PAAVAI ENGINEERING COLLEGE, NAMAKKAL – 637 018
(AUTONOMOUS)

DEPARTMENT OF MASTER OF COMPUTER APPLICATIONS

REGULATIONS 2015

CURRICULUM AND SYLLABUS

I – II SEMESTER

M.C.A.Programme

(3 Years Duration)

PAAVAI ENGINEERING COLLEGE

(Autonomous)

Vision

To strive to be a globally model Institution all set for taking ‘lead-role’ in grooming the younger generation socially responsible and professionally competent to face the challenges ahead.

Mission

- To provide goal- oriented, quality – based and value – added education through state – of – the – art technology on a par with international standards.
- To promote nation – building activities in science, technology, humanities and management through research
- To create and sustain a community of learning that sticks on to social, ethical, ecological, cultural and economic upliftment.

PAAVAI ENGINEERING COLLEGE

(Autonomous)

DEPARTMENT OF MASTER OF COMPUTER APPLICATIONS

Vision

To strive to be globally model institutions all set for taking lead role in grooming the younger generation socially responsible and professionally competent to face the challenges ahead

Mission

- To upgrade the academic activities by continuous improvement in the teaching - learning process with value based education.
- To enhance social responsibilities of the students necessary for successful practice of the profession.
- To facilitate research and industrial interaction.
- To mould the students into competent and creative technocrats to meet the growing global changes and challenges.
- To encourage the students as entrepreneurs and leaders of the society for the betterment of the Country.

Programme Educational Objectives (PEOs)		
Master of Computer Applications Graduates will be able to :		
PEO1	Global Reputation	To create value added, disciplined high profile Master of Computer Applications professionals for successful careers in their related industry that makes them globally reputed.
PEO2	Fundamental Knowledge	To develop the students with a sound foundation in mathematical, scientific and engineering fundamentals necessary to synthesize the technical core concepts focusing on skill development and knowledge up gradation which will lead to technical innovations.
PEO3	Continuous Learning	To practice and demonstrate the ability to use the domain knowledge and expertise through periodic assignments, performances and projects to continuously prove the functionality of Master of computer applications learning in social environmental aspects and to make allowances for further improvements.

Programme Outcomes (POs)		
Master of Computer Applications Graduates will be able to :		
PO1	Engineering knowledge	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem Analysis	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/Development of Solutions	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern Tool Usage	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6	The engineer and society	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO7	Environment and sustainability	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communications	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
PO12	Life-long learning	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes (PSOs)		
PSO1	Core Competencies:	Students attain deep domain knowledge in the fields of basic science to engineering applications and to enhance linguistic skills for effective communication and an ability to use conceptual knowledge of Surveying, fluid mechanics, hydrology and water resources and identify the environmental issues to propose suitable solutions.
PSO2	Creativity and Design:	Students gain profound knowledge in the area of Planning, analyzing, design and estimation of civil engineering structures with professional ethics and managerial skills for economic design and suggests suitable materials and techniques for construction and rehabilitation works.

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MASTER OF COMPUTER APPLICATIONS

REGULATIONS 2015

CURRICULUM

SEMESTER I

Course	Course Title	L	T	P	C
PMA15108	Mathematical Foundation for Computer Applications	3	2	0	4
CA15101	Computer Organization	3	0	0	3
CA15102	Problem Solving Techniques	3	0	0	3
CA15103	Programming in C	3	0	0	3
CA15104	Data structures and Algorithms	3	0	0	3
CA15105	Programming in C Laboratory	0	0	4	2
CA15106	Data Structures and Algorithms Laboratory	0	0	4	2
CA15107	Office Automation Laboratory	0	0	4	2
	Total	15	2	12	22

SEMESTER II

Course	Course Title	L	T	P	C
CA15201	Object Oriented Programming	3	0	0	3
CA15202	Database Management Systems	3	0	0	3
CA15203	System Software	3	0	0	3
CA15204	Operating Systems	3	0	0	3
CA15205	Computer Graphics and Multimedia	3	0	0	3
CA15206	Object Oriented Programming Laboratory	0	0	4	2
CA15207	DBMS Laboratory	0	0	4	2
CA15208	Graphics and Multimedia Laboratory	0	0	4	2
	Total	15	0	12	21

SEMESTER III

Course	Course Title	L	T	P	C
PMA15301	Resource Management Techniques	3	2	0	4
CA15301	Computer Communication Networks	3	0	0	3
CA15302	Object Oriented Analysis and Design	3	0	0	3
CA15303	Software Engineering	3	0	0	3
CA15304	Web Programming	3	0	0	3
CA15405	Software Development- Case Tools Laboratory	0	0	4	2
CA15306	Web Programming Laboratory	0	0	4	2
PEN15201	Communication and Soft Skills Laboratory	0	0	2	1
	Total	15	2	10	21

SEMESTER IV

Course	Course Title	L	T	P	C
CA15401	C# and .NET Framework	3	0	0	3
CA15402	Free Open Source Software	3	0	0	3
CA15403	Data Mining and Data Warehousing	3	0	0	3
CA15404	Big Data Analytics	3	0	0	3
CAE15***	Elective I	3	0	0	3
CA15405	Free Open Source Software Laboratory	0	0	4	2
CA15406	C# and .NET Programming Laboratory	0	0	4	2
CA15407	Technical Seminar and Report Writing	0	0	4	2
PCA15408	Career Development Laboratory	0	0	2	1
	Total	15	0	14	22

SEMESTER V

Course	Course Title	L	T	P	C
CA15501	Web Application Development	3	0	0	3
CA15502	Software Project Management	3	0	0	3
CA15503	Mobile Computing	3	0	0	3
CAE15***	Elective II	3	0	0	3
CAE15***	Elective III	3	0	0	3
CA15504	Advanced Internet Programming Laboratory	0	0	4	2
CA15505	XML and Web Services Laboratory	0	0	4	2
CA15506	Mini Project (Socially Relevant)	0	0	4	2
	Total	15	0	12	21

