



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

Scheme and Syllabus of III & IV Semester

(2024 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.

Bachelor of Computer Applications

DEPARTMENT VISION

To be a department of excellence in technical education, widely known for the development of application developers, IT professionals, entrepreneurs, researches creates benefit all of humanity.

DEPARTMENT MISSION

1. To ensure diverse knowledge integration with industry for creative learning and application.
2. To nurture talent in usage of application of Digital Intelligence and use of Power of technology.
3. To create entrepreneurs thro incubating technology businesses and committee to create and sustaining to be societal relevant education
4. To ensure the student connect at personal level and focus on to holistic development with Intellectual, Emotional, Spiritual and Behavioral traits.

PROGRAM OUTCOMES (POs)

PO1: Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)

PO3: Design/Development of Solutions: Design creative solutions for complex engineering problems and design/develop systems /components / processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)

PO4: Conduct Investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modeling, analysis & interpretation of data to provide valid conclusions. (WK8).

PO5: Engineering Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modeling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)

PO6: The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, WK7).

PO7: Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)

PO8: Individual and Collaborative Team work: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.

PO9: Communication: Communicate effectively and inclusively within the community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences

PO10: Project Management and Finance: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.

PO11: Life-Long Learning: Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change.
(WK8)

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: To progress into the software industry, academia, research, entrepreneurial pursuit, government, consulting firms, and other recent trends in technology enabled services.

PEO2: To achieve peer recognitions an individual or team; by adopting ethics and professionalism and communicating effectively to perform well in cross-culture and inter-disciplinary teams.

PEO3: To continue lifelong professional development in computing for the benefit of self- and societal growth

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Understand the principles of Computer Applications and enrich knowledge in recent advancements and developments in Software Industries.

PSO2: Competent in programming and computing skills, ability to apply software development methodologies and modeling to solve real world problems.

PSO3: To motivated the Students to learn through various programs about emerging technologies.

PSO4: To impart comprehensive knowledge with equal emphasis on theory and practice.

PSO5: To train future industry professionals.

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Bachelor of Computer Applications
 Scheme of Teaching and Examinations – 2024
(Effective from the Academic Year 2024-25)

Semester: III

S.No	Course Category and Course Code		Course Title	TD / PSB	Teaching Hours / Week				Examination			
					Lecture	Practical / Seminar	Tutorial / SDA	Credits	SEE Duration in Hours	CIE Marks	SEE Marks	Total Marks
					L	P	T/S					
1.	PCC	B24DPC301	Digital Principles and Computer Organization	BCA	3	0	0	3	3	50	50	100
2.	PCC	B24OOP302	Object Oriented Programming in C++	BCA	3	0	0	3	3	50	50	100
3.	PCC	B24OSC303	Operating System Concepts	BCA	3	0	0	3	3	50	50	100
4.	PCC	B24RDB304	Relational Data Base Management System	BCA	3	0	0	3	3	50	50	100
5.	PCC	B24SOE305	Software Engineering	BCA	3	0	0	3	3	50	50	100
6.	AEC	B24REA306	Reasoning and Aptitude	BCA	3	0	2	3	3	50	50	100
7.	PCCL	B24OOP307	Object Oriented Programming in C++ Lab	BCA	1	2	0	1	3	50	50	100
8.	PCCL	B24RDB308	Relational Data Base Management System Lab	BCA	1	2	0	1	3	50	50	100
TOTAL								20	24	400	400	800
Note: AEC-Ability Enhancement Courses, PCC – Professional Core Courses, PCCL – Professional Core Course Laboratory, VAC – Value Added Courses.												

HOD

Dean-Academics

Principal



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Bachelor of Computer Applications
 Scheme of Teaching and Examinations – 2024
(Effective from the Academic Year 2024-25)

Semester: IV

S.No	Course Category and Course Code		Course Title	TD / PSB	Teaching Hours / Week				Examination			
					Lecture	Practical / Seminar	Tutorial / SDA	Credits	Duration in Hours	CIE Marks	SEE Marks	Total Marks
					L	P	T/S					
1.	PCC	B24PIJ401	Programming in JAVA	BCA	3	0	0	3	3	50	50	100
2.	PCC	B24FCA402	Fundamentals of Computer Algorithms	BCA	3	0	0	3	3	50	50	100
3.	PCC	B24MPA403	Microprocessor and Assembly Language Programming	BCA	3	0	0	3	3	50	50	100
4.	PCC	B24WET404	Web Technology	BCA	3	0	0	3	3	50	50	100
5.	PCC	B24CGI405	Computer Graphics and Image Processing	BCA	3	0	0	3	3	50	50	100
6.	AEC	B24CCL406	Cyber-crime and Law	BCA	3	0	0	3	3	50	50	100
7.	PCCL	B24PIJL407	Programming in JAVA Lab	BCA	1	2	0	1	3	50	50	100
8.	PCCL	B24WETL408	Web technology lab	BCA	1	2	0	1	3	50	50	100
TOTAL								20		400	400	800

Note: AEC-Ability Enhancement Courses, PCC – Professional Core Courses, PCCL – Professional Core Course Laboratory, VAC – Value Added Courses.

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III - Semester Syllabus

SEMESTER - III					
DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION					
Category: PCC					
Course Code	:	B24DPC301	CIE	:	50 Marks
Teaching Hours L:T:P	:	3:0:0	SEE	:	50 Marks
Total Hours	:	45 (T)	Total	:	100 Marks
Credits	:	3	SEE Duration	:	3 Hrs

Course Objectives	
1.	Understand the fundamentals of digital logic design, including basic gates, Boolean algebra, Karnaugh maps, and number systems.
2.	Analyze and design combinational and arithmetic circuits, such as multiplexers, decoders, adders, and flip-flops.
3.	Gain knowledge of the basic structure and operation of computers, including instruction execution and control unit design.
4.	Explore input/output organization and memory systems, including ROM, cache, and virtual memory concepts.
5.	Understand advanced concepts like arithmetic unit design, pipelining, and embedded systems for real-time applications.

Module – 1	No. of Hours
Digital Logic: The Basic Gates - Universal Logic Gates - AND-OR Invert Gates. Combinational Logic Circuits: Booleans Laws and Theorems - Sum-of-Products Method - Truth Table to Karnaugh Map - Pairs, Quads, and Octets -Karnaugh Simplifications – Don't care Conditions - Product of Sums Method - Product of sums Simplification. Number Systems and Codes: Binary' Number System - Radix Representation of Numbers - Binary-to-decimal Conversion - Decimal-to binary Conversion - Octal Numbers - Hexadecimal Numbers - The ASCII Code - The Excess-3Code - The Gray Code.	9
Module – 2	No. of Hours
Data processing circuits: Multiplexers – De-multiplexers - 1-of-16 Decoder - BCD-to- decimal Decoders - Seven-segment Decoders - Encoders - Exclusive-OR Gates - Parity Generators and Checkers. Arithmetic Circuits: Binary Addition - Binary Subtraction - Unsigned Binary Numbers Sign-magnitude Numbers - 2's Complement Representation - 2's Complement Arithmetic - Arithmetic Building Blocks - The Adder – Subtractor. FLIP-FLOPs: RS FLIP-FLOPs – Edge triggered RS FLIP-FLOPs - Edge-triggered D FLIP-FLOPs - Edge-triggered JK FLIP-FLOPs – JK Master-Slave FLIP-FLOPs	9
Module – 3	No. of Hours
Basic Structure of Computers: Computer Types - Functional Units - Basic Operational Concepts- Bus Structures - Basic Processing Unit: Some Fundamental Concepts - Execution of a Complete Instruction -Hardwired Control - Micro programmed Control.	9
Module – 4	No. of Hours
Input / Output Organization: Accessing I/O devices - Interrupts - Direct Memory Access. The Memory System: Some Basic concepts - Read-Only Memories- Speed, Size, and Cost – Cache Memories - Virtual memories.	9
Module – 5	No. of Hours
Arithmetic: Design of Fast Adders - Multiplication of Positive Numbers - Integer Division. Pipelining: Basic Concepts - Data Hazards - Instruction Hazards. Embedded Systems: Examples of Embedded Systems - Processor Chips for Embedded Applications.	9

Course Outcomes: At the end of the course, the students will be able to	
CO1	Identify the gates , Boolean laws and theorems, make use of K-Map and solve number system related problems
CO2	Explain the function of data processing circuits , flip-flops and able to solve binary arithmetic
CO3	Discuss the computer types , bus structures, addressing modes and identify the procedure for an execution
CO4	Illustrate I/O device accessing , basic concepts of memories and its types
CO5	Demonstrate the design of fast adders, solve multiplication and Division of integers and discuss the concept of pipelining and embedded systems



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Text Books	
1.	Donald P. Leach, Albert Paul Malvino, GoutamSaha, 2014, Digital Principles and Applications, 8 th edition, Tata McGraw – Hill Publication, New Delhi.
2.	Carl Hamacher, ZvonkoVranesic, SafwatZaky, 2013, Computer Organization, 5 th edition, Tata McGraw – Hill Publication, New Delhi.

