



AHMEDABAD UNIVERSITY

AES INSTITUTE OF COMPUTER STUDIES

Master of Computer Applications (M.C.A.)

First Year MCA :

Trimester I

Subject Code: MCA 111

Subject: Structured Programming using C

Lecture per week : 3 Lecture + 1 Tutorial

Practical per week (hours) : 4 Practical

Internal Assessment : 50 Marks

External Assessment : 50 Theory + 50 Practical Marks

Total Credit : 8

Prerequisite: None

Aim:

The course is aimed to give introduction to problem solving and structure programming and give them in depth knowledge of important features of C. Techniques will be illustrated using sample problems drawn from various areas.

Objectives:

Developing problem-solving skills and programming logic.

Solving problems using structured programming approach

To make students familiar with programming language.

To develop program using proper control structures.

To understand concept of array and character string.

To make modular programming using function.

Unit No.	Topics to be Covered	No. of Lectures	Marks per Unit
Unit I	Introduction to problem solving Algorithm, flowcharts, pseudocode, structured programming: declaration of variables, simple logic, conditional statements, conditional constructs, branching of logic. Constants , Variables and Data types Character set, C tokens, keywords and identifiers, constants, variables, data types Operator and Expressions Operators(arithmetic, relational, logical, assignment, increment and decrement, conditional, bitwise, special) , precedence of arithmetic operators, type conversion in expression, operator precedence and associativity, mathematical function, Data types, variables and constants.	9	12
Unit II	Input and Output operations Reading and writing characters, formatted input and output.	9	10



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Decision making and Branching

if statement, if...else statement, nesting of if...else statement, else if ladder, switch statement, goto statement.

Decision making and Looping

While statement, do statement, for statement, jumps in loops

Unit III	Arrays one dimensional array, two dimensional array, multi dimension array	9	15
	Character Arrays and String Declaring and initializing string variables, reading strings from terminal, writing string to screen, arithmetic operations on characters, string handling functions, table of strings.		
Unit IV	User Defined Functions Need for user defined functions, multi function program, definition of function, return value and their types, function declaration and calls, category of functions, nesting of function, recursion, passing arrays and strings to function, scope, visibility and life time of variables	9	13
	Total	36	50

Outcomes:

Upon the completion of this course, the student will be able to:

1. Use the basic concepts of problem solving.
2. Develop logic for problems
3. Use data types, variables, character strings, decision making statement, array and User defined functions in C.
4. Design, build, and execute C programs.

Reference Books:

Programming in ANSI C - E Balagurusamy – 4th Edition - McGraw-Hill Companies, New Delhi.

Mastering C- K R Venugopal, S R Prasad-1st Edition- McGraw-Hill Companies, New Delhi.

Additional Reference Books:

- (1) The Complete Reference C, Herbert Schildt-4th Edition- McGraw-Hill Companies, New Delhi.
- (2) The C Programming language ANSI C version - Brian W. Kerninghan and Dennis Ritchie- 2nd Edition- Prentice Hall
- (3) Let us C - Kanetkar Y. - 8th Edition, BPB Pub- New Delhi.



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Subject Code: MCA 111

Subject Name: Structured Programming using C

Practicals per week (hours) : 4

Total Marks (Practical Exam) : 50

Sr. No.	Topics to be Covered	No. of Practicals
1	Overview of C Simple programs using console I/O functions Constants, Variables and Data types Declaration of Variables, Constants and data types Assigning values to variables Printing data using printf() function Reading data using scanf() function Operators and Expressions Operators (Arithmetic, Relational, Logical, Assignment, Increment and decrement, Conditional) Type conversions in expressions Mathematical functions	7
2	Managing input and output operations Reading a Character Writing a Character Formatted input and output Decision making and branching Simple IF statement The IF...ELSE statement Nesting of IF... ELSE statements The ELSE IF ladder The Switch statement The GOTO statement Decision making and looping The WHILE statement The DO statement FOR statement	10
3	Arrays Declaration and initialization of one dimensional array Accessing array elements Displaying array elements Sorting arrays Two-Dimensional array 1. declaration and initialization 2. accessing and displaying	10



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Strings

Declaration and initialization of strings

standard library functions :

1. strlen()
2. strcpy()
3. strcat()
4. strcmp()

Implementation without using standard library

4	User-defined functions	9
	Multi-function program	
	Definition of Functions	
	Return values and their types	
	Function calls	
	Function declaration	
	Category of functions	
	Nesting of functions	
	Recursion	
	Passing arrays to functions	
	Passing strings to functions	
	Total	36



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Master of Computer Applications (M.C.A.)

First Year MCA :

Trimester I

Subject Code: MCA 112 **Subject:** Computer Organization and Architecture

Lectures per week (hours) : 3 Lectures + 1 Tutorial
Practicals per week (hours) : 0
Internal Assessment : 50 Marks
External Assessment : 50 Marks
Total Credits : 4

Aim:

The course is aimed to introduce the internal organization and architecture of computers

Objectives:

- (1) To understand the concept of number systems.
- (2) To understand the memory types.
- (3) To gain basic knowledge of digital electronics.
- (4) To make students familiar with CPU and IO architectures

Unit No.	Topics to be Covered	No. of Lectures	Marks per Unit
Unit I	Representation of Information Number systems: binary, octal, hexadecimal Conversion among Number Systems Floating point numbers Arithmetic operations on Binary Numbers Characters and codes ASCII, EBCDIC Memory Management Techniques Primary memory, secondary memory, cache, virtual	8	12
Unit II	Basic Logic Design Gates: AND, OR, NOT, NAND, XOR, NOR Boolean algebra Combination circuit design Multiplexer, DeMultiplexer, Encoder and Decoder Flipflops Shift registers and counters Designing of Counters Redundant coding for error detection and correction	10	14
Unit III	CPU Architecture Microprocessors, Microcomputers and its architectures Introduction to Assembly Language Instruction format Addressing modes-direct, indirect, immediate, relative, indexed Instruction set selection Software hardware tradeoffs Instruction execution	9	12



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Unit IV	I/O Architecture	9	12
	Properties of simple I/O devices and their controllers		
	Transfer of information between I/O devices		
	CPU and memory		
	Program controlled and interrupt controlled information transfer		
	DMA control, I/O channels and peripheral processors		
	Testing and Troubleshooting I/O interfacing circuits		
	Total	36	50

Outcomes:

Upon the completion of this course, the student will be able to:

1. Design digital circuits.
2. Write programs efficiently.
3. Troubleshoot memory, CPU and IO related problems.

Reference Books:

- (1) Digital Logic and Computer Design, M. Morris Mano, PHI.
- (2) Microprocessor Architecture, programming and applications with 8085, Ramesh S. Gaonker, Panram Int. Pub, 5th edition.
- (3) Computer Architecture and Organization, B. Govindarajalu, Tata Mc-Graw Hill, 1st edition.

Additional Reference Books:

- (1) Digital Computer Fundamentals, Thomas C. Bartee, Tata Mc-Graw Hill, 6th edition.
- (2) Digital Principles and Applications, Albert Paul Malvino and Donald P. Leach, Tata Mc-Graw Hill, 5th edition.