SEMESTER VI

Course	Course Title	L	T	P	C
CA15601	Project Work	0	0	24	12

TOTAL CREDITS : 119

LIST OF ELECTIVES

ELECTIVE I

Course	Course Title	L	T	P	C
CAE15401	Energy Aware Computing	3	0	0	3
CAE15402	Information Security	3	0	0	3
CAE15403	Distributed Computing	3	0	0	3
CAE15404	Enterprise Application Integration	3	0	0	3
CAE15405	Game Programming	3	0	0	3
CAE15406	Soft Computing	3	0	0	3

ELECTIVE II

Course	Course Title	L	T	P	C
CAE15501	Network Protocols	3	0	0	3
CAE15502	High Performance Computing	3	0	0	3
CAE15503	Cloud Computing	3	0	0	3
CAE15504	Green Computing	3	0	0	3
CAE15505	Software Testing and Quality Assurance	3	0	0	3
CAE15506	Ad hoc and Sensor Networks	3	0	0	3

ELECTIVE III

Course	Course Title	L	T	P	C
CAE15507	Internet of Things	3	0	0	3
CAE15508	M-Commerce	3	0	0	3
CAE15509	Health Care Management	3	0	0	3
CAE15510	Geological Information Systems	3	0	0	3
CAE15511	Human Resource Management	3	0	0	3
CAE15512	Semantic web	3	0	0	3

PMA15108 MATHEMATICAL FOUNDATIONS FOR COMPUTER APPLICATIONS 3 2 0 4

COURSE OBJECTIVES

To enable the students to

- understand the concepts and operations of matrix algebra needed for computing graphics modelling
- understand and apply the class of functions which transform a finite set into another finite set which relates to input output functions in computer science
- make the students to think logically and mathematically and apply these techniques in solving problems
- impart discrete knowledge in computer engineering through finite automata
- impart discrete knowledge in computer engineering through Context free Grammars

UNIT I MATRIX ALGEBRA 15

Matrices, Rank of Matrix, Solving System of Equations-Eigen Values and Eigen Vectors-Inverse of a Matrix - Cayley Hamilton Theorem

UNIT II BASIC SET THEORY 15

Basic Definitions - Venn Diagrams and set operations - Laws of set theory - Principle of inclusion and exclusion - partitions- Permutation and Combination - Relations- Properties of relations - Matrices of relations - Closure operations on relations - Functions - injective, subjective and objective functions.

UNIT III MATHEMATICAL LOGIC 15

Propositions and logical operators - Truth table - Propositions generated by a set, Equivalence and implication - Basic laws- Some more connectives - Functionally complete set of connectives- Normal forms - Proofs in Propositional calculus - Predicate calculus.

UNIT IV FORMAL LANGUAGES 15

Languages and Grammars-Phrase Structure Grammar-Classification of Grammars-Pumping Lemma for Regular Languages-Context Free Languages.

UNIT V FINITE STATE AUTOMATA 15

Finite State Automata-Deterministic Finite State Automata(DFA), Non Deterministic Finite State Automata (NFA)- Equivalence of DFA and NFA-Equivalence of NFA and Regular Languages

TOTAL PERIODS 45+30 75

COURSE OUTCOMES

At the end of the course the students would be able to

- understand the basic knowledge of matrix, set theory, functions and relations concepts needed for designing and solving problems
- perform the knowledge of logical operations and predicate calculus needed for computing skill
- design and solve Boolean functions for defined problems

- apply the acquired knowledge of formal languages to the engineering areas like compiler design
- apply the acquired knowledge of finite automata theory and design discrete problems to solve by computers

REFERENCES

1. Kenneth H.Rosen, "Discrete Mathematics and its Applications", 6th Edition, Tata McGraw-Hill, 5th Reprint 2013.
2. Hopcroft and Ullman, "Introduction to Automata Theory, Languages and Computation", Narosa Publishing House, Delhi, 2012.
3. Trembly J.P and Manohar.R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw-Hill, 35th Reprint 2013.
4. Sakthivel" Mathematical Foundations Of Computer Science"   A.R.S Publications First Edition 2012.
5. A.Tamilarasi & A.M.Natarajan, "Discrete Mathematics and its Application", Khanna Publishers,2ndEdition 2014.

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	3	2	3	-	-	-	-		2	1	1	3
CO4	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO5	1	2	3	1	-	-	-	1	-	-	-	3	2	3

CA15101 COMPUTER ORGANIZATION 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- impart the knowledge in the field of digital electronics
- impart knowledge about the various components of a computer and its internals
- design and realize the functionality of the computer hardware with basic gate
- design other components using combinational and sequential logic
- understand the importance of the hardware-software interface

UNIT I DIGITAL FUNDAMENTALS 9

Number Systems and Conversions – Boolean Algebra and Simplification – Minimization of Boolean Functions – Karnaugh Map, Logic Gates – NAND – NOR Implementation

UNIT II COMBINATIONAL AND SEQUENTIAL CIRCUITS 9

Design of Combinational Circuits – Adder / Subtracter – Encoder – Decoder – MUX / DEMUX – Comparators, Flip Flops – Triggering **–** Master – Slave Flip Flop – State Diagram and Minimization –Counters – Registers.

UNIT III BASIC STRUCTURE OF COMPUTERS & PARALLEL PROCESSING 9

Functional units – Basic operational concepts – Bus structures – Performance and Metrics – Instruction and instruction sequencing – Addressing modes – ALU design – Fixed point and Floating point operation.