Reference Text Books	
1.	Morris Mano, 2012, Digital Logic & Computer Design, 5 th edition, Prentice Hall of India publishing.
2.	John D. Carpinelli, 2012, Computer System Organization and Architecture, Pearson Indian Education Service Private Limited, Chennai

Web links and Video lectures (e-Resources)	
Resources	
1. https://courses.cs.washington.edu/courses/cse370/08wi/pdfs/lectures/04-Logic%20gates.pdf	
2. http://www.ee.ncu.edu.tw/~jfli/computer/lecture/ch05.pdf	
3. http://www.pvpsiddhartha.ac.in/dep_it/lecturenotes/CSA/unit-4.pdf	

ASSESSMENT DETAILS BOTH (CIE AND SEE)

The weightage of continuous Internal Evaluation (CIE) is 50% and for the Semester End Examination (SEE) is 50%. The minimum passing mark for the CIE is 40% of maximum marks (20 marks out of 50). The minimum passing mark for SEE is 35% of maximum marks (18 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each course. Student has to secure a minimum 40% (40 marks out of 100) in the total of the CIE and SEE together.

CONTINUOUS INTERNAL EVALUATION (CIE)

CIE FOR THE THEORY:

1. Three tests each of 50 marks, after the completion of the syllabus 40%, 70% and 100% respectively.
2. Average of best two internal assessment tests each of 50 marks, scale down to 30 marks.
3. Any two assessment methods as per regulations i.e. Two assignments / Two Quizzes/ Weekly test / project work for 40 marks, scaled down to 20 marks.
4. Total marks scored (30+20 = 50 marks).
5. The minimum passing mark for the CIE is 40% of maximum marks (20 marks out of 50).

SEMESTER END EXAMINATION (SEE)

1. The question paper shall be set for 100 marks and duration of SEE is 3 hours.
2. The question paper will have two parts: Part-A and Part-B.
3. **Part-A** should contain minimum **Two or Four** quiz questions from each module of 02 marks/ 01 marks each. **Part-A is Compulsory** and it carries 20 Marks.
4. **Part-B** contains total 10 questions.
5. Two questions of 16 marks (with minimum of 3 sub questions) from each module with internal choice.
6. Students should answer five full questions, selecting one full question from each module.
7. Question papers to be set as per the Blooms Taxonomy levels.

CO-PO Mapping

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

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



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SEMESTER - III					
OBJECT ORIENTED PROGRAMMING IN C++					
Category: PCC					
Course Code	:	B24OOP302	CIE	:	50 Marks
Teaching Hours L:T:P	:	3:0:0	SEE	:	50 Marks
Total Hours	:	45(T)	Total	:	100 Marks
Credits	:	3	SEE Duration	:	3 Hrs

Course Objectives	
1.	Introduce the principles of Object-Oriented Programming (OOP) and highlight its advantages over procedural programming.
2.	Develop a strong foundation in C++ syntax, including tokens, data types, operators, control structures, and functions.
3.	Enable students to design and implement classes and objects with concepts like constructors, destructors, operator overloading, and type conversions.
4.	Explore and apply various forms of inheritance and polymorphism to promote code reuse and flexibility.
5.	Teach file handling techniques in C++, including stream operations, file pointers, error detection, and command-line arguments.

Module – 1	No. of Hours
Principles of Object Oriented Programming(OOP): Procedure oriented programming - OOP Paradigm - Basic concepts of OOP - Benefits of OOP – Object Oriented Languages - Applications of OOP. Beginning with C++: Simple C++ program - An example with Class - Structure of C++program.	9
Module – 2	No. of Hours
Introduction to C++: Tokens, Keywords, Identifiers, Variables, Operators, Manipulators, Expressions and Control Structures in C++.Function in C++ - Main function - Function Prototyping - Call by reference -Return by reference - Inline functions - Default arguments - Function Overloading.	9
Module – 3	No. of Hours
Classes and Objects: Specifying a class- member functions- Memory allocation of objects- Static data members- Static member functions- Objects as function arguments Friendly functions- Pointers to members. Constructors and Destructors - Operator overloading and type conversions	9
Module – 4	No. of Hours
Inheritance: Single Inheritance - Multilevel Inheritance – Multiple Inheritance, Hierarchical Inheritance - Hybrid Inheritance. Polymorphism: Pointers to Objects - Virtual functions	9
Module – 5	No. of Hours
Working with files: Classes for file stream operations - Opening and closing a file- End-of-file detection - File pointers - Error handling during file operations -Command line arguments	9

Course Outcomes: At the end of the course, the students will be able to	
CO1	Understand the fundamental principles of Object-Oriented Programming (OOP) and differentiate it from procedural programming paradigms.
CO2	Apply basic C++ syntax including tokens, operators, control structures, and functions to solve simple programming problems.
CO3	Design and implement C++ programs using classes, objects, constructors, destructors, and operator overloading.
CO4	Demonstrate the use of different types of inheritance and polymorphism to implement code reusability and runtime behavior.
CO5	Develop C++ programs to perform file operations and use command line arguments for data input and output.

Text Books	
1.	E. Balagurusamy, 2013, Object Oriented Programming with C++, 6 th edition, McGraw Hill Education, New Delhi

Reference Text Books	
1.	Herbert Schildt, 2003, The Complete Reference C++, 4 th edn, Tata McGraw Hill, New Delhi.



Web links and Video lectures (e-Resources)

Resources

- <https://www.youtube.com/watch?v=wN0x9eZLix4>

ASSESSMENT DETAILS BOTH (CIE AND SEE)

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CONTINUOUS INTERNAL EVALUATION (CIE)

CIE FOR THE THEORY:

1. Three tests each of 50 marks, after the completion of the syllabus 40%, 70% and 100% respectively.
2. Average of best two internal assessment tests each of 50 marks, scale down to 30 marks.
3. Any two assessment methods as per regulations i.e. Two assignments / Two Quizzes/ Weekly test / project work for 40 marks, scaled down to 20 marks.
4. Total marks scored (30+20 = 50 marks).
5. The minimum passing mark for the CIE is 40% of maximum marks (20 marks out of 50).

SEMESTER END EXAMINATION (SEE)

1. The question paper shall be set for 100 marks and duration of SEE is 3 hours.
2. The question paper will have two parts: Part-A and Part-B.
3. **Part-A** should contain minimum **Two or Four** quiz questions from each module of 02 marks/ 01 marks each. **Part-A is Compulsory** and it carries 20 Marks.
4. **Part-B** contains total 10 questions.
5. Two questions of 16 marks (with minimum of 3 sub questions) from each module with internal choice.
6. Students should answer five full questions, selecting one full question from each module.
7. Question papers to be set as per the Blooms Taxonomy levels.

CO-PO Mapping:

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

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



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SEMESTER - III					
OPERATING SYSTEM CONCEPTS					
Category: PCC					
Course Code	:	B24OSC303	CIE	:	50 Marks
Teaching Hours L:T:P	:	3:0:0	SEE	:	50 Marks
Total Hours	:	45(T)	Total	:	100 Marks
Credits	:	3	SEE Duration	:	3 Hrs

Course Objectives	
1.	Understand the structure and functions of operating systems, including system architecture, process management, and system calls.
2.	Learn and apply various CPU scheduling algorithms and techniques for handling deadlocks in an operating system.
3.	Understand memory and virtual memory management concepts such as paging, segmentation, and page replacement strategies.
4.	Explore file management techniques, disk scheduling algorithms, and file system security mechanisms.
5.	Understand the concepts of distributed processing, client-server architecture, and computer security threats, including viruses and intrusions.

Module – 1	No. of Hrs
Introduction: Computer-System Organization–Computer-System Architecture–Operating System Structure– Operating System Operations. Process Management- Kernel Data Structures –Computing Environments-Open Source Operating System-Operating System Structures: Operating System Services–User and Operating-System Interface–System Calls–Types of System Calls–System Programs–System Boot. Process Management: Process Concept- Process Scheduling – Operations on Processes–Inter Process Communication.	9
Module – 2	No. of Hrs
Process Scheduling: Basic Concepts – Scheduling Criteria – Scheduling Algorithms. Deadlocks: System model–Deadlock Characterization–Methods for handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection– Recovery from Deadlock.	9
Module – 3	No. of Hrs
Memory Management: Background–Swapping–Contiguous Memory Allocation–Segmentation – Paging – Structure of the Page Table. Virtual Memory Management: Background –Demand Paging–Page Replacement.	9
Module – 4	No. of Hrs
File Management: Overview– File Organization and Access– B-Trees– File Directories– File sharing– Record Blocking – Secondary storage Management– File System Security. Disk scheduling: Disk Performance Parameters–Disk Scheduling Policies.	9
Module – 5	No. of Hrs
Distributed Processing, Client-Server and Clusters: Client-Server Computing–Service Oriented Architecture–Distributed Message Passing–Remote Procedure Calls. Computer Security Threats: Computer Security Concepts– Threats, Attacks, and Assets–Intruders–Malicious Software Overview–Viruses, Worms, and Bots–Root kits.	9

Course Outcomes: At the end of the course, the students will be able to	
CO1	Illustrate the basics of computer system, architecture and operating system services and process scheduling
CO2	Explain the concept of scheduling criteria with scheduling algorithms, deadlocks and its recovery techniques
CO3	Discuss the background of memory management mechanisms with segmentation, paging and Demand paging
CO4	Describe file management with file organization, access, b-trees, file system Security and disk scheduling
CO5	Compare distributed processing with client server, clusters, computer Security threats

Text Books	
1.	Abraham Silberschatz, Peter B Galvin, Gerg Gagne, 2018, Operating System Concepts, 9 th edition, Wiley India Pvt .Ltd., New Delhi.
2.	William Stallings, 2018, Operating Systems Internals and Design principles, 7th edition, Pearson Education Inc, Noida.