**Subject Code:** MCA 113**Subject Name:** Database Management System-I

Lectures per week (hours)	: 3 Lectures + 1 Tutorial
Practical per week (hours)	: 4
Internal Assessment	: 50 Marks
External Assessment	: 50 Theory + 50 Practical Marks
Total Credits	: 8

Prerequisite: Basic Knowledge of Office Productivity Tools.**Aim:**

The course is aimed to give knowledge of basic concepts related to Database Management Systems.

Objectives:

- (1) To understand the concept and architecture of DBMS.
- (2) To make students familiar in conceptual and database design.
- (3) To provide understanding of Query Language-SQL using Oracle 10g

Unit No.	Topics to be Covered	No. of Lectures	Marks per Unit
Unit I	Introduction to Database Management Systems Basic Concepts, Purpose of DBMS, Benefits of DBMS over File Systems, Data Models, Levels of Abstraction in DBMS, Structure of DBMS, Components of DBMS Data Modeling (Part I) Entity Sets, Relationship Sets, Attributes and Keys, Types of Entities and Relationships, ER Diagram.	9	10
Unit II	Data Modeling (Part II) Enhanced ERD. Relational Modeling Relational Structure – tables, rows (tuples), domain and columns (attributes), Keys: super key, candidate keys, primary key, entity integrity constraints and referential integrity constraints, transformation from ER to Relational. Relational Algebra Select, Project, Union, Difference, Cartesian Product and Rename. Additional Operators: Intersection, Natural Join, Division.	9	12



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Unit III	Database Design Anomalies in database, Functional Dependencies, Decomposition, Dependency Preservance, Closure of a set of FD, Canonical Cover, Loss-less Join, Armstrong rules, Normal Forms : 1NF, 2NF, 3NF, BCNF, 4NF and 5NF	9	18
Unit IV	Structured Query Language Introduction to SQL, Advantages of using SQL, DDL, DML, Basic and Advanced queries in SQL and Views.	9	10
	Total	36	50

Outcomes:

Upon the completion of this course, the student will be able to:

1. Design the database of any application.
2. Access and manipulate data from database efficiently.
3. Apply the concept for advanced DBMS.

Reference Books:

- (1) Database Systems- Concepts, Design and Applications, S K Singh, Pearson Education, 1st Edition.
- (2) Oracle database 10g SQL, Jason Price, Tata McGraw-Hill Education, 1st Edition

Additional Reference Books:

- (1) Database Management Systems, Ramakrishnan and Gehrke, Mc Graw -Hill, 3rd Edition.
- (2) Database System Concepts, Silberschatz – Korth – Sudarshan, Mc Graw -Hill, 5th Edition
- (3) Fundamentals of Database Systems, Elamsri – Navathe, Pearson Education, 4th Edition
- (4) SQL, PL/SQL, The Programming Language of ORACLE, Ivan Bayross, BPB Publication, 3rd Edition.



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Subject Code: MCA 114

Subject Name: Database Management System - I

Practical per week (hours) : 4

Total Marks (Practical Exam) : 50

Topics to be covered in Practical Sessions

Sr. No.	Topics to be Covered	No. of Practicals
1.0	Interactive SQL – I 1.1 Table Fundamentals 1.2 Viewing data in the tables. 1.3 Insert, Update, Delete Operations. 1.4 Rename, Truncate and Drop Tables. 1.5 Synonyms, Sequence.	09
2.0	Interactive SQL – II 2.1 Data Constraints and its types. 2.2 Computation on table data 2.3 Functions	15
3.0	Interactive SQL – III 3.1 Concepts of Grouping 3.2 Sub Queries 3.3 Joins 3.4 Union, Intersection and Minus 3.5 Views.	12
	Total	36



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First Year MCA :

Trimester I

Subject Code: MCA 114

Subject Name: IT Tools

Lectures per week (hours) : -

Practicals per week (hours) : 5

External Assessment : 50

Total Credits : 2

Prerequisite: None

Aim:

The course is aimed to bring students from heterogeneous academic streams to a common minimum platform by selectively exposing them to their respective deficiencies and fulfill the prerequisites for some of the subjects of higher trimesters.

Objectives:

- (1) To understand the Office Productivity tools like MS Word, MS Excel and MS Power Point.
- (2) To understand the concept of Database Management System using MS Access.
- (3) To develop skills for effective development of web based applications using HTML and DHTML.
- (4) To make students aware of common data exchange technology using XML.

Outcomes:

Upon the completion of this course, the student will be able to:

- (1) Work effectively with Office Productivity Tools.
- (2) Develop small business applications using DBMS software.
- (3) Develop static web sites.
- (4) Apply the knowledge of common data exchange for Enterprise-wide applications.

Reference Books:

- (1) MS Office 2007 Bible, Groh-Tyson - Prague et al., Wiley, 1st Edition
- (2) Mastering HTML, Ray and Ray, BPB, 1st Edition
- (3) Learning XML, Ray, Shroff Publications, 1st Edition

Additional Reference Books:

- (1) MS Access 2007 Bible, Groh – Stockman et al., Wiley, 1st Edition
- (2) MS Excel 2007 Bible, Walkenbach et al., Wiley, 1st Edition
- (3) MS Word 2007 in Simple Steps, Kogent Solutions, Dreamtech, 1st Edition
- (4) Study Guide 2007 MS Office, Cox – Preppernau, Dreamtech, 1st Edition
- (5) Learn Advanced HTML 4.0 with DHTML, Romalho, BPB, 1st Edition
- (6) Teach yourself HTML 4 in 24 hours, Oliver, 4th edition.
- (7) Step by Step XML, Young, PHI, 2nd Edition (Microsoft Press).



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Topics to be covered in Practical Sessions

Sr. No.	Topics to be Covered	No. of Practicals
1	Introduction to office productivity tools Office Productivity Tools 1.1 MS Word 1.1.1 Page Layout Features 1.1.2 References - Table of content, Footnotes, Citation and Bibliography, captions, Index and table of Authorities 1.1.3 Mail merge facility 1.1.4 Review – Track changes, and Proofing 1.1.5 Insertion of different components 1.1.6 Functionality of Macros 1.1.7 Viewing and Designing Features 1.2 MS Excel 1.2.1 Chart 1.2.2 Formulas – Function Library, Define names, formula auditing and calculation Option 1.2.3 Get External data, Sort & filter and data tools. 1.2.4 Protection of sheet and workbook. 1.3 MS Power Point 1.3.1 Creation and designing of slides 1.3.2 Animation 1.3.3 Slide show feature 1.3.4 Presentation of slide show	12
2	DBMS 2.1 MS Access 2.1.1 Database Creation 2.1.2 Tables 2.1.3 Queries 2.1.4 Forms 2.1.5 Reports 2.1.6 Macros	8
3	Web Technology 3.1 HTML 3.1.1 Latest version of HTML Tags 3.1.2 About the different versions of HTML including XHTML 3.1.3 Validation of HTML Web page 3.2 DHTML 3.2.1 Cascading Style Sheet 3.2.2 Introduction to Java Script 3.3 XML 3.3.1 XML Introduction 3.3.2 How to use XML	10
	Total	30



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Master of Computer Applications (M.C.A.)

