Academic Year: 2023-2024

Master of Computer Application

Syllabus & Scheme

Semester – I & II

School of Computer Science

GYANVEER UNIVERSITY, SAGAR (M.P.)

Scheme of Examination MCA II Semester (Major /Minor/Elective)

School of Computer Science (Academic Session 2023-24)

Subject wise distribution of marks and corresponding credits

S. No.	Subject Name	Subject Code	Paper Name	Maximum Marks Allotted									Total Marks	Contact Periods Per week			Total Credits
				Theory Slot				Practical Slot									
				End Term Exam	Internal Assesment Class test (Descriptive & Objective)/Assignment/Seminar/			Internal Assesment			External Assesment						
				FINAL EXAM	Internal Assesment I	Internal Assesment II	Internal Assesment III	Class test/ Interaction	Attendance	Practical/ Presentation/ Lab Record	Viva Voce	Lab Work		L	T	P	
1	Core Course	MCA221T	PROGRAMMING IN C++	60	20	20	20	–	–	–	–	–	100	6	0	0	6
2	Core Course	MCA222T	COMPUTER NETWORKS & DATA COMMUNICATION	60	20	20	20	–	–	–	–	–	100	6	0	0	6
3	Core Course	MCA223T	Data Base Management System	60	20	20	20	–	–	–	–	–	100	6	0	0	6
4	Core Course	MCA224T	E-COMMERCE & GOVERNANCE	60	20	20	20	–	–	–	–	–	100	6	0	0	6
5	Core Course	MCA225P	LAB-III (PROGRAMMING IN C++)	–	–	–	–	10	10	20	10	50	100	0	0	2	2
6	Core Course	MCA226P	LAB-IV (DBMS (ORACLE/MY SQL))	–	–	–	–	10	10	20	10	50	100	0	0	2	2

Total Credit 6+6+6+6+2+2=28

Note Allotment of Marks for Internal Assesment for theory portion is Best of Two / either of two and addition of them

MCA SEMESTER – II

MCA221T - PROGRAMMING IN C++

Objectives: The objective of course is to develop programming skills of students, using object oriented programming concepts, learn the concept of class and object using C++ and develop classes for simple applications.

Course Content:

(Lecture-12)

UNIT-I

Introduction: Comparison of C and C++, Cout, Cin, Data Type, Type Conversion, Control Statement, Loops, Arrays and string arrays fundamentals, Function, Returning values from functions, Reference arguments, Overloaded function, Inline function, Default arguments, Returning by reference.

(Lecture-12)

UNIT-II

Object and Classes: Implementation of class and object in C++, access modifiers, object as data type, constructor, destructor, Object as function arguments, default copy constructor, parameterized constructor, returning object from function, Structures and classes, Classes objects and memory, static class data, Arrays of object, Arrays as class Member Data, The standard C++ String class, Run time and Compile time polymorphism.

(Lecture-12)

UNIT-III

Operator overloading and Inheritance: Overloading unary operators, Overloading binary operators, data conversion, pitfalls of operators overloading, Concept of inheritance, Derived class and base class, access modifiers, types of inheritance, Derived class constructors, member function, public and private inheritance.

(Lecture-12)

UNIT-IV

Pointer and Virtual Function: Addresses and pointers, the address-of operator & pointer and arrays, Pointer and Function pointer, Memory management: New and Delete, pointers to objects, debugging pointers, Virtual Function, friend function, Static function, friend class, Assignment and copy initialization, this pointer, dynamic type information.

(Lecture-12)

UNIT-V

Streams and Files: Streams classes, Stream Errors, Disk File I/O with streams, file pointers, error handling in file I/O with member function, overloading the extraction and insertion operators, memory as a stream object, command line arguments, printer output, Function templates, Class templates Exceptions, Containers, exception handling.

COURSE OUTCOMES:

After completion of the Course, the student will be able to

- Identify importance of object oriented programming and difference between structured oriented and object oriented programming features.
- make use of objects and classes for developing programs.
- use various object oriented concepts to solve different problems.