Reference Text Books

1.	Stuart E. Madnick. JohnJ. Donovan, 2016(Reprint), Operating Systems, Tata McGraw Hill Education, New Delhi.
2.	Andrew S. Tanenbaum, 2015, Modern Operating Systems, 4 th edition, Pearson Education.

Web links and Video lectures (e-Resources)

Resources

1. https://www.tutorialspoint.com/operating_system/os_process_scheduling.htm
2. <http://www.technologyuk.net/computing/operating-systems/process-management.shtml>
3. https://web.cs.wpi.edu/~cs3013/c07/lectures/Section08-Memory_Management.pdf
4. https://www.tutorialspoint.com/operating_system/os_file_system.htm

ASSESSMENT DETAILS BOTH (CIE AND SEE)

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CONTINUOUS INTERNAL EVALUATION (CIE)

CIE FOR THE THEORY:

1. Three tests each of 50 marks, after the completion of the syllabus 40%, 70% and 100% respectively.
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SEMESTER END EXAMINATION (SEE)

1. The question paper shall be set for 100 marks and duration of SEE is 3 hours.
2. The question paper will have two parts: Part-A and Part-B.
3. **Part-A** should contain minimum **Two or Four** quiz questions from each module of 02 marks/ 01 marks each. **Part-A is Compulsory** and it carries 20 Marks.
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5. Two questions of 16 marks (with minimum of 3 sub questions) from each module with internal choice.
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7. Question papers to be set as per the Blooms Taxonomy levels.

CO-PO Mapping:

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CO2	3	1	1	3	2	-	-	-	-	-	-
CO3	3	1	1	3	3	-	-	-	-	2	-
CO4	3	1	1	1	2	-	-	-	-	-	-
CO5	2	1	1	1	2	-	-	-	-	-	-

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



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SEMESTER - III					
RELATIONAL DATA BASE MANAGEMENT SYSTEM					
Category: PCC					
Course Code	:	B24RDB304	CIE	:	50 Marks
Teaching Hours L : T : P	:	3:0:0	SEE	:	50 Marks
Total Hours	:	45 (T)	Total	:	100 Marks
Credits	:	3	SEE Duration	:	3 Hrs

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	9
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 Miss pelt. Common Errors in Pronunciation	9
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.	9
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.	9
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.	9

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 Pvt Ltd - 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.



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3.	English Language Communication Skills – Lab Manual cum Workbook, Cengage learning India 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 DETAILS BOTH (CIE AND SEE)

The weightage of continuous Internal Evaluation (CIE) is 50% and for the Semester End Examination (SEE) is 50%. The minimum passing mark for the CIE is 40% of maximum marks (20 marks out of 50). The minimum passing mark for SEE is 35% of maximum marks (18 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each course. Student has to secure a minimum 40% (40 marks out of 100) in the total of the CIE and SEE together.

CONTINUOUS INTERNAL EVALUATION (CIE)

CIE FOR THE THEORY:

1. Three tests each of 50 marks, after the completion of the syllabus 40%, 70% and 100% respectively.
2. Average of best two internal assessment tests each of 50 marks, scale down to 30 marks.
3. Any two assessment methods as per regulations i.e. Two assignments / Two Quizzes/ Weekly test / project work for 40 marks, scaled down to 20 marks.
4. Total marks scored (30+20 = 50 marks).
5. The minimum passing mark for the CIE is 40% of maximum marks (20 marks out of 50).

SEMESTER END EXAMINATION (SEE)

1. The question paper shall be set for 100 marks and duration of SEE is 3 hours.
2. The question paper will have two parts: Part-A and Part-B.
3. **Part-A** should contain minimum **Two or Four** quiz questions from each module of 02 marks/ 01 marks each. **Part-A is Compulsory** and it carries 20 Marks.
4. **Part-B** contains total 10 questions.
5. Two questions of 16 marks (with minimum of 3 sub questions) from each module with internal choice.
6. Students should answer five full questions, selecting one full question from each module.
7. Question papers to be set as per the Blooms Taxonomy levels.

CO-PO Mapping:

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

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



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SEMESTER - III					
SOFTWARE ENGINEERING					
Category: PCC					
Course Code	:	B24SOE305	CIE	:	50 Marks
Teaching Hours L:T:P	:	3:0:0	SEE	:	50 Marks
Total Hours	:	45 (T)	Total	:	100 Marks
Credits	:	3	SEE Duration	:	3 Hrs

Course Objectives	
1.	Introduce fundamental concepts of software engineering, including software size, quality, productivity factors, and project planning activities.
2.	Understand and apply software cost estimation techniques and staffing models to predict development and maintenance costs.
3.	Analyze and document software requirements using formal specification methods and various modeling techniques like SADT, SSA, and GIST.
4.	Apply software design principles, modularization techniques, and best practices for implementation and documentation.
5.	Learn and implement software testing strategies and understand the essentials of Software Configuration Management (SCM) processes.

Module – 1	No. of Hours
Introduction to Software Engineering: Introduction –Some definitions –Some size factors–Quality and productivity factors – Managerial issues. Planning a Software Project: Introduction –Defining the problem– Developing a solution strategy – Planning the development process– Planning an organizational structure–Other planning activities	9
Module – 2	No. of Hours
Software Cost Estimation: Introduction – Software cost factors– Software Cost Estimation Techniques–Staffing Level Estimation–Estimating software maintenance costs.	9
Module – 3	No. of Hours
Software Requirements Definition: Introduction–The Software requirements specification– Formal specification techniques– Relational notations – State oriented notation –Languages and Processors for requirements specification– PSL / PSA – RSL / REVS –Structured analysis and design technique(SADT)–Structured system analysis(SSA)–GIST.	9
Module – 4	No. of Hours
Software Design: Introduction–Fundamental design concepts–Modules and modularizing criteria – Design notations–Design techniques–Design Guidelines. Implementation Issues: Structured coding techniques –coding style–Documentation guidelines	9
Module – 5	No. of Hours
Software Testing Strategies: A Strategic approach to software testing– Strategic issues–Testing strategies for conventional software–Validation testing–System testing. Testing Conventional Applications: Software testing fundamentals – Internal and External views of testing –White-box testing–Basis path testing – Control structure Testing – Black-box Testing. Software Configuration Management: Software configuration management – The SCM repository – The SCM process	9

Course Outcomes: At the end of the course, the students will be able to	
CO1	Illustrate basic software engineering methods and practices, and their development process model.
CO2	Discuss various software cost factor and cost estimation techniques
CO3	Demonstrate the basic concepts of Software requirement specification and various Languages and processors for requirements specification
CO4	Make use of various software design techniques ,Notations and Implementation issues
CO5	Construct various software testing strategies and SCM Process.

Text Books	
1.	Richard.E.Fairely, 2017 ,43 rd Edition, Software Engineering Concepts, Tata McGraw–Hill Education Private Limited, New Delhi
2.	Roger S.Pressman, 2018, Software Engineering A Practitioner’s Approach, 13 th edition, Tata McGraw–Hill



Education Private Limited, New Delhi.

Reference Text Books

1. Ian Sommerville, 2015, Software Engineering, 9th edition, Pearson Indian Education Service Private Limited, Chennai.
2. PankajJalote2015, An Integrated Approach to Software Engineering, 3rd edition, Narosa Publishing House, New Delhi.
3. Aggarwalk.k, Yogeshsingh, 2005, Software Engineering, 2nd edition, New age international Private Limited, Publishers, New Delhi.

Web links and Video lectures (e-Resources)

1. https://www.tutorialspoint.com/software_engineering/software_engineering_quickguide.htm
2. http://moodle.autolab.unipannon.hu/Mecha_tananyag/szoftverfejlesztési_folyamatok_angol/ch13.html
3. https://www.tutorialspoint.com/software_testing/software_testing_tutorial.pdf

ASSESSMENT DETAILS BOTH (CIE AND SEE)

The weightage of continuous Internal Evaluation (CIE) is 50% and for the Semester End Examination (SEE) is 50%. The minimum passing mark for the CIE is 40% of maximum marks (20 marks out of 50). The minimum passing mark for SEE is 35% of maximum marks (18 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each course. Student has to secure a minimum 40% (40 marks out of 100) in the total of the CIE and SEE together.

CONTINUOUS INTERNAL EVALUATION (CIE)

CIE FOR THE THEORY:

1. Three tests each of 50 marks, after the completion of the syllabus 40%, 70% and 100% respectively.
2. Average of best two internal assessment tests each of 50 marks, scale down to 30 marks.
3. Any two assessment methods as per regulations i.e. Two assignments / Two Quizzes/ Weekly test / project work for 40 marks, scaled down to 20 marks.
4. Total marks scored (30+20 = 50 marks).
5. The minimum passing mark for the CIE is 40% of maximum marks (20 marks out of 50).