UNIT IV PROCESSOR DESIGN 9

Processor basics – CPU Organization – Data path design – Control design – Basic concepts – Hard wired control – Micro programmed control – Pipeline control – Hazards – Super scalar operation.

UNIT V MEMORY, I/O SYSTEM AND PARALLEL PROCESSING 9

Memory technology – Memory systems – Virtual memory – Caches – Design methods – Associative memories – Input/output system – Programmed I/O – DMA and Interrupts – I/O Devices and Interfaces - Multiprocessor Organization – Symmetric multiprocessors – Cache Coherence – Clusters: Non Uniform Memory Access- Vector Computation.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- design digital circuits by simplifying the Boolean functions
- understand the organization and working principle of computer hardware components
- understand mapping between virtual and physical memory
- acquire knowledge about multiprocessor organization and parallel processing
- trace the execution sequence of an instruction through the processor

REFERENCES

1. Morris Mano, “Digital Design”, Prentice Hall of India, Fourth Edition 2012.
2. Carl Hamacher, ZvonkoVranesic, SafwatZaky and NaraigManjikian, “Computer organization and Embedded Systems”, Sixth Edition, Tata McGraw Hill, 2012.
3. William Stallings, “Computer Organization & Architecture – Designing for Performance” 9th Edition 2013.
4. Charles H. Roth, Jr., “Fundamentals of Logic Design”, Jaico Publishing House, Mumbai, Fourth Edition, 2013.
5. David A. Patterson and John L. Hennessy, “Computer Organization and Design: The Hardware/Software Interface”, Fourth Edition, Morgan Kaufmann / Elsevier, 2012.

Mapping of Courses Outcomes with Programme Outcomes:

(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week

COs	**Programme Outcomes (POs)**												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	3	2	3	-	-	-	-		2	1	1	3
CO4	2	1	2	3	-	-	-	2	-	-	-	-	2	2
CO5	1	2	3	2	-	-	-	2	-	-	-	3	2	3

CA15102	PROBLEM SOLVING TECHNIQUES	3 0 0 3

COURSE OBJECTIVES

To enable the students to

- impart the knowledge in the field of digital electronics
- impart knowledge about the various components of a computer and its internals
- design and realize the functionality of the computer hardware with basic gate.
- understand the importance of the hardware-software interface.
- impart the knowledge in the field of digital electronics

UNIT I DIGITAL FUNDAMENTALS 9

Number Systems and Conversions – Boolean Algebra and Simplification – Minimization of Boolean Functions – Karnaugh Map, Logic Gates – NAND – NOR Implementation

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Memory technology – Memory systems – Virtual memory – Caches – Design methods – Associative memories – Input/output system – Programmed I/O – DMA and Interrupts – I/O Devices and Interfaces – Multiprocessor Organization – Symmetric multiprocessors – Cache Coherence – Clusters: Non Uniform Memory Access - Vector Computation.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- design digital circuits by simplifying the Boolean functions
- understand the organization and working principle of computer hardware components
- understand mapping between virtual and physical memory
- acquire knowledge about multiprocessor organization and parallel processing
- trace the execution sequence of an instruction through the processor

REFERENCES

1. Morris Mano, “Digital Design”, Prentice Hall of India, Fourth Edition 2012.
2. Carl Hamacher, ZvonkoVranesic, SafwatZaky and Naraig Manjikian, “Computer organization and Embedded Systems”, Sixth Edition, Tata McGraw Hill, 2012.
3. William Stallings,“Computer Organization& Architecture – Designing for Performance” 9th Edition 2013.
4. Charles H. Roth, Jr., “Fundamentals of Logic Design”, Jaico Publishing House, Mumbai, Fourth Edition, 2013.
5. David A. Patterson and John L. Hennessy, “Computer Organization and Design: The Hardware/Software Interface”, Fourth Edition, Morgan Kaufmann / Elsevier, 2012.

Mapping of Courses Outcomes with Programme Outcomes: (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week													
Cos	**Programme Outcomes (POs)**												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	1	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	2	2	2	-	-	-	-		2	1	1	2
CO4	2	1	2	3	-	-	-	2	-	-	-	-	2	2
CO5	1	2	3	2	-	-	-	2	-	-	-	2	2	3

CA15103 PROGRAMMING IN C 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- understand the fundamentals of basic programming concept
- know about data storage techniques a query processing
- understand the fundamentals of structures
- understand the fundamentals of file management systems
- understand the fundamentals of basic programming concept

UNIT I INTRODUCTION TO C LANGUAGE 9

Overview of ‘C’ language - Constants, Variables and Data Types - Operators, Expressions and Assignment statements - Managing Input/Output Operations - Formatted I/O - Decision Making - Branching - IF, Nested IF - Switch – go to - Looping- While, do, for statements.

UNIT II ARRAYS AND FUNCTIONS 9

Arrays - dynamic and multi-dimensional arrays - Character arrays and Strings - String handling Functions – Userdefined Functions - Categories of Functions - Recursion.

UNIT III STRUCTURES AND UNIONS 9

Basics of Structures-Declaring a Structure - Array of Structures -Passing Structures elements to Functions-Passing entire Structure to Function - Structures within Structures - Union - Union of Structures - Enumerated Data Types – typedef Statement.

UNIT IV POINTERS 9

Pointers - Declaration, Accessing a variable, dynamic memory allocation, Pointers versus Arrays, Array of pointers,Pointers to functions and structure Pointers.

