



AHMEDABAD UNIVERSITY

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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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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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	9	13



	structures, Bit fields 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. Kernighan 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



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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	Lattices Definition, Types and Properties of relation – Matrix of a relation – Equivalence relation – Equivalence class – Computer application of relation Examples of Posets – Hasse diagram – Maximal, Minimal, least and greatest elements of a poset – Computer application of poset or partial ordering 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.	10	15



Unit II	Boolean Algebra and Applications of Boolean Algebra 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	10	15
Unit III	Matrix Algebra 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	8	12
Unit IV	Algorithm and Time Complexity & Predicate Calculus 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	8	8
	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.



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Reference Books:

- (1) Discrete Mathematical Structures with Applications to Computer Science by J. P. Tremblay and R. Manohar, Tata McGraw – Hill, First Edition
- (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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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	9	12



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cultural communication - Ethics in Business

Communication – Social Correspondence

Total

36

50

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