SEMESTER END EXAMINATION (SEE)

1. The question paper shall be set for 100 marks and duration of SEE is 3 hours.
2. The question paper will have two parts: Part-A and Part-B.
3. **Part-A** should contain minimum **Two or Four** quiz questions from each module of 02 marks/ 01 marks each. **Part-A is Compulsory** and it carries 20 Marks.
4. **Part-B** contains total 10 questions.
5. Two questions of 16 marks (with minimum of 3 sub questions) from each module with internal choice.
6. Students should answer five full questions, selecting one full question from each module.
7. Question papers to be set as per the Blooms Taxonomy levels.

CO-PO Mapping:

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

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



SEMESTER - III					
REASONING AND APTITUDE					
Category: AEC					
Course Code	:	B24REA306	CIE	:	50 Marks
Teaching Hours L:T:P	:	3:0:0	SEE	:	50 Marks
Total Hours	:	45 (T)	Total	:	100 Marks
Credits	:	3	SEE Duration	:	3Hrs

Course Objectives	
1.	Understand and apply various types of analogies and classifications to enhance logical reasoning.
2.	Develop problem-solving skills in basic arithmetic operations including HCF, LCM, and decimal fractions.
3.	Apply mathematical concepts to solve problems related to numbers, ages, and profit & loss.
4.	Analyze and solve problems related to time, work, distance, and trains effectively.
5.	Compute and interpret simple interest, compound interest, and area-based problems.

Module – 1	No. of Hours
Analogy : Completing the Analogous Pair - Simple Analogy - Choosing the Analogous Pair- Double Analogy - Choosing a Simple Word – Detecting Analogies – Three Word Analogy – Number Analogy – Alphabet Analogy . Classification: Choosing the Odd Word - Choosing the Odd Pair of Words - Choosing the Odd Numeral - Choosing the Odd Numeral Pair - Choosing the Odd Letter Group	9
Module – 2	No. of Hours
H.C.F and L.C.M of numbers – Decimal fractions.	9
Module – 3	No. of Hours
Problems on numbers – Problems on ages – Profit and loss.	9
Module – 4	No. of Hours
Time and work - Time and distance - Problems on trains.	9
Module – 5	No. of Hours
Simple interest – Compound interest – Area	9

Course Outcomes: At the end of the course, the students will be able to	
CO1	Identify and solve various analogy and classification problems to enhance verbal and logical reasoning skills.
CO2	Compute HCF and LCM of numbers and apply operations on decimal fractions in quantitative scenarios.
CO3	Solve real-life problems involving numbers, ages, and profit & loss using arithmetic techniques.
CO4	Apply mathematical reasoning to solve problems on time, work, distance, and trains.
CO5	Calculate simple and compound interest, and solve problems related to area using geometric formulas.

Text Books	
1.	R.S.Agarwal. Reasoning. Chand Publications, 8 th Edition
2.	R.S.Agarwal. Quantitative Aptitude. Chand Publications, 7 th Edition
Reference Text Books	
1.	A. Abhijit. Quantitative Aptitude for Competitive Examinations Paperback (English). McGraw Hill Education, 5th Edition.
2.	PremSuri and Sudharshan Chopra. Premier Digest – Arithmetic for Competitive Examinations. Sulthan Chand Publications, New Delhi, 2 nd Edition.
3.	Sarvesh K Verma. Quantitative Aptitude Quantum CAT. Arihant Publication

Web links and Video lectures (e-Resources)	
1.	https://nptel.ac.in/courses/122/102/122102009/
2.	https://www.faceprep.in/quantitative-aptitude/
3.	https://www.indiabix.com/aptitude/questions-and-answers/
4.	https://www.examstocks.com/quantitative-aptitude-questions-and-answerspdf/



ASSESSMENT DETAILS BOTH (CIE AND SEE)

The weightage of continuous Internal Evaluation (CIE) is 50% and for the Semester End Examination (SEE) is 50%. The minimum passing mark for the CIE is 40% of maximum marks (20 marks out of 50). The minimum passing mark for SEE is 35% of maximum marks (18 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each course. Student has to secure a minimum 40% (40 marks out of 100) in the total of the CIE and SEE together.

CONTINUOUS INTERNAL EVALUATION (CIE)

CIE FOR THE THEORY:

1. Three tests each of 50 marks, after the completion of the syllabus 40%, 70% and 100% respectively.
2. Average of best two internal assessment tests each of 50 marks, scale down to 30 marks.
3. Any two assessment methods as per regulations i.e. Two assignments / Two Quizzes/ Weekly test / project work for 40 marks, scaled down to 20 marks.
4. Total marks scored (30+20 = 50 marks).
5. The minimum passing mark for the CIE is 40% of maximum marks (20 marks out of 50).

SEMESTER END EXAMINATION (SEE)

1. The question paper shall be set for 100 marks and duration of SEE is 3 hours.
2. The question paper will have two parts: Part-A and Part-B.
3. **Part-A** should contain minimum **Two or Four** quiz questions from each module of 02 marks/ 01 marks each. **Part-A is Compulsory** and it carries 20 Marks.
4. **Part-B** contains total 10 questions.
5. Two questions of 16 marks (with minimum of 3 sub questions) from each module with internal choice.
6. Students should answer five full questions, selecting one full question from each module.
7. Question papers to be set as per the Blooms Taxonomy levels.

CO-PO Mapping:

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

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



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SEMESTER - III					
OBJECT ORIENTED PROGRAMMING IN C++ LAB					
Category: PCCL					
Course Code	:	B240OPL307	CIE	:	50 Marks
Teaching Hours L : P : S	:	1:2:0	SEE	:	50 Marks
Total Hours	:	14 Sessions (P)	Total	:	100 Marks
Credits	:	1	SEE Duration	:	3 Hrs

Course Objectives	
1.	Understand the concept and application of constructors, copy constructors, and storage classes in C++..
2.	Explore and implement static members, inline functions, and operator overloading techniques.
3.	Apply the principles of inheritance, method overriding, and pointer arithmetic for object-oriented design
4.	Develop recursive functions, utilize this pointer, and apply friend functions and classes effectively.
5.	Handle runtime errors using exception handling and implement generic programming using class templates.

Sl. No	Experiments
Develop C++ programs for	
1.	Constructor and copy constructor
2.	Storage classes like auto, extern, register and static.
3.	Static member data, static member function and bitwise operators.
4.	Overloading and method overriding.
5.	Inheritance
6.	Pointer Arithmetic.
7.	Inline Functions.
8.	Functions & Recursion. a. Recursion b. Function with “this” pointer
9.	Friend Function & Friend Class.
10.	Exception handling methods.
11.	Overload Unary & Binary Operators as Member Function & Non Member Function. a. Unary operator as member function b. Binary operator as non-member function
12.	Class Templates

Course Outcomes: At the end of the course, the students will be able to	
CO1	Explain the concepts of oops for building object based applications
CO2	Write a program in different logic with suitable validations for a given problem
CO3	Implement the techniques and features of the Object Oriented Programming constructs to construct an application
CO4	Implement method overloading and method overriding for different user specifications
CO5	Write programs implementing inheritance for an application domain.



ASSESSMENT DETAILS BOTH (CIE AND SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks).

A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

CONTINUOUS INTERNAL EVALUATION (CIE)

Component	Scale down to	Total Marks
Conduction of experiments and Record Writing (Each Experiment evaluated for 10 marks)	20	20
Internal Lab Test 1(After 6 experiments) Exam conduction for 50 marks	15	15
Internal Lab Test 2 (After 6 experiments) Exam conduction for 50 marks	15	15
CIE		50

SEMESTER END EVALUATION (SEE)

- SEE marks for the practical course are 50 Marks. Practical examinations are to be conducted between the schedules mentioned in the academic calendar of the Institution.
- All laboratory experiments are to be included for practical examination.
- Students can pick one question (experiment) from the questions lot prepared by the examiners.
- Evaluation of test write-up, conduction procedure, result and viva will be conducted jointly by examiners.
- Rubrics suggested for SEE, writeup-20%, Conduction procedure and result in -60%, Viva-voce 20% of maximum marks. SEE for practical shall be evaluated for 100 marks and scored marks shall be scaled down to 50 marks.
- Change of experiment is allowed only once and 15% of Marks allotted to the procedure part are to be made zero. The minimum duration of SEE is 03 hours.

CO-PO Mapping

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

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



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SEMESTER- III					
RELATIONAL DATA BASE MANAGEMENT SYSTEM LAB					
Category: PCCL					
Course Code	:	B24RDBL308	CIE	:	50 Marks
Teaching Hours L : P : S	:	1:2:0	SEE	:	50 Marks
Total Hours	:	14 Sessions (P)	Total	:	100 Marks
Credits	:	1	SEE Duration	:	3 Hrs

Course Objectives	
1.	To provide a strong foundation in SQL including DDL, DML, DCL, and advanced SQL concepts
2.	To teach ER models and relational database design including normalization.
3.	To introduce stored procedures, triggers, and their integration in client applications.
4.	To develop an understanding of Oracle database operations such as system functions and aggregate queries.
5.	To explain database administration tasks like installation, backup, recovery, and batch processing.