UNIT V FILE MANAGEMENT 9

File Management in C - Data hierarchy- Files and Streams - Sequential access file- Random access file - Preprocessors

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- understand the basic concepts of the programs
- design a program using C functions and structures
- acquire the knowledge of pointer to monitor the performance of the C language
- develop a simple applications using file manipulation
- develop a simple applications using structures

REFERENCES

1. Byron C Gottried, “Programming with C”, Schuams outline series, 2nd edition, Tata McGraw Hill, 2013.
2. Yashavant P. Kanetkar “Understanding Pointers In C” , BPB Publications, New Delhi, 2012.
3. ReemaThareja, “Programming in C”, Oxford University Press, 2012.
4. Kamthane, “Programming with ANSI and Turbo C”, Pearson Education, Delhi 2013.
5. E. Balagurusamy“ Programming in ANSI C ” , Tata McGraw Hill, 2013.

Mapping of Courses Outcomes with Programme Outcomes:

(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week

COs	**Programme Outcomes (POs)**												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	2	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	1	3	2	2	-	-	-	-		2	1	2	1
CO4	1	2	3	2	-	-	-	2	-	-	-	-	2	2
CO5	1	2	2	2	-	-	-	2	-	-	-	2	1	3

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CA15104 DATA STRUCTURES AND ALGORITHMS 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- understand the linear and non linear data structures available in solving problems
- know about the sorting and searching techniques and its efficiencies
- get a clear idea about the various algorithm design techniques
- using the data structures and algorithms in real time applications
- able to analyze the efficiency of algorithm

UNIT I LINEAR DATA STRUCTURES 9

Introduction - Abstract Data Types (ADT) – Arrays and its representation –Structures – Stack – Queue – Circular Queue - Applications of stack – Infix to postfix conversion – evaluation of expression – Applications of Queue - Linked Lists – Doubly Linked lists – Applications of linked list – Polynomial Addition

UNIT II TREE STRUCTURES 9

Need for non-linear structures – Trees and its representation – Binary Tree – expression trees – Binary tree Traversals– left child right sibling data structures for general trees – applications of trees – Huffman Algorithm - Binary searchtree.

UNIT III BALANCED SEARCH TREES, SORTING AND INDEXING 9

AVL trees–B-Trees-Sorting–Bubble sort - Quick Sort - Insertion Sort – Heap sort – Hashing - Hashing functions- Collision Resolution Techniques - Separate chaining - Open addressing - Multiple hashing.

UNIT IV GRAPHS 9

Definitions – Representation of graph - Graph Traversals - Depth-first traversal – breadth-first traversal - applications of graphs - Topological sort – shortest-path algorithms – minimum spanning tree – Prim's and Kruskal's algorithms – biconnectivity – Euler circuits.

UNIT V ALGORITHM DESIGN AND ANALYSIS 9

Algorithm Analysis – Asymptotic Notations - Divide and Conquer – Merge Sort – Binary Search - Greedy Algorithms – Knapsack Problem – Dynamic Programming – Warshall’s Algorithm for Finding Transitive Closure – Backtracking – Sum of Subset Problem – Branch and Bound – Travelling Salesman Problem.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- select and apply the data structure to suit any given problem
- design their own data structure according to the application need
- apply the algorithm design techniques to any of the real world problem

- develop any new application with the help of data structures and algorithms
- write efficient algorithm for a given problem and able to analyze its time complexity

REFERENCES

1. M. A. Weiss, “Data Structures and Algorithm Analysis in C++”, Pearson Education Asia, 2013.
2. Tanaenbaum A.S.,Langram Y. Augestein M.J “ Data Structures using C” Pearson Education , 2012
3. AnanyLevitin “Introduction to the Design and Analysis of Algorithms” Pearson Education 2013.
4. E. Horowitz, S.Sahni and Dinesh Mehta, “Fundamentals of Data structures in C++”, University Press, 2013.
5. ReemaThareja, “Data Structures using C”, Oxford Press, 2012.

Mapping of Courses Outcomes with Programme Outcomes:

(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week

COs	**Programme Outcomes (POs)**												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	1	2	2	-	-	-	-		2	2	2	2
CO4	2	1	2	2	-	-	-	1	-	-	-	-	2	2
CO5	1	1	3	2	-	-	-	2	-	-	-	1	1	3

CA15105 PROGRAMMING IN C LABORATORY 0 0 4 2

COURSE OBJECTIVES

To enable the students to

- understand the fundamentals of structures.
- understand the fundamentals of file management systems.

1. Display the following:
   (i) Floyd’s triangle (ii) Pascal Triangle
2. Generate the following series of numbers:
   (i) Armstrong numbers between 1 to 100
   (ii) Prime numbers between 1 to 50
   (iii) Fibonacci series up to N numbers
3. Manipulate the strings with following operations.
   (i) Concatenating two strings
   (ii) Reversing the string
   (iii) Finding the substring
   (iv) Replacing a string
   (v) Finding length of the string
4. Find the summation of the following series:
   (i) Sine (ii) Cosine (iii) Exponential
5. Simulate following Banking operations using functions.
   (i) Deposit (ii) Withdrawal (iii) Balance Enquiry
6. Implement using recursion
   (i) Fibonacci number generation. (ii) Factorial
7. Generate Student mark sheets using structures.
8. Create a collection of books using arrays of structures and do the following:
   (i) Search a book with title and author name (ii) Sorts the books on title.
9. Perform string operations using pointers.
10. Program to implement dynamic memory allocation. Creating, Reading and displaying a sequential and random access file.