First Year MCA :

Trimester II

Subject Code: MCA 121

Subject: Data Structures

Lectures per week (hours)

: 3 Lectures + 1 Tutorial

Practicals per week (hours)

: 3

Internal Assessment

: 50 Marks

External Assessment

: 50 Theory + 50 Practical Marks

Total Credits

: 7

Prerequisite: Introduction to Programming using C.

Aim:

The course is aimed to introduce the various types of data structures.

Objectives:

- (1) To understand the concept of data structures and its applications.
- (2) To write program more efficiently.
- (3) To make students familiar with analysis of algorithms.

Unit No.	Topics to be Covered	No. of Lectures	Marks per Unit
Unit I	Introduction to data structure Primitive & Non-primitive data structures, Operations on primitive data structure, algorithm analysis for time and space requirements. Storage management.(array representation, pointer overview)	6	10
Unit II	Introduction to Sorting and searching Stack and Queue <ul style="list-style-type: none">• Definition of stack, Application of stack,• Representation of stack using array and pointer.• Operations on stack• Definition of queue, Application of queue• Representation of queue using array and pointer.• Operations on Queue• Types of Queue	12	14



Unit III	Linked list.	9	12
	Singly linked list.		
	<ul style="list-style-type: none">• Representation of single linked list.• Operations on singly linked list.<ul style="list-style-type: none">○ Insertion as a first node, insertion as a last node, Insertion of a node at specific location.○ Deletion of first node, deletion of last node, deletion of a desired node○ Searching for the particular element○ Sorting the linked list○ Reversing the list○ Traversing a linked list.		
	Doubly linked list		
	<ul style="list-style-type: none">• Representation of doubly linked list.• Operations of doubly linked list<ul style="list-style-type: none">○ Insertion as a first node, insertion as a last node, Insertion of a node at specific location.○ Deletion of first node, deletion of last node, deletion of a desired node○ Searching for the particular element○ Sorting the linked list○ Traversing a linked list.		
	Circular linked list		
	<ul style="list-style-type: none">• Representation of circular linked list• Inserting and deleting a node in it.		
Unit IV	Non-linear data structures	9	14
	Trees		
	<ul style="list-style-type: none">• Definition of tree• Representation of tree• Types of tree• Binary tree traversal• Storage representation and manipulation of binary tree• Conversion of general tree to a binary tree• Other representation of tree, application to tree.		
	Graphs		
	<ul style="list-style-type: none">• Introduction, Basic Terminologies• Representation of graphs• Graph Traversal• Application of Graph Structure• Finding out the transitive closure and shortest path of Graph		
	Total	36	50



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Outcomes:

Upon the completion of this course, the student will be able to:

1. Choose appropriate data structures to solve problems.
2. Write programs efficiently using various data structures.

Reference Books:

- (1) An introduction to data structures with their applications, Trembley and Sorenson, TMH (2nd edition).
- (2) Data structures using C and C++, Y . Langsam, M. J. Augenstein, A. M. Tenenbaum, PHI (2nd edition).

Additional Reference Books:

- (1) Data Structures through C, Y. P. Kanetkar, BPB Publications.
- (2) Data Structures and Algorithms: Concepts, Techniques and Applications, GAV Pai, Tata Mc-Graw Hill.

Subject Code: MCA 121

Subject Name: Data Structures

Practicals per week (hours) : 4

Total Marks (Practical Exam) : 50

Topics to be covered in Practical Sessions

Sr. No.	Topics to be Covered	No. of Practicals
1.0	Introduction to data structure	4
	1.1. Array	
	1.2. Pointers	
	1.3. Bubble sort and selection sort	
	1.4. Sequential Search and Binary Search	
2.0	2.1 Stack	10
	2.1.1. Representation of stack using array	
	2.1.2. Representation using pointer	
	2.1.3. Application of stack	
	2.2 Queue	
	2.2.1. Representation of queue using array	
	2.2.2. Representation using pointer	
	2.2.3. Application of queue	
	2.2.4. Circular queue	
	2.2.5. Dqueue	
	2.2.6. Priority queue	
3.0	Linked list.	10
	3.1 Singly linked list.	
	3.1.1 Representation of single linked list	
	3.1.2 Operations on singly linked list.	
	<ul style="list-style-type: none">• Insertion as a first node, insertion as a last node, Insertion of a node at specific location.	



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- Deletion of first node, deletion of last node, deletion of a desired node
- Searching for the particular element
- Sorting the linked list
- Reversing the list
- Traversing a linked list.
- Splitting list
- Merging list

3.2 Doubly linked list

3.2.1 Representation of doubly linked list.

3.2.1 Operations of doubly linked list

- Insertion as a first node, insertion as a last node, Insertion of a node at specific location.
- Deletion of first node, deletion of last node, deletion of a desired node
- Searching for the particular element
- Sorting the linked list
- Traversing a linked list.

3.3 Circular linked list

3.2.1 Representation of circular linked list

Inserting and deleting a node in it.

4.0

Non-linear data structures

12

Trees

- Implementation of tree using linked list and array
- Binary tree traversal
- Storage representation and manipulation of binary tree
- Conversion of general tree to a binary tree
- Other representation of tree
- Application of tree.

Graphs

- Representation of graphs using Adjacency matrix and linked list
- Graph traversal

Total

36



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AES INSTITUTE OF COMPUTER STUDIES

Master of Computer Applications (M.C.A.)

First Year MCA :

Trimester II

Subject Code: MCA 122

Subject Name: Database Management System-II

Lectures per week (hours)	: 3 Lectures + 1 Tutorial
Practical per week (hours)	: 3
Internal Assessment	: 50 Marks
External Assessment	: 50 Theory + 50 Practical Marks
Total Credits	: 7

Prerequisite:

Basic Knowledge of Database Management System & Structured Query Language.

Aim:

The course is aimed to give advanced knowledge of Database Management Systems related to online transaction, back up, recovery and security of database.

Objectives:

- (1) To understand the concept and architecture of ORACLE.
- (2) To make students familiar with Transaction Processing and Concurrency Control.
- (3) To familiarize concepts of Procedural Language Structure Query Language

Unit No.	Topics to be Covered	No. of Lectures	Marks per Unit
Unit I	Database Architecture Oracle Architecture -Introduction, Memory structures of SGA, Background processes, Additional Process and memory structure, Physical structure of database, Logical structure of database. Types of Databases Introduction to other databases(MS-SQL Server, MYSQL),Overview and comparison of Parallel, Distributed and Object oriented Database along with pros. and cons.	8	12
Unit II	Transaction Processing and Concurrency Control Transaction concepts: execution and problems, transaction execution with SQL, transaction properties, transaction log. Concurrency control: problems, schedules, degree of consistency, permutable actions, serializable schedule, locking methods for concurrency control, timestamp ordering.	10	12



Unit III	Database Administration Need of backup, techniques of back up, types of database failure, types of database recovery, recovery techniques, threat to database security, statistical database security, granting of privileges using SQL, audit trail, firewall, data encryption.	8	10
Unit IV	PL/SQL Advantage of PL/SQL over SQL, features of PL/SQL, Architecture of PL/SQL, programming environment of PL/SQL, Cursor: implicit – explicit – Ref(strong ,weak) , record types, stored procedure, function, package, trigger, exception handling.	10	16
	Total	36	50

Outcomes:

Upon the completion of this course, the student will be able to:

1. Apply concepts of online transaction processing for any Business Application.
2. Implement knowledge in backup and recovery of database
3. Apply concepts of PL/SQL programming as Database and Application Programmer.