Sl. No	Experiments
1.	Basic SQL – DDL & DML, Views, Group operations, aggregate operations, System operations in Oracle
2.	Intermediate SQL –Joins, Sub queries, DCL operations
3.	Advanced SQL – Nested tables, V-arrays
4.	ER Modeling
5.	Database Design and Normalization
6.	Stored procedures and using them in a client application
7.	Triggers and their front end application
8.	DBA mechanisms – Installation, Backup and recovery operations, Batch processing

Course Outcomes: At the end of the course, the students will be able to	
CO1	Model Entity Relationship with E-R diagrams
CO2	Design database schema considering normalization and relationships within database
CO3	Write SQL queries to user specifications
CO4	Develop triggers, procedures, user defined functions and design accurate and PLSQL programs in Oracle and DB2
CO5	Use the database from a front end application

ASSESSMENT DETAILS BOTH (CIE AND SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks).

A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

CONTINUOUS INTERNAL EVALUATION (CIE)

Component	Scale down to	Total Marks
Conduction of experiments and Record Writing (Each Experiment evaluated for 10 marks)	20	20
Internal Lab Test 1(After 6 experiments) Exam conduction for 50 marks	15	15
Internal Lab Test 2 (After 6 experiments) Exam conduction for 50 marks	15	15
CIE		50



SEMESTER END EVALUATION (SEE)

1. SEE marks for the practical course are 50 Marks. Practical examinations are to be conducted between the schedules mentioned in the academic calendar of the Institution.
2. All laboratory experiments are to be included for practical examination.
3. Students can pick one question (experiment) from the questions lot prepared by the examiners.
4. Evaluation of test write-up, conduction procedure, result and viva will be conducted jointly by examiners.
5. Rubrics suggested for SEE, writeup-20%, Conduction procedure and result in -60%, Viva-voce 20% of maximum marks. SEE for practical shall be evaluated for 100 marks and scored marks shall be scaled down to 50 marks.
6. Change of experiment is allowed only once and 15% of Marks allotted to the procedure part are to be made zero.
7. The minimum duration of SEE is 03 hours.

CO-PO Mapping

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

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



IV - Semester Syllabus

SEMESTER - IV					
PROGRAMMING IN JAVA					
Category: PCC					
Course Code	:	B24PIJ401	CIE	:	50 Marks
Teaching Hours L:T:P	:	3:0:0	SEE	:	50 Marks
Total Hours	:	45 (T)	Total	:	100 Marks
Credits	:	3	SEE Duration	:	3 Hrs

Course Objectives	
1.	To introduce the fundamental concepts of object-oriented programming and the Java language syntax.
2.	To familiarize students with classes, objects, methods, and constructors in Java.
3.	To understand and implement key OOP concepts such as encapsulation, inheritance, and polymorphism.
4.	To explain and apply control structures, arrays, exception handling, and string operations.
5.	To develop programs using packages, interfaces, and advanced features like static and abstract classes.

Module – 1	No. of Hours
Object-Oriented Programming Concepts: Encapsulation, Inheritance, Polymorphism- Features of Java Language - Types of Java Programs - Java Architecture - Data Types - Structure of a Java Program – Comments - Type Conversion - Block Statements and Scope- Operators. Control Statements: The if...else Statement - The switch Statement - The while Statement - The do...while Statement - The for...Statement - The break Statement - The continue Statement - The comma Statement – Array: Single Dimensional Array – Multi Dimensional Array.	9
Module – 2	No. of Hours
Classes: Defining a Class - The new Operator and Objects - The dot Operator - Method Declaration and Calling - Constructors - Instance Variable Hiding - this in Constructor - Method Overloading - Passing Objects as Parameters to Methods.	9
Module – 3	No. of Hours
Inheritance: Creating Subclasses - Method Overriding - Final Class- Final Method - Final Variables- Object Destruction and Garbage Collection – Recursion- Static Methods, Block and Variables- Static Method - Static Variables - Static Block - Abstract Classes.	9
Module – 4	No. of Hours
Packages and Interfaces: Packages–Defining a Package–Finding Packages and CLASSPATH A Short Package- Example Packages and Member Access – An Access –Example– Importing Packages- Interfaces–Defining an Interface–Implementing Interfaces -Nested Interfaces– Applying Interfaces Variables in Interfaces.	9
Module – 5	No. of Hours
Exception Handling: Exception– Handling Fundamentals – Exception Types- Uncaught Exceptions - Multiple catch Clauses–Nested try Statements–throw–throws–finally–Java’s Built-in Exceptions. Creating Your Own Exception. String Handling: The String Constructors-String Length–String Operations –String Buffer– String Buffer methods–String Builder Classes.	9

Course Outcomes: At the end of the course, the students will be able to	
CO1	Explain the principles of object-oriented programming and the features of the Java language.
CO2	Write Java programs using classes, objects, methods, and constructors.
CO3	Implement inheritance, method overloading/overriding, and use polymorphism effectively
CO4	Develop Java programs using control structures, arrays, and handle exceptions properly.
CO5	Create and use packages, interfaces, static and abstract features in Java for modular programming.

Text Books	
1.	E Balagurusamy, 2019, A Programming with JAVA, McGraw Hill Education (India) Private Limited, 6 th Edition.
2.	Dr. K. Somasundaram, Programming in JAVA2, Jaico Publisher.



Reference Text Books

1.	Herbert Schildt, 2019, "Java The Complete Reference", Eleventh Edition, Oracle Press, New Delhi.
2.	Allen B. Downey & ChrisMayfield, 2020, Think Java, O'reilly Media Inc Sebastopol, CA.

Web links and Video lectures (e-Resources)

Resources

1. https://onlinecourses.nptel.ac.in/noc24_ce107/preview
2. <http://www.digimat.in/nptel/courses/video/106106126/L01.html>

ASSESSMENT DETAILS BOTH (CIE AND SEE)

The weightage of continuous Internal Evaluation (CIE) is 50% and for the Semester End Examination (SEE) is 50%. The minimum passing mark for the CIE is 40% of maximum marks (20 marks out of 50). The minimum passing mark for SEE is 35% of maximum marks (18 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each course. Student has to secure a minimum 40% (40 marks out of 100) in the total of the CIE and SEE together.

CONTINUOUS INTERNAL EVALUATION (CIE)

CIE FOR THE THEORY:

1. Three tests each of 50 marks, after the completion of the syllabus 40%, 70% and 100% respectively.
2. Average of best two internal assessment tests each of 50 marks, scale down to 30 marks.
3. Any two assessment methods as per regulations i.e. Two assignments / Two Quizzes/ Weekly test / project work for 40 marks, scaled down to 20 marks.
4. Total marks scored (30+20 = 50 marks).
5. The minimum passing mark for the CIE is 40% of maximum marks (20 marks out of 50).

SEMESTER END EXAMINATION (SEE)

1. The question paper shall be set for 100 marks and duration of SEE is 3 hours.
2. The question paper will have two parts: Part-A and Part-B.
3. **Part-A** should contain minimum **Two or Four** quiz questions from each module of 02 marks/ 01 marks each. **Part-A is Compulsory** and it carries 20 Marks.
4. **Part-B** contains total 10 questions.
5. Two questions of 16 marks (with minimum of 3 sub questions) from each module with internal choice.
6. Students should answer five full questions, selecting one full question from each module.
7. Question papers to be set as per the Blooms Taxonomy levels.

CO-PO Mapping:

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

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



MOOGAMBIGAI CHARITABLE AND EDUCATIONAL TRUST
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Department of Bachelors of Computer Administration

SEMESTER - IV					
FUNDAMENTALS OF COMPUTER ALGORITHMS					
Category: PCC					
Course Code	:	B24FCA402	CIE	:	50 Marks
Teaching Hours L:T:P	:	3:0:0	SEE	:	50 Marks
Total Hours	:	45 (T)	Total	:	100 Marks
Credits	:	3	SEE Duration	:	3 Hrs

Course Objectives	
1.	To introduce fundamental algorithm design concepts and analyze their performance.
2.	To teach various algorithmic strategies such as divide-and-conquer, greedy, dynamic programming, and backtracking.
3.	To understand and implement fundamental data structures like stacks queues, trees, and graphs.
4.	To apply different algorithmic techniques to real-world problems like sorting, shortest path, spanning trees, and knapsack problems.
5.	To enable students to compare algorithmic approaches based on time and space complexity.