TOTAL PERIODS 60

COURSE OUTCOMES

At the end of the course the students would be able to

- understand the basic concepts of the programs
- design a program using C functions and structures

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2

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CA15106 DATA STRUCTURES AND ALGORITHMS LABORATORY 0 0 4 2

COURSE OBJECTIVES

To enable the students to

- using the data structures and algorithms in real time applications
- able to analyze the efficiency of algorithm

1. Polynomial Addition using array
2. Array implementation of stack
3. Array implementation of Queue
4. Infix to postfix conversion
5. Singly Linked List operations
6. Binary tree traversals
7. Quick sort
8. Dictionary application using any of the data structure
9. Find the Shortest Path using Dijkstra’s Algorithm – Greedy method
10. Warshall’s Algorithm for finding transitive closure using Dynamic programming
11. Sum of subset problem using backtracking

TOTAL PERIODS 60

OURSE OUTCOMES

At the end of the course the students would be able to

- develop any new application with the help of data structures and algorithms
- write efficient algorithm for a given problem and able to analyze its time complexity to apply

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	2	2	-	-	-	-	-	-	-	2	2	2
CO2	1	2	3	3	2	-	-	-	-	-	-	2	2	1

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CA15107 **OFFICE AUTOMATION LABORATORY** **0 0 4 2**

COURSE OBJECTIVES

To enable the students to

- understand MS-Office concept
- get a clear idea about the various design techniques

MS-WORD

1. Text Manipulations
2. Usage of Numbering, Bullets, Tools and Headers
3. Usage of Spell Check and Find and Replace
4. Text Formatting
5. Picture Insertion and Alignment
6. Creation of Documents Using Templates
7. Creation of Templates
8. Mail Merge Concept
9. Copying Text and Picture From Excel
10. Creation of Tables, Formatting Tables
11. Splitting the Screen
12. Opening Multiple Document, Inserting Symbols in Documents

MS-EXCEL

1. Creation of Worksheet and Entering Information
2. Aligning, Editing Data in Cell
3. Excel Function (Date, Time, Statistical, Mathematical, Financial Functions)
4. Changing of Column Width and Row Height (Column and Range of Column)
5. Moving, copying, Inserting and Deleting Rows and Columns
6. Formatting Numbers and Other Numeric Formats
7. Drawing Borders around Cells 8. Creation of Charts Raising Moving
8. Changing Chart Type
9. Controlling the Appearance of a Chart

MS-POWER POINT (Working With Slides)

1. Creating, saving, closing presentation
2. Adding Headers and footers
3. Changing slide layout
4. Working fonts and bullets
5. Inserting Clipart
6. Run and Slide Show

TOTAL PERIODS 60

COURSE OUTCOMES

At the end of the course the students would be able to

- design own data according to the application need
- develop any new document with the help of MS office

Mapping of Courses Outcomes with Programme Outcomes:

(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week

COs	**Programme Outcomes (POs)**												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2

CA15201 OBJECT ORIENTED PROGRAMMING 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- learn how C++ supports Object Oriented principles such as abstraction, polymorphism etc
- understand and apply the principles hiding, localization and modularity in software development
- use the generic programming features of C++ including the STL
- design and implement reliable and maintainable object-oriented applications
- design and moderate complexity composed of several classes

UNIT I FUNDAMENTALS OF OBJECT ORIENTED PROGRAMMING 9

Object Oriented Programming concepts – Encapsulation – Programming Elements – Program Structure – Enumeration Types –– Functions and Pointers – Function Invocation – Overloading Functions – Scope and Storage Class – Pointer Types – Arrays and Pointers – Call–by–Reference – Assertions – Standard templatelibrary.

UNIT II IMPLEMENTING ADTS AND ENCAPSULATION 9

Aggregate Type struct–Structure Pointer Operators – Unions – Bit Fields – Data Handling and Member Functions– Classes – Constructors and Destructors – Static Member – this Pointer – reference semantics – implementation of simple ADTs.

UNIT III POLYMORPHISM 9

ADT Conversions – Overloading – Overloading Operators – Unary Operator Overloading – Binary Operator Overloading – Function Selection – Pointer Operators – Visitation – Iterators – containers – Sequence Containers -List – List Iterators – Associative Containers.

UNIT IV TEMPLATESAND FILE HANDLING 9

Template Class–Function Templates – RTTI Templates - Class Templates – Parameterizing – STL – Algorithms–Function Adaptors – Streams and Formatted I/O – I/O Manipulations -File handling – Random Access

UNIT V INHERITANCE 9

Derived Class– Typing Conversions and Visibility – Code Reuse – Virtual Functions – Templates and Inheritance– Run–Time Type Identifications – Exceptions – Handlers – Standard Exceptions.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- understand and design the solution to a problem using object-oriented programming concepts
- use proper class protection mechanism to provide security
- demonstrate the use of virtual functions to implement polymorphism
- understand and implement the features of C++ including templates, exceptions and file handling for providing programmed solutions to complex problems
- reuse the code with extensible Class types, User-defined operators and function overloading

REFERENCES

1. BhushanTrivedi, “Programming with ANSI C++”, Oxford Press, Second Edition, 2012.
2. HM Deitel and PJ Deitel “C++ How to Program”, Seventh Edition, 2013, Prentice Hall
3. Ira Pohl, “Object–Oriented Programming Using C++”, Pearson Education, 2 Edition, 2013.
4. E Balagurusamy, “Object Oriented Programming with C++”, 3 edition, 2012, Tata McGraw Hill
5. Stanley B.Lippman, JoseeLajoie, “C++ Primer”, Pearson Education, Third Edition, 2012.

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	1	2	1	2	-	-	-	-	-	-	-	1	1	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	2	2	2	-	-	-	-		2	1	1	3
CO4	2	1	2	2	-	-	-	2	-	-	-	-	3	2
CO5	1	2	1	2	-	-	-	2	-	-	-	2	2	2

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CA15202 DATABASE MANAGEMENT SYSTEMS 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- understand the fundamentals of data models and conceptualize and depict a database system
- understand the fundamentals of ER diagram
- make a study of SQL and relational database design
- know about data storage techniques an query processing
- impart knowledge in transaction processing, concurrency

UNIT I INTRODUCTION 9

File systems versus Database systems–Data Models – DBMS Architecture – Data Independence – Data Modeling using Entity – Relationship Model – Enhanced E-R Modeling.