References:

1. David Parsons; Object oriented programming with C++; BPB publication
2. Object oriented programming in C++ by Robert Lafore: Galgotia
3. Balagurusamy; Object oriented programming with C++; TMH
4. Herbert Shildt, "The Complete Reference C++", Tata McGraw Hill publication

(Lecture-12)

UNIT-IV

Network Layer: Design issues, Internet organization of network layer; Rating algorithms:

optimality principle, shortest path, flooding, Flow - bared, hierarchical, multicast, broadcast; congestion control algorithms: General principle, prevention, Traffic shaping, choke packets, load shading etc.; Internetworking: How network differ, connectionless internetworking, Tunneling, internetworking, fragmentation, firewalls; Network layer in the Internet: IP protocol, IP address, subnets, OSPF, BGP, FTP, telnet, email. etc.

(Lecture-12)

UNIT-V

Network Programming: Basically Sockets : Overview, Unix Domain Protocols, Overview, Unix Domain Protocols, socket-address, socket-system calls, reserved ports, passing file descriptions, I/O asynchronous & multiplexing, socket implementations.

COURSE OUTCOMES:

After completion of the Course, the student will be able to

- Understand the basics of data communication, networking, internet and their importance.
- Analyze the services and features of various protocol layers in data networks.
- Analyze TCP/IP and their protocols.
- Recognize the different internet devices and their functions.

References:

- A.S. Tanenbaum, "Computer Network", 4th addition, PHI
- Forouzan "Data Communication and Networking 3ed", TMH

MCA SEMESTER – II
MCA223T - Database Management Systems

Objectives:

- Demonstrate the basic elements of a relational database management system.
- Identify the data models for relevant problems.
- Design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data into RDBMS and formulate SQL queries on the data.
- Demonstrate their understanding of key notions of query evaluation and optimization techniques.
- Extend normalization for the development of application software's.

Course Content:

(Lecture-12)

Unit I

Introduction: Purpose of DBMS, view of data, data independence, data model. data base languages. traditional/flat files versus database approach, merits and demerits of both approaches. Profile of people working in DB environment, database administration. and overall system structure.

Entity-relationship model: Basic concepts of entities and relationships. design issues. mapping constraints, keys, super key, entity-relationship (E-R) diagram. weak entity sets. extended E-R features, design of E-R database schema and reduction of E-R schema to tables.

(Lecture-12)

Unit II

Relational –model: Structure of relational database, relational algebra. tuple relational calculus. and extended relational algebra operators.

Integrity Constraints: Domain constraints, referential integrity, foreign key.

Structure Query Language(SQL): Basic structure ,set operations. aggregate functions. Null values nested and correlated sub queries ,derived relations.views.Data Definition Language(DDL) Embedded SQL,and other SQL features, introduction to(other relational query languages),Query – By-Example(QBE) and QUEry Language(QUEL). assertions. triggers and stored procedures.

(Lecture-12)

Unit III

Design theory of relational databases: Functional Dependencies, Design issues problem faced in designing an application, decomposition, Normalization using multivalve dependencies, Normalization using join dependencies, Domain key normal form and alternative approaches to database design.

(Lecture-12)

Unit IV

Concurrent operation on database: Locked based protocols, Time-stamp based protocols. multiple granularity, multiversion schemes, deadlock handling, Insert and delete operation. Thomas Writing Rule and concurrency in index structures.

(M.P.)

(Lecture-12)

Unit V

Crash recovery systems: Failure classification, storage structure, recovery and Atomicity. Log Based Recovery mechanisms, Shadow paging, Recovery with concurrent transactions. and advanced recovery techniques.
Introduction to distributed and Object Oriented Databases.
Case study : Oracle

Learning Outcomes:
After completion of the course, the student

- Will be able to understand and demonstrate the basic elements of a relational database management system.
- Will have knowledge about data models for relevant problems.
- Will have knowledge about design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data into RDBMS

Required Text(s):

- Henry F. Kourth, Abraham Silverschatz, S. Sudarshan "Database System Concepts", 5th Edition TataMcGraw Hills Publishing Co.,2005
- Ramez Elmasri, shamkant B. Navathe, Fundamentals of Database System. 5th edition, addition Wesley, 2006.