Reference Books:

- (1) Database Systems- Concepts, Design and Applications, S K Singh, Pearson Education, 1st Edition.
- (2) Oracle Database 10g PL/SQL by Christopher Allen, McGraw-Hill Professional, 1st Edition
- (3) Oracle Database 10g DbA Handbook, loney, Tata McGraw-Hill Education, 1st Edition

Additional Reference Books:

- (1) Database Management Systems, Ramakrishnan and Gehrke, Mc Graw -Hill, 3rd Edition.
- (2) Database System Concepts, Silberschatz – Korth – Sudarshan, Mc Graw -Hill, 5th Edition
- (3) Fundamentals of Database Systems, Elamsri – Navathe, Pearson Education, 4th Edition
- (4) Oracle database 10g SQL, Jason Price, Tata McGraw-Hill Education, 1st Edition
- (5) Oracle 9i DBA Handbook, Loney, TMH, 1st Edition
- (6) Oracle 9i PL/SQL Programming, Scott Urman, TMH, TMH Edition.



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Master of Computer Applications (M.C.A.)

Subject Code: MCA 122

Subject Name: Database Management System - II

Practical per week (hours) : 3

Total Marks (Practical Exam) : 50

Topics to be covered in Practical Sessions

Sr. No.	Topics to be Covered	No. of Practicals
1.0	PL/SQL - I 1.1 PL/SQL Block Basics 1.2 PL/SQL Data Types 1.3 Programming Environment of PL/SQL 1.4 Implicit Cursor 1.5 Explicit Cursor 1.6 Cursor loops	07
2.0	PL/SQL – II 2.1 Ref Cursor 2.2 Strong and Weak Cursor 2.3 PL/SQL Records 2.4 Exception Handling 2.5 Procedures	11
3.0	PL/SQL – III 3.1 Functions 3.2 Packages 3.3 Triggers.	09
	Total	27



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Master of Computer Applications (M.C.A.)

First Year MCA :

Trimester II

Subject Code: MCA 123 **Subject:** Programming using C and C++

Lectures per week : 3 Lectures + 1 Tutorial
Lectures per week : 4 Practical
Internal Assessment : 50 Marks
External Assessment : 50 Theory + 50 Practical Marks
Total Credit : 8

Prerequisite: Basic knowledge of problem solving and C language.

Aim:

The course is aimed to understand the advance concepts of procedural programming language and create a base for object oriented concepts.

Objectives:

- (1) To understand the mechanism of classes and structures.
- (2) To introduce the concept of efficient storage management techniques.
- (3) To give knowledge of file management in C and C++.

Unit No.	Topics to be Covered	No. of Lectures	Marks per Unit
Unit I	Introduction to C++ Software evolution of programming languages, Difference between procedural programming approach and object-oriented programming approach, features and advantages of OOP approach, object oriented concepts (objects, classes, data abstraction and encapsulation, inheritance, polymorphism, dynamic binding, message passing), comparison C and C++, applications of C++, Structure of a C++ program, data types, reference variables, operators in C++, type-conversions (explicit and implicit), water-fall model of type conversion,	9	10
Unit II	Structures, Classes and functions Introduction, Defining a structure, Declaring structure variables, Accessing structure members, Structure initialization, Copying and comparing structure variables, Operations on individual members, Arrays of structures, Arrays within structures, Structures within structures, Structures and functions, Unions, Size of structures, Bit fields	9	13



	difference between structure in C and C++ class, creating objects from C++ classes, C++ functions, function prototyping, inline functions, function overloading, Call by reference		
Unit III	Pointers Introduction, Understanding pointers, Accessing the address of a variable, Declaring and Initialization of pointer variables, Accessing a variable through its pointer, Chain of pointers, Pointer expressions, Pointer increments and scale factor, Pointers and arrays, Pointers and character strings, Arrays of pointers, Pointers as function arguments, Functions returning pointers, Pointers to functions, Pointers and structures Dynamic memory allocation Introduction, Dynamic memory allocation, Allocating a block of memory : MALLOC, Allocating multiple blocks of memory : CALLOC, Releasing the used space : Free, altering the size of block: REALLOC	9	12
Unit IV	File IO in C Introduction, Defining and opening a file, Closing a file, Input/output operations on files, Error handling during I/O operations, Random access to files, Command line arguments Streams and File IO in C++ Concept of streams, input and output streams, console IO functions, formatting functions using flags, Reading and writing data to files using file streams. Introduction to Preprocessor Introduction, Macro substitution, File inclusion	9	15
	Total	36	50

Outcomes:

Upon the completion of this course, the student will be able to:

1. Use Class and Structure to store data having different data types
2. Manage memory space efficiently.
3. Read and write simple disk files.
4. Access data randomly using files.

Prescribed Reference Books:

1. The Complete Reference C - Herbert Schildt -4th Edition- McGraw Hill Companies, New Delhi.
2. The Complete Reference C++ - Herbert Schildt -4th Edition- McGraw Hill Companies, New Delhi.



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Additional Reference Books:

1. Programming in ANSI C - E Balagurusamy , 4th Edition - McGraw-Hill Companies, New Delhi.
2. Let us C - Kanetkar Y., 8th Edition, BPB Pub., New Delhi.
3. The C Programming language ANSI C version , Brian W. Kerninghan and Dennis Ritchie, 2nd Edition, Prentice Hall
4. Programming with ANSI C++ by Bhushan Trivedi, Oxford University Press (First Edition)
5. Object oriented Programming in Turbo C++ by Robert Lafore (First Edition, 2002)
6. Let Us C ++ by Yashwant Kanitkar

Subject Code: MCA 123

Subject Name: Programming using C and C++

Practicals per week (hours) : 4

Total Marks (Practical Exam) : 50

Sr. No.	Topics to be Covered	No. of Practical
1	Functions, Classes and Objects Data types, C++ functions, function prototyping, inline functions, function overloading, Call by reference, difference between structure and class, creating objects from class, static-members of class.	9
2	Structures Implementation of structure, Arrays of structures, Arrays within structures, Nested structures Introduction to Pointers Declaration, Initialization, Indirection operator, address of operator, Accessing address of a variable Pointer arithmetic.	9
3	Advanced Pointers Arrays and pointers, Pointers and Character Strings Function and pointers, Pointer and Structures File management in C Defining and opening a file, Closing a file, Input/output operations on files, Error handling during I/O operations, Random access to files, Command line arguments.	9
4	File management in C++ Concept of streams, input and output streams, console IO functions, formatting functions using flags, Reading and writing data to files using file streams The Preprocessor Simple Macro substitution	9
	Total	36



AHMEDABAD UNIVERSITY

AES INSTITUTE OF COMPUTER STUDIES

Master of Computer Applications (M.C.A.)

