicial System of India, Supreme Court of India and other Courts, Judicial Reviews and Judicial Activism	3
Module – 5	**No. of Hours**
State Executive and Governor, CM, State Cabinet, Legislature - VS & VP, Election Commission, Elections & Electoral Process. Amendment to Constitution, and Important Constitutional Amendments till today. Emergency Provisions.	3

Course Outcomes: At the end of the course, the students will be able to	
CO1	Analyze the basic structure of Indian Constitution.
CO2	Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution.
CO3	Know about our Union Government, political structure & codes, procedures.
CO4	Understand our State Executive & Elections system of India
CO5	Remember the Amendments and Emergency Provisions, other important provisions given by the constitution.

Text Books	
1.	"Constitution of India" (for Competitive Exams) - Published by Naidhruva Edutech Learning Solutions, Bengaluru. – 2022.
2.	"Introduction to the Constitution of India", (Students Edition.) by Durga Das Basu (DDBasu): Prentice –Hall, 2008.
Reference Text Books	
1.	"Constitution of India, Professional Ethics and Human Rights" by Shubham Singles, Charles E. Haries, and et al: published by Cengage Learning India, Latest Edition – 2019
2.	"The Constitution of India" by Merunandan K B: published by Merugu Publication, 2nd Edition, Bengaluru.

Web links and Video lectures (e-Resources)

https://www.youtube.com/watch?v=wPp9XYisds4&pp=ygUMI3NvbnVmaW50ZXNo

ASSESSMENT STRUCTURE:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage. To qualify and become eligible to appear for SEE, in the CIE, a student must score at least 40% of 50 marks, i.e., 20 marks. To pass the SEE, a student must score at least 35% of 50 marks, i.e., 18 marks. Notwithstanding the above, a student is considered to have passed the course, provided the combined total of CIE and SEE is at least 40 out of 100 marks.

CONTINUOUS INTERNAL EVALUATION (CIE):

Component	Type of Assessment	Max. Marks	Max. Marks Scaling Down to	Total Marks
Theory	**Internal Assessment1**	**50**	**40**	**50**
	Internal Assessment2	**50**		
	Internal Assessment3	**50**	**(Average of Best two Assessments)**	
Self Learning	**Two Assignments**	**10+10**	**10**	
SEE	**Semester End Examination**	**100**	**50**	**50**
Grand Total				**100**

SEMESTER END EXAMINATION (SEE)

SEE paper shall be set for 50 questions, each of the 01 marks. The pattern of the question paper is MCQ (multiple choice questions). The time allotted for SEE is 01 hour.

CO-PO Mapping:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
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CO2	1	2	1	-	1	-	2	-	1	-	-
CO3	1	1	2	1	1	1	1	-	-	1	-
CO4	1	1	1	2	2	-	2	1	1	1	-
CO5	1	1	2	-	1	-	1	-	1	-	1

Level 3 - High, Level 2 - Moderate, Level 1 - Low