Module – 1	No. of Hours
Introduction: .What is an Algorithm - Algorithm Specification- Performance Analysis – Elementary Data Structure – Stacks And Queues- Trees – Binary Trees – Binary Search Trees – Priority Queue – Heap and Heap sorts - Graphs: Introduction –Definitions- Graph Representations. Basic Traversal And Search Technique: Techniques For Binary Trees-Techniques For Graphs : Breadth First Search and Traversal – Depth First Search and Traversal	9
Module – 2	No. of Hours
Divide and Conquer methodology: Finding maximum and minimum - Merge sort -Quick sort – Selection sort - Strassen's Matrix Multiplication	9
Module – 3	No. of Hours
Greedy Method: Introduction – Knapsack Problem–Tree Vertex Splitting- Job Sequencing With Deadlines- Minimum-Cost Spanning trees : Prim's Algorithm - Kruskal's Algorithm - An Optimal Randomized Algorithm – Single source Shortest Path	9
Module – 4	No. of Hours
Dynamic programming: General Methods- Multi stage graph – All Pairs Shortest Path— Optimal Binary Search Trees-0/1 Knapsack Problem – Travelling Salesperson Problem – Flow shops scheduling.	9
Module – 5	No. of Hours
Backtracking- The General Method- The 8-Queens Problem- Sum Of Subsets-Graph Coloring – Hamiltonian Cycles – Knapsack problem	9

Course Outcomes: At the end of the course, the students will be able to	
CO1	Define and analyze the performance of algorithms and utilize basic data structures.
CO2	Apply divide-and-conquer strategies to solve problems like sorting and matrix multiplication.
CO3	Implement greedy algorithms for optimization problems such as knapsack, job scheduling, and spanning trees.
CO4	Use dynamic programming for solving complex problems including TSP and optimal BSTs.
CO5	Solve constraint satisfaction problems using backtracking techniques like 8-Queens and graph coloring

Text Books	
1.	Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran “Fundamentals of Computer Algorithms, Universities Press, 2 nd Edition, 2019.
Reference Text Books	
1.	Anany Levitin, “Introduction to the Design and Analysis of Algorithms”, 3 rd Edition, Pearson Education, 2012.

Web links and Video lectures (e-Resources)	
Resources: https://www.youtube.com/watch?v=8hly31xKli0	



ASSESSMENT DETAILS BOTH (CIE AND SEE)

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CONTINUOUS INTERNAL EVALUATION (CIE)

CIE FOR THE THEORY:

1. Three tests each of 50 marks, after the completion of the syllabus 40%, 70% and 100% respectively.
2. Average of best two internal assessment tests each of 50 marks, scale down to 30 marks.
3. Any two assessment methods as per regulations i.e. Two assignments / Two Quizzes/ Weekly test / project work for 40 marks, scaled down to 20 marks.
4. Total marks scored (30+20 = 50 marks).
5. The minimum passing mark for the CIE is 40% of maximum marks (20 marks out of 50).

SEMESTER END EXAMINATION (SEE)

1. The question paper shall be set for 100 marks and duration of SEE is 3 hours.
2. The question paper will have two parts: Part-A and Part-B.
3. **Part-A** should contain minimum **Two or Four** quiz questions from each module of 02 marks/ 01 marks each. **Part-A is Compulsory** and it carries 20 Marks.
4. **Part-B** contains total 10 questions.
5. Two questions of 16 marks (with minimum of 3 sub questions) from each module with internal choice.
6. Students should answer five full questions, selecting one full question from each module.
7. Question papers to be set as per the Blooms Taxonomy levels.

CO-PO Mapping

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

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



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SEMESTER - IV					
MICROPROCESSOR AND ASSEMBLY LANGUAGE PROGRAMMING					
Category: PCC					
Course Code	:	B24MPA403	CIE	:	50 Marks
Teaching Hours L:T:P	:	3:0:0	SEE	:	50 Marks
Total Hours	:	45 (T)	Total	:	100 Marks
Credits	:	3	SEE Duration	:	3 Hrs

Course Objectives	
1.	To introduce the architecture, instruction set, and programming concepts of the Intel 8086 microprocessor.
2.	To explain the process of developing assembly language programs using tools and directives.
3.	To describe memory and I/O interfacing techniques using programmable devices.
4.	To introduce the Intel 8051 microcontroller and its architecture, instruction set, and I/O functionalities.
5.	To explore system design concepts using 8086 and provide an overview of multiprocessor

Module – 1	No. of Hours
The 8086 Microprocessor: Introduction to Microprocessors - Introduction to INTEL 8086 - Introduction to 8086 Instructions - Format of 8086 Instructions - Addressing Modes of the 8086 - Instructions Affecting Flags of 8086 - Classification of 8086 Instructions - Examples of 8086 Assembly Language Instructions - Byte and String Manipulation in 8086 - Interrupt and Interrupt Service Routine in 8086 - Classification of Interrupts of 8086 - Priorities of Interrupts of 8086.	9
Module – 2	No. of Hours
Introduction to Assembly-Language Programming: Levels of Programming - Flow Chart - Variables and Constants Used in Assemblers - Assembler Directives - Assembly-Language Program Development Tools – Editor - Assembler - Library Builder – Linker - Debugger – Simulator - Emulator - Hand Coding of Assembly-Language Programs	9
Module – 3	No. of Hours
Memory and IO Interfacing: Introduction to Memory - Memory Interfacing- IO Interfacing- Parallel Communication Interface- Programmable Peripheral Interface (INTEL 8255)- Pins Signals and Functional block diagram of 8255 - Programmable Timer (INTEL 8254): Pins-Signals and Functional block diagram of 8254- Programmable Interrupt Controller (INTEL 8259): Pins Signals and Functional block diagram of 8259.	9
Module – 4	No. of Hours
THE 8051 Microcontroller: Introduction to Microcontrollers - Introduction to the INTEL8051 Microcontroller - Special Function Registers (SFR) of 8051- IO Ports and Circuits of 8051- Addressing Modes in 8051- Instructions Affecting Flags of 8051- Classification of 8051 Instructions	9
Module – 5	No. of Hours
The 8086 microprocessor based system and advanced processor: Pins and Signals of INTEL 8086 - System Design Using the 8086 Microprocessor - System Bus Structure – IO Programming - Introduction to Multiprogramming - Multiprocessor Configurations - Introduction to Advanced Processors.	9

Course Outcomes: At the end of the course, the students will be able to	
CO1	Know the concepts of microcomputer and microprocessors and internal architecture of 8086 microprocessor.
CO2	Have a knowledge on structured assembly language programs to solve the problems using 8086 microprocessor.
CO3	Describe memory organization of 8086, functionality of programmable peripheral interface and programmable interrupt controller.
CO4	Discuss the concept of micro controller and its working methodology.
CO5	Analyze pins and signals of 8086 and advanced processors.

Text Books	
1.	NagoorKani, 2017, Microprocessor and Microcontroller, McGraw – Hill Education (India), Private Limited.



Reference Text Books

1.	Krishna Kant, 2016, Microprocessor and Microcontrollers Architecture, Programming and System Design 8085,8086,8051,8096, 2 nd edition, PHI Learning Private Limited, New Delhi.
2.	Ramesh S. Gaonkar, 2013, Microprocessor Architecture, Programming and Application with the 8085.

Web links and Video lectures (e-Resources)

Resources

- https://www.tutorialspoint.com/assembly_programming/assembly_variables.htm
- <https://www.geeksforgeeks.org/microprocessor-tutorials/>
- <http://examradar.com/memories-io-interfacing/>

ASSESSMENT DETAILS BOTH (CIE AND SEE)

The weightage of continuous Internal Evaluation (CIE) is 50% and for the Semester End Examination (SEE) is 50%. The minimum passing mark for the CIE is 40% of maximum marks (20 marks out of 50). The minimum passing mark for SEE is 35% of maximum marks (18 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each course. Student has to secure a minimum 40% (40 marks out of 100) in the total of the CIE and SEE together.

CONTINUOUS INTERNAL EVALUATION (CIE)

CIE FOR THE THEORY:

- Three tests each of 50 marks, after the completion of the syllabus 40%, 70% and 100% respectively.
- Average of best two internal assessment tests each of 50 marks, scale down to 30 marks.
- Any two assessment methods as per regulations i.e. Two assignments / Two Quizzes/ Weekly test / project work for 40 marks, scaled down to 20 marks.
- Total marks scored (30+20 = 50 marks).
- The minimum passing mark for the CIE is 40% of maximum marks (20 marks out of 50).

SEMESTER END EXAMINATION (SEE)

- The question paper shall be set for 100 marks and duration of SEE is 3 hours.
- The question paper will have two parts: Part-A and Part-B.
- Part-A** should contain minimum **Two or Four** quiz questions from each module of 02 marks/ 01 marks each. **Part-A is Compulsory** and it carries 20 Marks.
- Part-B** contains total 10 questions.
- Two questions of 16 marks (with minimum of 3 sub questions) from each module with internal choice.
- Students should answer five full questions, selecting one full question from each module.
- Question papers to be set as per the Blooms Taxonomy levels.

CO-PO Mapping

PO \ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
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CO3	3	1	1	3	3	-	-	-	-	2	-
CO4	2	1	1	2	2	-	-	-	-	1	-
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Level 1-High, Level 2-Moderate, Level 3-Low



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SEMESTER - IV					
WEB TECHNOLOGY					
Category: PCC					
Course Code	:	B24WET404	CIE	:	50 Marks
Teaching Hours L : T : P	:	3:0:0	SEE	:	50 Marks
Total Hours	:	45 (T)	Total	:	100 Marks
Credits	:	3	SEE Duration	:	3 Hrs

Course Objectives	
1.	To introduce the structure and basic tags of HTML for web page development.
2.	To teach the use of lists, text formatting and special HTML tags to format content.
3.	To explain the creation and formatting of HTML tables using relevant tags and attributes.
4.	To develop skills in using hyperlinks, images, and frames in web design.
5.	To provide knowledge for designing HTML forms and creating complete web pages.