UNIT II RELATIONAL MODEL AND QUERY EVALUATION 9

Relational Model Concepts – Relational Algebra – SQL – Basic Queries – Complex SQL Queries – Views – Constraints – Relational Calculus – Tuple Relational Calculus – Domain Relational Calculus – overview of commercial RDBMSs – Database Design – Functional Dependencies – Normal Forms – 1NF – 2NF-3NF-BCNF –4NF-5NF - Algorithms for Executing Query Operations — Cost Estimation

UNIT III TRANSACTION PROCESSING 9

Transaction Processing – Properties of Transactions - Serializability – Transaction support in SQL – Locking Techniques – Time Stamp ordering – Validation Techniques – Granularity of Data Items – Recovery concepts – Shadow paging–Log Based Recovery–Database Security Issues– Access control – Statistical Database Security

UNIT IV FILES AND INDEXING 9

File operations–Hashing Techniques – Indexing – Single level and Multi-level Indexes – B+ tree – Static Hashing- Indexes on Multiple Keys.

UNIT V SPECIAL PURPOSE DATABASES 9

OODBMS - Object-Based Databases - OO Data Model - OO Languages – Persistence – Object Relational Databases- Temporal Databases – Mobile Databases – Spatial Databases – Case Study for Design and Manage the Database for any Project

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- understand the basic concepts of the database and data models
- design a database using ER diagrams and map ER into Relations and normalize the relations
- acquire the knowledge of query evaluation to monitor the performance of the DBMS
- develop a simple database applications using normalization
- acquire the knowledge about different special purpose databases and to critique how they differ from traditional database systems

REFERENCES

1. Abraham Silberschatz, Henry F.Korth and S.Sundarshan “Database System Concepts”, Sixth Edition, McGraw Hill, 2012.
2. C.J. Date, “An Introduction to Database Systems”, Eight Editions, Pearson Education Delhi, 2013.
3. Ramez Elamassri and Shankant B-Navathe, “Fundamentals of Database Systems”, Sixth Edition, Pearson Education Delhi, 2013.
4. Raghu Ramakrishnan, Johannes Gehrke, “Database management systems” McGraw Hill, 2013.
5. Peter Rob, Carlos Coronel, “Database System Concepts”, Cengage Learning, 2012.

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	1	2	2	2	-	-	-	-	-	-	-	1	1	2
CO2	2	2	2	2	2	-	-	-	-	-	-	2	2	2
CO3	2	3	1	2	3	-	-	-	-		2	2	1	1
CO4	1	1	1	2	-	-	-	2	-	-	-	-	1	2
CO5	1	2	2	2	-	-	-	2	-	-	-	2	2	2

CA15203 **SYSTEM SOFTWARE** **3 0 0 3**

COURSE OBJECTIVES

To enable the students to

- understand the relationship between system software and machine architecture
- understand the design and implementation of assemblers, linkers and loaders
- understand the design, function and implementation of assemblers, linkers and loaders
- have an understanding of macro processors
- have an understanding of system software tools

UNIT I BASICS OF SYSTEM SOFTWARE AND ASSEMBLER 9

Introduction – System software and SIC/XE machine architecture - Basic assembler functions – Assembler algorithms and data structures – Machine dependent assembler features, Instruction formats and addressing modes– Program relocation – Machine independent assembler features – Literals – Symbol-defining statements – Expressions – Program Blocks – Control Sections and Program Linking-Implementation examples MASM assembler.

UNIT II COMPILER- LEXICAL ANALYSIS, SYNTAX ANALYSIS 9

Phases of compiler-Lexical Analysis: Role of a Lexical analyzer, input buffering, specification and recognition of tokens, Finite Automata, Designing a lexical analyzer generator, Pattern matching based on NFA's. Syntax Analysis: Role of Parser, Top-down parsing, recursive descent and predictive parsers (LL), Bottom-Up parsing, Operator precedence parsing, LR, SLR and LALR parsers.

UNIT III COMPILER CODE GENERATION, OPTIMIZATION 9

Intermediate languages: graphical representations, DAGs, Three address code, types of three address statements, syntax directed translation into three address code, implementation of three address statements-Code Optimization: Machine dependent and machine independent code generation: Sources of optimization-Code Generation-Semantic stacks, evaluation of expressions, control structures, and procedure calls.

UNIT IV LOADERS AND LINKERS 9

Basic loader functions: Design of an Absolute Loader – A Simple Bootstrap Loader Machine dependent loader features Relocation – Program Linking – Algorithm and Data Structures for Linking Loader. Machine-Independent loader features – Automatic Library Search – Loader Options Loader design options – Linkage Editors – Dynamic Linking – Bootstrap Loaders. Implementation examples: MSDOS linker.

UNIT V MACRO PROCESSORS & OTHER SYSTEM SOFTWARE 9

Basic macro processor functions – Macro Definition and Expansion – Macro Processor Algorithm and data structures – Implementation examples: MASM Macro Processor- Text editors – Overview of Editing Process - User Interface – Editor Structure – Interactive Debugging Systems – Debugging functions and capabilities – Relationships with Other parts of the system – User Interface Criteria **-**Virtual Machines

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- trace the path of a source code to object code and the executable file
- design the front end of the compiler-scanner, parser
- understand and identify the relationship between system software and machine architecture
- analyze the functions of assembler, compiler, linker, and loaders
- know the design and implementation of loaders and linkers

REFERENCES

1. Leland Beck, “System Software – An Introduction to Systems Programming”, Third Edition, Pearson Education, Inc., 2013
2. A.V. Aho, R. Shethi and Ulman; Compilers - Principles, Techniques and Tools, Second Edition, Pearson Education, 2012.
3. D. M. Dhamdhere, "Systems Programming and Operating Systems", Tata McGraw Hill Company, Second Edition, 2013.
4. John J. Donovan, “Systems Programming”, Tata McGraw Hill Company, Second Edition, 2013.
5. V. Raghavan, “Principles of Compiler Design”, Tata McGrawHill Education Publishers, 2012.