First Year MCA :

Trimester II

Subject Code: MCA 124

Subject: Discrete Mathematics For Computer Science

Lectures per week (hours) : 3 Lectures + 1 Tutorial

Practicals per week (hours) : -

Internal Assessment : 50 Marks

External Assessment : 50 Marks

Total Credits : 4

Prerequisite: The basic knowledge of set theory, functions and matrices are required.

Aim:

The course is aimed to understand the mathematics behind many concepts of computer applications like RDBMS, Logical design of gates, Data Structures, Computer graphics, Analysis of algorithm etc.

Objectives:

- (1) To understand the concept of relation and will apply it in RDBMS.
- (2) To acquire knowledge of Boolean algebra and apply it in construction of various types of logical gates and minimization of circuits. This way they can gain knowledge of “how to save hardware” using the concept of Boolean algebra.
- (3) To acquire advanced concept of matrices and will apply it in computer applications.
- (4) To enhance skills of developing logic.
- (5) To learn about algorithm analysis, become familiar with big – O, omega and theta notations.

Unit No.	Topics to be Covered	No. of Lectures	Marks per Unit
Unit I	<p>Lattices Definition, Types and Properties of relation – Matrix of a relation – Equivalence relation – Equivalence class – Computer application of relation</p> <p>Examples of Posets – Hasse diagram – Maximal, Minimal, least and greatest elements of a poset – Computer application of poset or partial ordering</p> <p>Definition of lattice – Properties of lattices – Lattice as an algebraic system – Sub lattice – Direct product and homomorphism – Special lattices like bounded lattice, distributive lattice, complemented lattice, and complete lattice.</p>	10	15



Unit II	Boolean Algebra and Applications of Boolean Algebra	10	15
	Definition of Boolean algebra – Sub algebra – homomorphism – Join and meet irreducible – atoms, anti atoms - stone's representation theorem (only statement)		
	Boolean expressions – Free Boolean algebra – Min & Max terms – Values of Boolean expressions – Boolean functions – Representation of Boolean function		
	Minimization of Boolean functions using k – map and Quine - McCluskey algorithm		
Unit III	Matrix Algebra	8	12
	Inverse of a matrix – Matrix inversion by elementary transformation – Solution of linear equation by matrix method – Rank of a matrix – Row reduced echelon form – Normal form – Consistency of a system of linear algebraic equations		
Unit IV	Algorithm and Time Complexity & Predicate Calculus	8	8
	Algorithm and Time Complexity: Algorithm Analysis – Big – O notation – omega notation – theta notation - Examples of big-O, omega and theta notation.		
	Predicate Calculus: Introduction – Predicates – The statement functions - variables and quantifiers – Predicate formulas – Free and bound variables – Universe of discourse – Predicate Calculus		
	Total	36	50

- No proof is required for theorems or results. Theorems should be justified or explained by giving suitable examples

Outcomes:

Upon the completion of this course, the student will be able to:

1. Apply the concept of relation in RDBMS very effectively.
2. Find minimal Boolean expressions using various algorithms of Boolean algebra.
3. Apply the concept of Time complexity in Data Analysis and Algorithms very effectively.
4. Learn the fundamentals of logic.

Reference Books:

- (1) Discrete Mathematical Structures with Applications to Computer Science by J. P. Tremblay and R. Manohar, Tata McGraw – Hill, First Edition



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- (2) Discrete Mathematical Structures for Computer Scientists and Engineers by M. K. Das, Narosa Publication, First Edition
- (3) Discrete Mathematics by Swapan Kumar Sarkar, S. Chand Publication, First Edition
- (4) Discrete Mathematical Structure – Theory and Applications by D. S. Malik and M. K. Das, Thomson Publication, First Edition.

Additional Reference Books:

- (1) Discrete Mathematics and its Applications by K.H. Rosen, Tata McGraw Hill, Fourth Edition
- (2) Discrete Mathematical Structures by Bernard Kolman, Robert C. Busby, Pearson Education Ltd., Fifth Edition
- (3) Discrete Mathematics with Graph theory and Combinatorics by T. Veerarajan, Tata McGraw Hill, First Edition



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AES INSTITUTE OF COMPUTER STUDIES

Master of Computer Applications (M.C.A.)

First Year MCA :

Trimester II

Subject Code: MCA 125 **Subject:** Communication Skills

Lectures per week (hours) : 3 Lectures + 1 Tutorial

Practicals per week (hours) : Nil

Internal Assessment : 50 Marks

External Assessment : 50 Marks

Total Credits : 4

Prerequisite: None

Aim:

The course is aimed to develop all round communication skills of the students- listening, speaking and writing.

Objectives:

- (1) To understand the concept, process and importance of communication.
- (2) To gain knowledge of media of communication.
- (3) To develop skills of effective communication - both written and oral.

Unit No.	Topics to be Covered	No. of Lectures	Marks per Unit
Unit I	Introduction to Communication and Oral and non verbal Communication Nature and scope of communication – Barriers to communication – Listening – Presentations – Non-verbal communication – Interviews – Group Discussions – Meetings and Conferences – Conversations – Negotiations – Informal Oral Communication - Speaking	9	12
Unit II	Written Communication and Business Letter Writing Writing Process – Words and Phrases – Sentences – Paragraphs – Letter Writing – Planning a letter – Types of Letters Sales, Job Application, Claim and Adjustment, Credit and collection - Memos	9	13
Unit III	Report Writing and Resume Preparation Report Writing – Short Reports – Long Reports – Elements of style in report Writing - Resume Preparation	9	13
Unit IV	Other Miscellaneous Documents and Topics How to write e mails, Proposals, Quotations, Research Papers and Dissertations, Thesis, Instruction Manuals, Notices, Agenda , Minutes, Orders, Tenders – Communication across Functional areas – Cross cultural communication - Ethics in Business Communication – Social Correspondence	9	12
	Total	36	50



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Outcomes:

Upon the completion of this course, the student will be able to:

1. Effectively communicate orally in formal, informal and social situations.
2. Effectively engage in all types of written communication.

Reference Books:

- (1) Technical Communication, Oxford University Press, Meenakshi Raman and Sangeeta Sharma, 1st Edition.
- (2) Business Communication, Oxford University Press, Meenakshi Raman and Prakash Singh, 1st Edition.
- (3) Business Correspondence and Report Writing, Oxford University Press, R C Sharma and Krishna Mohan, 3rd Edition.
- (4) Basic Business Communications, TMH R Lesikar and M Flatley, 9th Edition.
- (5) Communication Skills for Engineers, Pearson Education, Sunita Mishra and C Muralikrishna, 1st Edition

Additional Reference Books:

- (1) Essentials of Business Communication, Sultan Chand & Sons, Rajendra Pal and J. S. Korlhalli, 1st Edition.
- (2) Business Communication (Principles, Methods and Techniques), Deep & Deep Publications Pvt. Ltd., Nirmal Singh, 2nd Edition.
- (3) Business Communication, Galgotia Publishing Company, K. K. Sinha, 1st Edition



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AES INSTITUTE OF COMPUTER STUDIES

Master of Computer Applications (M.C.A.)