Module – 1	No. of Hours
Introduction to HTML: HTML Tags – Structure of HTML Program – Head Tag - Body Tag – Paragraph Tag – Formatting Tags (Bold, Underline, Italic, Strike through, Subscript, Superscript, Big, Small)	9
Module – 2	No. of Hours
List: Lists - Ordered List - Unordered List - Data Definition List – Marquee Tag - Break Tag - Ruler Tag - Font Tag.	9
Module – 3	No. of Hours
Table: Table - Table building Tags - Attributes of Table - Table Tag – Table Header Tag - Table Row Tag - Table Data Tag - Row Span - Column Span.	9
Module – 4	No. of Hours
Links and Images: Links - Linking Pages Using Anchor Tag - Attributes of Anchor Tag -Image Tag and its Attributes - Frame Tag.	9
Module – 5	No. of Hours
Forms: Forms - Form Tag - Input Tag – Input Types (Textbox, Radio button, Checkbox, Password) - Selection Tag – Text Area Tag - Sample Web Page Creation.	9

Course Outcomes: At the end of the course, the students will be able to	
CO1	Describe the basic tags design in static pages.
CO2	Express the basic functions of lists in web designing.
CO3	Develop web based application using suitable tags, links and images.
CO4	Analyze the Table tags usage in web page.
CO5	Dissect the web page using frames.

Text Books	
1.	Ivan Bayross. Web Enabled Commercial Applications Development Using HTML, DHTML, JavaScript,Perl CGI. BPB Publications, 2nd Revised Edition, 2000.

Reference Text Books	
1.	John W. Gosney. HTML Professional Project. Thomoson Course Technology, 2004.
2.	Eric Freeman & Elisabeth Robson. A Brain-Friendly Guide Head First HTML5Programming. O'Reilly Media, Inc., 1 st Edition

Web links and Video lectures (e-Resources)	
Web Sources	
1.	https://nptel.ac.in/courses/106/105/106105084/
2.	https://nptel.ac.in/courses/106/106/106106092/
3.	https://onlinecourses.swayam2.ac.in/aic20_sp11/preview



ASSESSMENT DETAILS BOTH (CIE AND SEE)

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CONTINUOUS INTERNAL EVALUATION (CIE)

CIE FOR THE THEORY:

1. Three tests each of 50 marks, after the completion of the syllabus 40%, 70% and 100% respectively.
2. Average of best two internal assessment tests each of 50 marks, scale down to 30 marks.
3. Any two assessment methods as per regulations i.e. Two assignments / Two Quizzes/ Weekly test / project work for 40 marks, scaled down to 20 marks.
4. Total marks scored (30+20 = 50 marks).
5. The minimum passing mark for the CIE is 40% of maximum marks (20 marks out of 50).

SEMESTER END EXAMINATION (SEE)

1. The question paper shall be set for 100 marks and duration of SEE is 3 hours.
2. The question paper will have two parts: Part-A and Part-B.
3. **Part-A** should contain minimum **Two or Four** quiz questions from each module of 02 marks/ 01 marks each. **Part-A is Compulsory** and it carries 20 Marks.
4. **Part-B** contains total 10 questions.
5. Two questions of 16 marks (with minimum of 3 sub questions) from each module with internal choice.
6. Students should answer five full questions, selecting one full question from each module.
7. Question papers to be set as per the Blooms Taxonomy levels.

CO-PO Mapping:

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

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



SEMESTER - IV					
COMPUTER GRAPHICS AND IMAGE PROCESSING					
Category: PCC					
Course Code	:	B24CGI405	CIE	:	50 Marks
Teaching Hours L:T:P	:	3:0:0	SEE	:	50 Marks
Total Hours	:	45(T)	Total	:	100 Marks
Credits	:	3	SEE Duration	:	3Hrs

Course Objectives	
1.	To introduce the fundamentals of computer graphics and various display systems.
2.	To develop an understanding of output primitives and drawing algorithms.
3.	To explain the attributes of graphical elements and anti-aliasing techniques.
4.	To provide knowledge on 2D geometric transformations and clipping algorithms.
5.	To familiarize students with digital image processing fundamentals, color models, and pixel operations.

Module – 1	No. of Hours
Overview of Graphics Systems: Video Display Devices – Refresh Cathode -Ray Tubes - Raster Scan - Random Scan Displays – Color CRT Monitors – Direct View Storage Tubes – Flat Panel Displays - Raster Scan and Random Scan Systems– Input Devices.	9
Module – 2	No. of Hours
Output Primitives: Line Drawing - Circle Generating - Ellipse Generating Algorithms – Boundary Fill Algorithm – Flood Fill Algorithm – Character Generation.	9
Module – 3	No. of Hours
Attributes of Output Primitives: Line – Area – Fill – Character – Text -Marker and Bundled Attributes - Anti Aliasing Techniques.	9
Module – 4	No. of Hours
Geometric Transformations: Basic Transformations - Reflection and Shear – Window – To - View Port Transformation – Point – Line – Polygon – Text -Exterior Clipping Operations.	9
Module – 5	No. of Hours
Digital Image Fundamentals: Introduction – Origin – Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels – color models.	9

Course Outcomes: At the end of the course, the students will be able to	
CO1	Illustrate basic software engineering methods and practices, and their development process model.
CO2	Discuss various software cost factor and cost estimation techniques
CO3	Demonstrate the basic concepts of Software requirement specification and various Languages and processors for requirements specification
CO4	Make use of various software design techniques ,Notations and Implementation issues
CO5	Construct various software testing strategies and SCM Process.

Text Books	
1.	Donald Hearn and M.Pauline Baker. Computer Graphics, C Version. Pearson Education, second Indian reprint, 2003.
2.	Rafael C. Gonzales, Richard E. Woods. Digital Image Processing. 3 rd Edition, Pearson Education, 2010.

Reference Text Books	
1.	1. N. Krishnamurthy. Introduction to Computer Graphics. Tata McGraw-Hill, 2002.
2.	2. Rafael C. Gonzales, Richard E. Woods, Steven L. Eddins. Digital Image
3.	Processing Using MATLAB. 3 rd Edition Tata McGraw Hill Pvt. Ltd, 2011.

Web links and Video lectures (e-Resources)	
1.	https://www.nptelvideos.com/video.php?id=955&c=10
2.	https://www.javatpoint.com/computer-graphics-dda-algorithm



ASSESSMENT DETAILS BOTH (CIE AND SEE)

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CONTINUOUS INTERNAL EVALUATION (CIE)

CIE FOR THE THEORY:

1. Three tests each of 50 marks, after the completion of the syllabus 40%, 70% and 100% respectively.
2. Average of best two internal assessment tests each of 50 marks, scale down to 30 marks.
3. Any two assessment methods as per regulations i.e. Two assignments / Two Quizzes/ Weekly test / project work for 40 marks, scaled down to 20 marks.
4. Total marks scored (30+20 = 50 marks).
5. The minimum passing mark for the CIE is 40% of maximum marks (20 marks out of 50).

SEMESTER END EXAMINATION (SEE)

1. The question paper shall be set for 100 marks and duration of SEE is 3 hours.
2. The question paper will have two parts: Part-A and Part-B.
3. **Part-A** should contain minimum **Two or Four** quiz questions from each module of 02 marks/ 01 marks each. **Part-A is Compulsory** and it carries 20 Marks.
4. **Part-B** contains total 10 questions.
5. Two questions of 16 marks (with minimum of 3 sub questions) from each module with internal choice.
6. Students should answer five full questions, selecting one full question from each module.
7. Question papers to be set as per the Blooms Taxonomy levels.

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CO2	3	1	1	1	1	-	-	-	-	1	-
CO3	2	1	1	1	1	-	-	-	-	1	-
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SEMESTER - IV					
CYBER-CRIME AND LAW					
Category: AEC					
Course Code	:	B24CCL406	CIE	:	50 Marks
Teaching Hours L:T:P	:	3:0:0	SEE	:	50 Marks
Total Hours	:	45 (T)	Total	:	100 Marks
Credits	:	3	SEE Duration	:	3Hrs

Course Objectives	
1.	Understand and describe the major types of cybercrime
2.	Identify cybercrime vulnerabilities and exploitations of the Internet.
3.	Understand the law with regards to the investigation and prosecution of cyber criminals.
4.	Apply appropriate law enforcement strategies to both, prevent and control cybercrime.