Mapping of Courses Outcomes with Programme Outcomes:

(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week

COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	1	2	1	2	-	-	-	-	-	-	-	1	1	2
CO2	1	1	2	1	2	-	-	-	-	-	-	2	2	2
CO3	2	2	2	2	2	-	-	-	-		2	2	1	2
CO4	1	2	2	1	-	-	-	1	-	-	-	-	2	2
CO5	2	1	1	2	-	-	-	2	-	-	-	2	1	2

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CA15204 **OPERATING SYSTEMS** **3 0 0 3**

COURSE OBJECTIVES

To enable the students to

- be aware of the evolution and fundamental principles of operating system, processes and their communication
- understand the various operating system components
- know about file management and the distributed file system concepts in operating systems
- understand the process management, memory management
- be aware of the evolution and fundamental principles of operating system, processes and their communication

UNIT I INTRODUCTION 9

Introduction-Types of operating systems-operating systems structures-Systems components operating systems services-System calls-Systems programs-Processes-process concept- process scheduling-operation on processes-co- operating processes-Inter process communications-CPU Scheduling-Scheduling criteria-Scheduling algorithms- Multiple-processor Scheduling

UNIT II PROCESS SYNCHRONIZATION 9

Process Synchronization -Critical Section problem -Semaphores-Classical problems of synchronization-critical regions-Monitors-Deadlock Characterization-Deadlock handling-Deadlock Prevention-Deadlock avoidance-Deadlock Detection-Deadlock Recovery –Threads-Multithreading Models

UNIT III MEMORY MANAGEMENT 9

Memory Management-Swapping-Contiguous Memory allocation-Paging-Segmentation-Virtual Memory-Demand paging-Page Replacement-Thrashing

UNIT IV DISK SCHEDULING AND DISTRIBUTED SYSTEMS 9

Disk Structures-Disk Scheduling-File Systems Interface-File concepts-Access methods-Directory Structures-File System Implementation-File Systems structures-Directory Implementation-Allocation Methods-Free Space management-Distributed File systems-Naming and Transparency-Remote File Accesses- Stateful Versus Stateless Service-File replication

UNIT V CASE STUDIES 9

Linux System-design Principles- process management-File Systems-Windows Vista-Systems Structures-Process management-memory management-Android OS-Virtual machine OS

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- understand the operating system components and its services
- implement the algorithms in process management and solving the issues of IPC
- demonstrate the mapping between the physical memory and virtual memory
- understand file handling concepts in OS perspective
- understand the operating system components and services with the recent operating systems

REFERENCES

1. Abraham Silberschalz Peter B Galvin, G.Gagne, ”Operating Systems Concepts”, Seventh Edition, Addision Wesley Publishing Co.,2013
2. Andrew S.Tanenbaum, “Modern operating Systems”, Third Edition, PHI Learning Pvt. Ltd., 2012
3. William Stallings, “Operating Systems: Internals and Design Principles”, Seventh Edition, Prentice Hall, 2013.
4. H M Deital, P J Deital and D R Choffnes, “Operating Systems” ,3rd edition, Pearson Education, 2013.
5. D M Dhamdhere, “ Operating Systems: A Concept-based Approach”, Second Edition, Tata McGraw-Hill Education, 2013.

Mapping of Courses Outcomes with Programme Outcomes:

(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week

COs	**Programme Outcomes (POs)**												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	1	2	1	2	-	-	-	-	-	-	-	1	1	2
CO2	1	3	2	1	3	-	-	-	-	-	-	2	2	2
CO3	2	2	2	2	3	-	-	-	-		2	2	1	2
CO4	2	2	2	2	-	-	-	3	-	-	-	-	2	2
CO5	1	2	1	3	-	-	-	2	-	-	-	2	2	3

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CA15205 COMPUTER GRAPHICS AND MULTIMEDIA 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- understand computational development of graphics with mathematics
- provide in-depth knowledge of display systems, image synthesis, shape modelling of 3D application
- understand basic concepts related to Multimedia including data
- understand the concepts of standards, algorithms and software
- experience development of multimedia software by utilizing existing libraries and descriptions of algorithms

UNIT I BASIC CONCEPTS 9

2D Transformations - Clipping – Window - View Prot Mapping - Graphical User Interfaces and Interactive Input Methods – Picture Construction Techniques - Virtual Reality Environment.

UNIT II 3D GRAPHICS 9

3D Transformation – 3D Viewing – Visible Surface Detection – Back Face Detection – Depth Buffer Method – Scan Line Method.