First Year MCA :

Trimester III

Subject Code: MCA 131

Subject Name: Fundamentals of Operating Systems

Lectures per week (hours) : 3 Lectures + 1 Tutorial

Practicals per week (hours) :

Internal Assessment : 50 Marks

External Assessment : 50 Theory Marks

Total Credits : 4

Prerequisite: Basic knowledge of Computer System peripherals and its functionality.

Aim:

The course is aimed to provide fundamental knowledge about Operating of various components of Computer System.

Objectives:

- (1) To understand the concept, structure and mechanism of Operating Systems.
- (2) To understand the complex interaction among various parts of systems.
- (3) To make students familiar with multi-user and multitasking Operating System.

Unit No.	Topics to be Covered	No. of Lectures	Marks per Unit
Unit I	<p>Computer System Overview Basic Elements, Processor Register, Instruction Execution, Interrupt and Interrupt Processing, Memory Hierarchy, Cache Memory</p> <p>Operating System Overview Operating System Objective, OS as User/Computer Interface and Resource Manager, Evolution of OS – Serial, Simple Batch and Multiprogrammed Batch Systems, Time Sharing, Levels of OS</p> <p>Process Description Process and Process States, Two State Process Model, Creation and Termination of Process, Five State Process Model and Suspended Process</p>	9	12
Unit II	<p>Process Control OS Control Structure, Process Control Structure, Modes of Execution and Process Switching</p> <p>Threads & SMP Process & Thread, Multithreading and Thread Functionality, SMP Architecture and Organization and Overview of Microkernel</p> <p>Fundamentals of Concurrency Principles of Concurrency, Race Condition, Process interaction, Competition among Process for Resources</p>	9	13



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Unit III	Concurrency: Mutual Exclusion & Synchronization Requirement of Mutual Exclusion, Semaphore, Producer / Consumer problem using Semaphore, Barbershop problem – An Unfair Barbershop and Fair Barbershop, Overview of Message passing Reader/Writer problem	9	12
Unit IV	Concurrency: Deadlock and Starvation Principle of Deadlock, Types of Resources, Resource Allocation Graph, Conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance and Detection, Dining Philosopher problem File System File Concept, Access Methods, Directory and Disk Structure, Overview of File Mounting, Sharing and Protection	9	13
	Total	36	50

Outcomes:

Upon the completion of this course, the students will be able:

1. To know the Computer System Operating platform.
2. Functional and Control units of Operating System.
3. Familiarize with Concurrency Mechanism

Prescribed Reference Books:

- (1) Operating Systems: Internals and Design Principles, William Stallings, PHI, 5th edition.
- (2) Operating System Concepts, Silberschatz, Galvin, Gagne, Wiley-India, 8th Edition

Additional Reference Books:

- (1) Operating Systems Design and Implementation, Andrew Tananbaum, Pearson Education, 4th Edition
- (2) Operating Systems Concepts and Design, Milan Milenkovic, Tata McGraw-Hill, 2nd Edition.



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AES INSTITUTE OF COMPUTER STUDIES

Master of Computer Applications (M.C.A.)

First Year MCA :

Trimester III

Subject Code: MCA 132

Subject Name: Object Oriented Concepts and Programming with C++

Lectures per week (hours)

: 3 Lectures + 1 Tutorial

Practical per week (hours)

: 4 Practical

Internal Assessment

: 50 Marks

External Assessment

: 50 Theory + 50 Practical Marks

Total Credits

: 8

Prerequisite: Programming using C and C++ (Trimester II subject)

Aim

To learning object-oriented concepts and their applications using C++ programming language

Objectives

- Differentiate between procedural programming approach and object-oriented programming (OOP) approach and the advantages of OOP approach to real-life software application development.
- Learn object-oriented concepts and their application using C++ language to develop efficient and maintainable solutions to various programming problems.
- Learn ANSI C++ language and its various features.
- To provide a strong foundation to the students for learning modern day object-oriented technologies like JAVA, .NET and PHP.

Course Contents:

Unit No.	Topics to be Covered	No. of Lectures	Marks per Unit
Unit I	Introduction to Classes, objects, static members, Constructors and Destructors Classes and objects, Memory allocation for objects, Static-members of class, static data-members and static methods, array of objects, const member functions, Constructors and their use, Multiple constructors in a class, parameterized constructors, constructors with default arguments, constructing two-dimensional arrays, constant objects, dynamic initialization, dynamic memory allocation, copy constructors, member initialization list, destructors.	9	12
Unit II	Operator overloading Friend functions, function with object as arguments, defining operator overloading, process of overloading, overloading unary operators, overloading binary operators and their usage, overloading binary operators using friend functions, manipulation of strings using operators (brief idea of inbuilt ANSI C++ string class and its overloaded operators), rules for overloading	9	12



operators, user defined conversions: basic to class type, class to basic type, one class to another class type, using friends functions for operator overloading

Templates

Introduction to generic programming and software reusability, its advantages, types of templates: function template and class template, single argument function templates, instantiation, function templates with multiple arguments, function templates with two generic arguments and non-generic arguments, template argument deduction, explicitly specializing a template function, overloading a generic function with another generic function, class templates, defining functions of class template outside class, class instantiation, using non-type arguments in template class, using default arguments in template class.

Unit III

Inheritance

Advantages of inheritance, implementation of inheritance in C++ object model, Types of inheritance, use of protected access specifier in inheritance, public, private and protected modes of inheritance, defining a derived class from a single base class using public modifier, deriving multiple classes from single base class and its example, multiple inheritance with example, drawbacks of multiple inheritance, virtual base class and why it is required, abstract class, rules of constructors and destructors in inheritances, composite (container) objects

Runtime polymorphism using Virtual Functions

Polymorphism, different types and its importance, difference between compile-time and run-time polymorphism, pointer to objects, array of pointers to objects, this pointer, virtual functions and achieving runtime polymorphism, virtual destructors, pure virtual functions.

Unit IV

IO streams and formatted IO

Predefined Streams, advantages of using C++ IO over C I/O, new features in ANSI C++ IO, hierarchy of C++ stream classes, formatted and unformatted I/O, put and get member functions, using getline, read and write functions with their programs, using formatting flags in ios class, setting and clearing format flags, using setf function with two arguments, manipulators, differences between manipulators and ios functions, using manipulators for toggle effect, short hand manipulators, creating your own manipulator, usage of custom manipulator with a report printing program

9

13

9

13



	copy constructors, member initialization list, destructors.	
2.0	Operator overloading Friend functions, function with object as arguments, overloading unary operators, overloading binary operators and their usage, overloading binary operators using friend functions, manipulation of strings using operators user defined conversions: basic to class type, class to basic type, one class to another class type, using friends functions for operator overloading Templates function template and class template, single argument function templates, instantiation, example of generic sorting and need for operator overloading, example of sorting employee objects using generic bubble sort, function templates with multiple arguments, function templates with two generic arguments and non-generic arguments, template argument deduction, explicitly specializing a template function, overloading a generic function with another generic function, class templates, defining functions of class template outside class, class instantiation, using non-type arguments in template class, using default arguments in template class.	09
3.0	Inheritance Types of inheritance, use of protected access specifier in inheritance, public, private and protected modes of inheritance, defining a derived class from a single base class using public modifier, deriving multiple classes from single base class and its example, multiple inheritance with example, virtual base class, abstract class, rules of constructors and destructors in inheritances, composite (container) objects Runtime polymorphism using Virtual Functions Polymorphism, different types and its importance, difference between compile-time and run-time polymorphism, pointer to objects, array of pointers to objects, this pointer, virtual functions and achieving runtime polymorphism, virtual destructors, pure virtual functions.	09
4.0	IO Streams, Using files for IO and namespaces Using Streams for formatting I/O, manipulators, creating your own manipulator, text and binary streams, dealing with text and binary files, random access using seek. Defining namespaces, nested namespaces, using std namespace.	09
	Total	36



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AES INSTITUTE OF COMPUTER STUDIES

Master of Computer Applications (M.C.A.)