Module – 1	No. of Hours
Cyber Crime: Definition and Origin of the Word, Cyber Crime and Information Security, who are Cyber Criminals, Classification of Cybercrimes, E-mail Spoofing, Spamming, Cyber Defamation, Internet Time Theft, Salami Attack, Salami technique Data Diddling, Forgery, Web Jacking, Newsgroup Spam, Industrial Spying, Hacking, Online Frauds, Pornographic Offenders, Software Piracy, Computer Sabotage Email Bombing, Computer Network Intrusion, Password Sniffing, Credit Card Frauds, Identity Theft.	9
Module – 2	No. of Hours
Cyber Offenses: How Criminals plan them, Categories of Cyber Crimes, How Criminal Plans the Attack: Active Attacks, Passive Attacks, Social Engineering, Classification of Social Engineering, Cyber Stalking: types of Stalkers, Cyber Cafe and Cyber Crimes, Botnets, Attack Vectors, Cyber Crime and Cloud Computing.	9
Module – 3	No. of Hours
Tools and Methods used in Cybercrime: Proxy server and Anonymizers, phishing: How Phishing works? How password cracking works? Key loggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Dos and DDOS Attacks, SQL Injection, Buffer Overflow, An Attack on Wireless Networks.	9
Module – 4	No. of Hours
Phishing and Identity Theft: Phishing: Methods of Phishing, Phishing Techniques, Types of Phishing Scams, Phishing countermeasures, Identity theft, Types and Techniques of identity thefts and its counter measures.	9
Module – 5	No. of Hours
IT ACT, Offenses and Penalties: Offences under the Information and Technology Act 2000 - Penalty and adjudication - Punishments for contraventions under the Information Technology Act 2000 (Case Laws, Rules and recent judicial pronouncements to be discussed) - Limitations of Cyber Law.	9

Course Outcomes: At the end of the course, the students will be able to	
CO1	Understand and describe the major types of cybercrime
CO2	Identify cybercrime vulnerabilities and exploitations of the Internet
CO3	Understand the law with regards to the investigation and prosecution of cyber criminals
CO4	Apply appropriate law enforcement strategies to both, prevent and control cybercrime.

Text Books	
1.	Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives By Nina Godbole, Sunit Belapur, Wiley
2.	Understanding Cybercrime: Phenomena, and Legal Challenges Response, ITU 2012

Reference Text Books
Cyber Crime and Laws, by Santosh Kumar, Gagandeep Kaur, 3 rd Edition, 2024.

Web links and Video lectures (e-Resources)
1. https://nptel.ac.in/courses/122/102/122102009/
2. https://www.faceprep.in/quantitative-aptitude/



3. <https://www.indiabix.com/aptitude/questions-and-answers/>
4. <https://www.examstocks.com/quantitative-aptitude-questions-and-answerspdf/>

ASSESSMENT DETAILS BOTH (CIE AND SEE)

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CONTINUOUS INTERNAL EVALUATION (CIE)

CIE FOR THE THEORY:

1. Three tests each of 50 marks, after the completion of the syllabus 40%, 70% and 100% respectively.
2. Average of best two internal assessment tests each of 50 marks, scale down to 30 marks.
3. Any two assessment methods as per regulations i.e. Two assignments / Two Quizzes/ Weekly test / project work for 40 marks, scaled down to 20 marks.
4. Total marks scored (30+20 = 50 marks).
5. The minimum passing mark for the CIE is 40% of maximum marks (20 marks out of 50).

SEMESTER END EXAMINATION (SEE)

1. The question paper shall be set for 100 marks and duration of SEE is 3 hours.
2. The question paper will have two parts: Part-A and Part-B.
3. **Part-A** should contain minimum **Two or Four** quiz questions from each module of 02 marks/ 01 marks each. **Part-A is Compulsory** and it carries 20 Marks.
4. **Part-B** contains total 10 questions.
5. Two questions of 16 marks (with minimum of 3 sub questions) from each module with internal choice.
6. Students should answer five full questions, selecting one full question from each module.
7. Question papers to be set as per the Blooms Taxonomy levels.

CO-PO Mapping:

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

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



MOOGAMBIGAI CHARITABLE AND EDUCATIONAL TRUST
Rajarajeswari College of Engineering
(An Autonomous Institution under Visvesvaraya Technological University, Belagavi)
Department of Bachelors of Computer Administration

SEMESTER - IV					
PROGRAMMING IN JAVA LAB					
Category: PCCL					
Course Code	:	B24PIJL407	CIE	:	50 Marks
Teaching Hours L : P : S	:	1:2:0	SEE	:	50 Marks
Total Hours	:	14 Sessions (P)	Total	:	100 Marks
Credits	:	1	SEE Duration	:	3 Hrs

Course Objectives	
1.	To introduce the practical implementation of core Java programming concepts.
2.	To develop problem-solving skills using recursion, control structures, and loops in Java.
3.	To apply the principles of OOP such as method and constructor overloading, abstraction, and interfaces.
4.	To demonstrate Java's capabilities in string manipulation, class design, exception handling, and modular programming.
5.	To strengthen understanding of Java features like inner classes, packages, and exception handling through practical examples.

Sl. No	Experiments
1.	Write a java program to find the Fibonacci series using recursive and non-recursive functions
2.	Write a java program to multiply two given matrices.
3.	Write a java program for Method overloading and Constructor overloading.
4.	Write a java program that checks whether a given string is palindrome or not.
5.	Write a Java program to print the following triangle of numbers 1 1 2 1 2 3 1 2 3 4 1 2 3 4 5
6.	Write a java program to represent Abstract class with example.
7.	Write a java program to implement Interface using extends keyword.
8.	Write a Java program to list the factorial of the numbers 1 to 10. To calculate the factorial value, use while loop. (Hint Fact of 5 = 5*4*3*2*1)
9.	Write a Java program to accept a number and find whether the number is Prime or not
10.	Write a java program to create user defined package.
11.	Write a java program to create inner classes.
12.	Write a java program for creating multiple catch blocks.

Course Outcomes: At the end of the course, the students will be able to	
CO1	Write Java programs using recursive and iterative approaches for solving numerical problems like Fibonacci, prime checking, and factorials.
CO2	Implement matrix operations, string manipulations, and triangle-based number patterns using loops and conditionals.
CO3	Apply method overloading, constructor overloading, and abstract classes in object-oriented design.
CO4	Develop modular Java programs using user-defined packages, interfaces, and inner classes.
CO5	Handle exceptions effectively using multiple catch blocks and explore Java's runtime behavior.



ASSESSMENT DETAILS BOTH (CIE AND SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks).

A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

CONTINUOUS INTERNAL EVALUATION (CIE)

Component	Scale down to	Total Marks
Conduction of experiments and Record Writing (Each Experiment evaluated for 10 marks)	20	20
Internal Lab Test 1(After 6 experiments) Exam conduction for 50 marks	15	15
Internal Lab Test 2 (After 6 experiments) Exam conduction for 50 marks	15	15
CIE		50

SEMESTER END EVALUATION (SEE)

- SEE marks for the practical course are 50 Marks. Practical examinations are to be conducted between the schedules mentioned in the academic calendar of the Institution.
- All laboratory experiments are to be included for practical examination.
- Students can pick one question (experiment) from the questions lot prepared by the examiners.
- Evaluation of test write-up, conduction procedure, result and viva will be conducted jointly by examiners.
- Rubrics suggested for SEE, writeup-20%, Conduction procedure and result in -60%, Viva-voce 20% of maximum marks. SEE for practical shall be evaluated for 100 marks and scored marks shall be scaled down to 50 marks.
- Change of experiment is allowed only once and 15% of Marks allotted to the procedure part are to be made zero. The minimum duration of SEE is 03 hours.

CO-PO Mapping

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

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



SEMESTER - IV					
WEB TECHNOLOGY LAB					
Category: PCCL					
Course Code	:	B24WETL408	CIE	:	50 Marks
Teaching Hours L : P : S	:	1:2:0	SEE	:	50 Marks
Total Hours	:	14 Sessions (P)	Total	:	100 Marks
Credits	:	1	SEE Duration	:	3 Hrs

Course Objectives	
1.	To introduce the basics of HTML and its role in web development.
2.	To enable students to use various HTML tags for structuring and formatting web content.
3.	To demonstrate how to incorporate multimedia and interactivity in web pages.
4.	To develop the ability to create structured and user-friendly HTML documents like forms, lists, and tables.
5.	To provide practical skills in designing simple static web pages.

Sl. No	Experiments
1.	Write a HTML program using basic text formatting tags
2.	Write a HTML program by using text formatting tags.
3.	Write a HTML program using presentational element tags , <i>, <strike>, <sup>, <sub>, <big>, <small>, <hr>
4.	Write a HTML program using phrase element tags <blockquote>, <cite>, <abbr>, <acronym>, <kbd>, <address>
5.	Write a HTML program using different list types
6.	Create a HTML page that displays ingredients and instructions to prepare a recipe.
7.	Write a HTML program using grouping elements <div> and .
8.	Write a HTML program using images, audios, videos
9.	Write a HTML program to create your time table.
10.	Write a HTML program to create login form and verify username and password

Course Outcomes: At the end of the course, the students will be able to	
CO1	Use basic text formatting and presentational tags to enhance web content.
CO2	Create HTML documents using phrase and grouping elements effectively.
CO3	Design structured web pages using lists, tables, and multimedia elements.
CO4	Develop functional forms with input fields and basic validation logic.
CO5	Construct static web pages for real-life applications such as recipes, timetables, and login pages.

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CO3	2	1	1	1	2	-	-	1	-	1	-
CO4	3	1	1	1	2	-	-	1	-	1	-
CO5	2	1	1	1	1	-	-	1	-	1	-

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