UNIT III MULTIMEDIA BASICS 9

Introduction to Multimedia – Components – Hypermedia – Authoring – Authoring tools – File formats – Color models – Digital Audio representation – Transmission – Audio signal processing – Digital music making – MIDI – Digital video – Video compression techniques – Video performance measurements – Multimedia Databases – Animation – Key frames and tweeting techniques – Principles of animation – Virtual reality – Multimedia for portable devices

UNIT IV MULTIMEDIA COMMUNICATION 9

Stream characteristics for Continuous media – Temporal Relationship – Object Stream Interactions – Media Synchronization – Models for Temporal Specifications – Streaming of Audio and Video – Recovering from packet loss – RTSP –– Multimedia Communication Standards –RTP/RTCP – SIP and H.263- Real time streaming and On-demand streaming

UNIT V MULTIMEDIA APPLICATION DEVELOPMENT 9

Design, Development and evaluation of multimedia a system - The development of user interface design – Design Process - Multimedia & the Internet - Multimedia conferencing - Multimedia file sharing – Multimedia broadcasting - Multimedia Development Issues - Multimedia project - Structured Multimedia development - Multimedia project timing - Sample project

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- gain proficiency in 3D computer graphics API programming
- enhance the perspective of modern computer system with modelling, analysis and interpretation of 2D and 3D visual information
- understand different realizations of multimedia tools
- develop interactive animations using multimedia tools
- gain the knowledge of different media streams in multimedia transmission

REFERENCES

1. Donald Hearn and M. Pauline Baker, “Computer Graphics in C Version”, Second Edition, Pearson Education
2. Tom McReynolds – David Blythe “ Advanced Graphics Programming Using OpenGL”, Elsevier, 2013
3. ParagHavaldar and Gerard Medioni, “Multimedia Systems-Algorithms, Standards and Industry Practices”,Course Technology, Cengage Learning, 2012.
4. John F. KoegelBufend , “Multimedia systems”, Pearson Education, Delhi, 2013
5. Ralf Steinmetz and Klara “Multimedia Computing, Communications and Applications”, Pearson

Mapping of Courses Outcomes with Programme Outcomes:

(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week

COs	**Programme Outcomes (POs)**												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	1	2	-	-	-	-	-	-	-	2	1	2
CO2	1	1	2	2	1	-	-	-	-	-	-	1	2	2
CO3	2	2	2	2	2	-	-	-	-		2	1	1	2
CO4	2	1	1	1	-	-	-	2	-	-	-	-	2	2
CO5	2	2	2	2	-	-	-	2	-	-	-	2	2	2

CA15206 OBJECT ORIENTED PROGRAMMING LABORATORY 0 0 4 2

COURSE OBJECTIVES

To enable the students to

- learn how C++ supports Object Oriented principles such as abstraction
- understand and apply the principles hiding

1. Write a C++ Program to illustrate Enumeration and Function Overloading
2. Write a C++ Program to illustrate Scope and Storage class
3. Implementation of ADT such as Stack and Queues
4. Write a C++ Program to illustrate the use of Constructors and Destructors and Constructor Overloading
5. Write a Program to illustrate Static member and methods
6. Write a Program to illustrate Bit fields
7. Write a Program to overload as binary operator, friend and member function
8. Write a Program to overload unary operator in Postfix and Prefix form as member and friend function
9. Write a Program to illustrate Iterators and Containers
10. Write a C++ Program to illustrate function templates
11. Write a C++ Program to illustrate template class
12. Write C++ Programs and incorporating various forms of Inheritance
13. Write a C++ Program to illustrate Virtual functions
14. Exception Handling
15. File Handling – Read, Write, Update

TOTAL PERIODS 60

COURSE OUTCOMES

At the end of the course the students would be able to

- understand and design the solution to a problem using object-oriented programming concepts
- use proper class protection mechanism to provide security

Mapping of Courses Outcomes with Programme Outcomes:

(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week

COs	**Programme Outcomes (POs)**												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	2	2	-	-	-	-	-	-	-	2	1	2
CO2	2	1	3	3	2	-	-	-	-	-	-	1	2	1

CA15207 **DBMS LABORATORY** **0 0 4 2**

COURSE OBJECTIVES

To enable the students to

- understand the fundamentals of data models and conceptualize and depict a database system using ER diagram
- make a study of SQL and relational database design

1. Creation of base tables and views.
2. Data Manipulation INSERT, DELETE and UPDATE in Tables. SELECT, Sub Queries and JOIN
3. Data Control Commands
4. High level language extensions – PL/SQL. Or Transact SQL – Packages 5. Use of Cursors, Procedures and Functions
5. Embedded SQL or Database Connectivity.
6. Oracle or SQL Server Triggers – Block Level – Form Level Triggers
7. Working with Forms, Menus and Report Writers for a application project in any domain 9. Front-end tools – Visual Basic/Developer 2000.

TOTAL PERIODS 60

COURSE OUTCOMES

At the end of the course the students would be able to

- understand the basic concepts of the database and data models
- design a database using ER diagrams and map ER into Relations and normalize the relations

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2

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CA15208 GRAPHICS AND MULTIMEDIA LABORATORY 0 0 4 2

COURSE OBJECTIVES

To enable the students to

- understand computational development of graphics with mathematics
- provide in-depth knowledge of display systems, image synthesis, shape modeling of 3D application

Using C or C++

1. Implement the Bresenham's Line, Circle Drawing algorithms
2. Implement the Two Dimensional Transformations such as translation, rotation, scaling, reflection and shearing
3. Implement the Cohen-Sutherland 2D Line Clipping Algorithm.
4. Implement the Conversion between the color models.

Using Adobe Photoshop

5. Design the logo for a designing industry.
6. Design the fire effect for a text.

Using CorelDraw (or) PageMaker

7. Design the poster for the inter-collegiate cultural meet.

Using Adobe Flash

8. Animation using motion, shape and frame-by-frame animation (use onion skin, guide layer, masking and etc.)
9. Design and animate the cartoons, animals and the like

Using Dreamweaver

10. Create a web page with all multimedia elements.

TOTAL PERIODS 60

COURSE OUTCOMES

At the end of the course the students would be able to

- gain proficiency in 3D computer graphics API programming
- enhance the perspective of modern computer system with modeling, analysis and interpretation of 2D and 3D visual information

Mapping of Courses Outcomes with Programme Outcomes:

(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week

COs	**Programme Outcomes (POs)**												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2

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