First Year MCA :

Trimester III

Subject Code: MCA 133

Subject: System Software

Lectures per week (hours)

: 3 Lectures + 1 Tutorial

Practicals per week (hours)

: 4

Internal Assessment

: 50 Marks

External Assessment

: 50 Theory + 50 Practical Marks

Total Credits

: 8

Prerequisite:

The basic knowledge of business data processing and logical organization of computers are required.

Aim:

The course is aimed to understand design and implementation of various types of system software.

Objectives:

- (1) To study the relationship between machine architecture and system software
- (2) To study various kind of system softwares like assembler, macro processor compiler and interpreter.

Unit No.	Topics to be Covered	No. of Lectures	Marks per Unit
Unit I	<p>Language Processor Introduction – language processing activity – fundamentals of language processing – fundamentals of language specification</p> <p>Scanning and Parsing Scanning (Introduction to finite state automata – regular expression – building DFAs) – Parsing (Parse tree – abstract syntax tree – top down parsing – bottom up parsing).</p>	8	12
Unit II	<p>Assemblers Elements of Assembly language programming – symbol table – mnemonics table – pass structure of assembler (pass I and pass II) – assembler directives.</p>	8	10
Unit III	<p>Macro and Macro Processors: Macro definition and call – macro expansion – nested macro calls - advanced macro facilities - design of macro processor</p>	7	12
Unit IV	<p>Compiler and Interpreters Aspects of compilation – memory allocation –</p>	13	16



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compilation of expressions – compilation of control structures – code optimization – interpreters.

Linker

Translated, linked and load time addresses, Relocation and Linking Concepts, Self Relocating Programs

Loaders

Binary Image – Types of Loaders

Total 36 50

Outcomes:

Upon the completion of this course, the student will be able to:

- (1) Understand the relationship between machine architecture and system softwares
- (2) Implement scanner, parser, assembler, and macro processor practically.

Prescribed Reference Books:

- (1) Systems Programming and Operating Systems by D.M. Dhamdhare, Tata Mcgraw – Hill Publishing Company, 2nd Edition.
- (2) System Software by Santanu Chattopadhyay, PHI Private Ltd., 1st Edition.

Additional Reference Books:

- (1) Systems Programming by Donovan J.J., Tata Mcgraw – Hill Publishing Company, 1st Edition.
- (2) Compilers: Principles, Techniques and Tools by Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman, Pearson Education, 2nd Edition.

Subject Code: MCA 245 **Subject Name:** System Software
Practicals per week (hours) : 4
Total Marks (Practical Exam) : 50

Topics to be covered in Practical Sessions

Sr. No.	Topics to be covered	No. of Practicals
1.0	Introduction to Assembly Language	8
	1.1 Data Transfer Instructions	
	1.2 Arithmetical Instructions	
	1.3 String Instructions	
	1.4 Logical Instructions	
2.0	Scanning and Parsing	14
	2.1 Scanner	
	2.2 Parser	
3.0	Assemblers And Macro Processors	14
	3.1 Assembler Pass – I	
	3.2 Assembler Pass - II	
	Total	36



AHMEDABAD UNIVERSITY

AES INSTITUTE OF COMPUTER STUDIES

Master of Computer Applications (M.C.A.)

First Year MCA :

Trimester III

Subject Code: MCA 134 **Subject:** Computer Oriented Numerical and Statistical Methods

Lectures per week (hours)	: 3 Lectures + 1 Tutorial
Practicals per week (hours)	: 2
Internal Assessment	: 50 Marks
External Assessment	: 50 Marks Theory + 50 Marks Practical
Total Credits	: 6

Prerequisite:

The basic concepts of trigonometric, logarithmic, exponential and arithmetic functions, polynomial and roots of a polynomial. The basic knowledge of statistics, measures of central tendency, measures of dispersion, correlation and regression.

Aim:

In the modern times, a comprehensive grasp of mathematics and statistics is absolutely necessary for the meaningful study of business problems as well as profit making decisions.. The aim of this course is to teach various quantitative and qualitative methods and tests which help students to select, interpret, analyze and present data.

Objectives:

- (1) To develop the concept of error in various methods
- (2) To explain, calculate and interpret inferential statistics including probability and hypothesis tests.
- (3) To identify and apply the correct statistical technique to the problem.
- (4) To predict the future values using different time series methods.
- (5) To analyze the variance amongst different sample data.
- (6) To identify connections between statistics and the real world.

Unit No.	Topics to be Covered	No. of Lectures	Marks per Unit
Unit I	Computer Arithmetic and Iterative Methods Definition of error – Types of errors in numerical analysis – Descartes’ rule of sign - Categories of iterative methods – Bisection method – False Position method – Newton Raphson method Probability and Expectation Basic Terminology – Conditional probability – Total Probability - Baye’s rule applications	9	12
Unit II	Random variable and Probability distribution Expectation .- Joint probability – Probability mass function – Binomial distribution – Poisson distribution- Normal distribution.	9	12
Unit III	Statistical Inference Theory and Non – parametric tests	9	14



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	Statistical Inference Theory: (overview of sampling) Type I and Type II error – One tail and Two tail tests – Large Sample z tests – Small sample t - tests Non – parametric tests: Chi square test – Applications of chi square test – Sign test – U test – H test – One sample run test.		
Unit IV	Time Series and Analysis of Variance (ANOVA) Time Series: Definition – Components of Time series – Methods of finding trend (Semi average method – Moving average method, Least Square Method) – Method of finding seasonal variations (Method of simple average – Ratio to trend method) Analysis of Variance (ANOVA): Definition, Assumptions and uses of ANOVA – One way ANOVA – Two way ANOVA	9	12
	Total	36	50

Outcomes:

Upon the completion of this course, the student will be able to:

1. Efficiently list the sources of errors in computation
2. Identify correct statistical technique to the problem.
3. Effectively choose proper hypothesis and solve the problem
4. Apply the knowledge of various parametric and non – parametric tests to solve the real life applications.
5. Forecast values using proper time series method.

Prescribed Reference Books:

- (1) Numerical Methods: Principles, Analyses and algorithms by Srimanta Pal, Oxford Higher Education, First Edition
- (2) Statistical Methods by S.P. Gupta, S. Chand Company Ltd., 1st Edition
- (3) Statistics for Management by R. Levin and D.S. Rubin, PHI Private Ltd., 7th Edition

Additional Reference Books:

- (1) Comprehensive Statistical Methods by P.N. Arora, Sumeet Arora, S. Arora, S. Chand Company Ltd., 2nd Edition.
- (2) Statistics for Managers Using Microsoft Excel by Levine, Stephan, Krehbiel, Berenson, PHI Private Ltd., 4th Edition.
- (3) Statistics: Theory, Methods and Application by D.C. Sancheti and V.K. Kapoor, S. Chand Company Ltd., 7th Edition.
- (4) Business Statistics by A.P. Verma, Asian Books Private Ltd., Third Edition.
- (5) Business Statistics – A Self Study by B. Jhunjhunwala, S. Chand Company Ltd., 1st Edition.



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Master of Computer Applications (M.C.A.)

Subject Code: MCA 134 **Subject Name:** Computer Oriented Numerical and Statistical Methods

Practicals per week (hours) : 2

Total Marks (Practical Exam) : 50

Topics to be covered in Practical Sessions

Sr. No.	Topics to be covered	No. of Practical
1.0	Iterative Methods*	6
	1.1 Bisection Method	
	1.2 False Position Method	
	1.3 Newton Raphson Method	
	Probability and Expectation	
	1.4 Conditional probability	
	1.5 Baye's Rule	
	1.6 Expectation	
2.0	Random variable and Probability distribution	4
	2.1 Binomial Distribution	
	2.2 Poisson Distribution	
	2.3 Geometric Distribution	
	2.4 Normal Distribution	
3.0	Statistical Inference Theory and Non – parametric tests	4
	3.1 Large Sample Tests	
	3.2 Small Sample Tests	
	3.3 Tests of Number of Successes and Difference between Proportion	
	3.4 Chi – Square Test, Sign Test, H – Test, U – Test One – Sample Run Test	
4.0	Time Series and Analysis of Variance (ANOVA)	4
	4.1 Moving average	
	4.2 Ratio to trend method	
	4.3 One way ANOVA	
	4.4 Two way ANOVA	
	Total	18

* Students will have to explore the above mentioned practical using MATLAB or C.



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AES INSTITUTE OF COMPUTER STUDIES

Master of Computer Applications (M.C.A.)

First Year MCA :

Trimester III

Subject Code: MCA 135 **Subject:** Management Systems

Lectures per week (hours) : 3 Lectures + 1 Tutorial
Practicals per week (hours) : 0
Internal Assessment : 50 Marks
External Assessment : 50 Theory Marks
Total Credits : 4

Prerequisite: None

Aim:

The course is aimed to help the student understand and appreciate the basic concepts of Management Systems and importance of Management Systems for an organization.

Objectives:

To understand the basic concept of Management Systems

To understand the basic functioning of various departments in an organization.

To gain knowledge of basic financial and cost accounting systems and analysis and interpretation of financial statements.

Unit No.	Topics to be Covered	No. of Lectures	Marks per Unit
Unit I	Introduction to Business Systems and Management Information System. Functional departments in Non-Manufacturing Organizations Introduction – Definition – Evolution of modern day concept of MIS – MIS and other disciplines – Manual and automated manifestations – need, Purpose and objective of MIS – Conceptual, logical and physical depiction of MIS - Role and place of MIS in Business Org – Types of Business Org and relevance to MIS – Classification of Info Systems (TPS, MIS, EIS , OIS , DSS, ES) - TPS checks and controls – Functional departments in Nonmanufacturing organizations like Banks and Financial Institutions, Insurance Sector, Hospitality, Healthcare, Transportation etc.	7	10
Unit II	Functional departments in Manufacturing Organizations and their Functioning Functional departments like Manufacturing, Sales and Marketing, Materials, Research and Development, Finance and Accounting, Transportation and logistics, Share, Human Resources etc., their functioning and the MIS requirement in these departments.	9	15



Unit III	Introduction to Financial Accounting System Role of accounting system in an enterprise, accounting as in information system, its importance, basic transactions in business, difference between transactions and events (adjustments), cash and credit transactions, Internal and external users of accounting system, audit. Accounting procedure (mechanics) and accounting books: Journal, Ledger and Trial balance, interpreting the results using P and L a/c and Balance sheet. Journal and format of journal, recording the transactions in journal (only basic transactions of business), Types of transaction: Equity, liability, asset, purchase, sales, expense, income, examples of recording transaction in journal, division of journal. Rules of financial accounting Rules of personal, real and nominal accounts, Balance sheet equation based single rule of debit and credit (personal a/c, real a/c and nominal a/c), applying rules to seven transaction model Ledger Format of ledger, posting transactions from journal to ledger Trial Balance Preparing trial balance from ledger, use of trial balance, Errors affecting and not effecting trial balance Preparation of Financial Statements Basic concepts of accounting, format and purpose of Trading account, Profit and loss account, Balance sheet, adjustments or events, their effect on final accounts, examples of preparation of final accounts from trial balance. Exposure to FAS Software Basic understanding of FAS (like Tally 9) as an information system, features of Tally, Installation and configuration, creation of company, ledgers and ledger groups, voucher entry, types of voucher – payment, receipt, sales, purchase, journal and contra voucher, Examples of recording transactions in Tally, generation of Leger and Trial balance and its effect on Balance sheet, Reports – Trial balance, Day book, Balance sheet, Profit and Loss account and ratio analysis, examples of voucher entry and preparation of final accounts.	12	10
Unit IV	Analysis and interpretation of financial statements using ratio analysis Introduction to ratios and their benefits to different stake holders in business, functional classification of	08	15



ratio analysis, (only basic ratios to be covered)
Liquidity ratios, Profitability ratios, Asset turnover ratios, Financial structure ratios, Duo pont chart (return on investment), examples of calculating different ratios from financial statements (P and L a/c and Balance sheet),

Introduction to Cost Accounting

Difference between financial accounting and cost accounting, advantages of cost accounting, different elements of cost (material, labor and expenses), classification into direct and indirect costs, overheads and classification of overheads, preparing cost sheet.

Introduction to Standard Costing

Difference between costing and standard costing, advantage of standard costing, variances and variance analysis, favorable and unfavorable variances, calculating material cost variance, labor cost variance and overhead variance and examples of standard costing to find difference variances.

Total

36

50

Outcomes:

Upon the completion of this course, the student will be able to:

Understand and appreciate the basic concepts of Management Systems.

Understand and appreciate the basic functioning of various departments in manufacturing and non manufacturing organizations.

Understand and appreciate the importance of Financial and cost accounting and able to contribute effectively in the development of such systems.

Prescribed Reference Books:

Textbook of Financial Cost and Management accounting, P Periasamy, Himalaya Publishing House, 3rd edition, 2008.

Financial Accounting for Business Managers, Asish K Bhattacharyya, PHI, 3rd edition, 2008.

Management Information Systems, Dr Milind Oka, Everest Publishing House, 16th edition, 2009

Additional Reference Books:

Management Information Systems Managing the Digital Firm, Laudon and Laudon, Pearson Education, 10th Edition

Information Systems for Modern Management. Robert G. Murdick, Joel E. Ross, James R. Claggett. PHI, 3rd Edition

Financial Accounting, R. Narayanaswamy, PHI, 3rd edition, 2008.