MCA SEMESTER – II

MCA224T - E-COMMERCE & GOVERNANCE

Course Objectives: The primary objective for most ecommerce teams is to generate revenue – to be very efficient at selling through understanding complex consumer behavior to maximize conversion rates; and up-sell and cross-sell products and services to maximize value over the lifetime of the customer.

Course Content:

(Lecture-12)

Unit -I

Introduction to e-commerce: History of e-commerce, e-business models B2B, B2C, C2C, C2B, legal; environment of e-commerce, ethical issues, electronic data interchange, value chain and supply chain, advantages and disadvantages of e-commerce.

(Lecture-12)

Unit- II

Electronic Payment Systems: Credit cards, debit cards, smart cards, e-credit accounts, e - money, Marketing on the web, marketing strategies, advertising on the web, customer service and support, introduction to m-commerce, case study: e-commerce in passenger air transport.

(Lecture-12)

Unit -III

E-Government, theoretical background of e-governance, issues in e-governance applications, evolution of e-governance, its scope and content, benefits and reasons for the introduction of e-governance, e-governance models- broadcasting, critical flow, comparative analysis, mobilization and lobbying, interactive services / G2C2G.

(Lecture-12)

Unit -IV

E-readiness, e-government readiness, E- Framework, step & issues, application of data warehousing and data mining in e-government, Case studies: NICNET-role of Nationwide networking in e-governance, e-seva.

(Lecture-12)

Unit- V

E-Government systems security: Challenges and approach to e-government security, security concern in e-commerce, security for server computers, communication channel security, security for client computers.

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Course Outcomes:

After completion of the Course, the student will be able

- To protect and promote the interest of trade, commerce and industry.
- To unite people engaged in trade, commerce and industry for concerted action to protect, promote their common interests.
- To take interest in and formulate it's view matters directly or indirectly affecting the business community.

Reference Books:

- Gary P. Schneider, "E-commerce", Cengage Learning India.
- C.S.R. Prabhu, "E-governence: concept and case study", PHI Learning Private Limited.
- V. Rajaraman, "Essentials of E-Commerce Technology", PHI Learning Private Limited.
- David Whiteley, "E-commerce study , technology and applications", TMH.

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MCA SEMESTER – II
MCA225P - PROGRAMMING IN C++

Objectives: The primary objective for Programming in C++ is to Introduces the principles of data abstraction, class, inheritance and polymorphism, principles of virtual functions .

Course Content:

LIST OF EXPERIMENTS:-

1. 1. Program illustrating basic input/output operations using CIN, COUT.
2. Implementing class and objects.
3. Implementing function overloading.
4. Implementing various constructors and destructor
5. Program illustrating overloading of various operators.
6. Program illustrating use of Friend, Inline, Static Member functions, default arguments.
7. Program illustrating various forms of Inheritance
8. Program illustrating use of virtual functions, virtual Base Class.
9. Program illustrating use of file handling
10. Write a Program to design a class having static member function named show count () which has the property of displaying the number of objects created of the class
11. Write a Program which creates & uses array of object of a class.(for eg. implementing the list of Managers of a Company having details such as Name, Age, etc..).
12. Write a Program to find Maximum out of Two Numbers using friend function. Note: Here one number is a member of one class and the other number is member of some other class.
13. Write a Program to swap private data members of classes named as class_1, class_2 using friend function.
14. Write a Program using copy constructor to copy data of an object to another object.
15. Write a Program to allocate memory dynamically for an object of a given class using class's constructor.
16. Write a Program to design a class to represent a matrix. The class should have the functionality to insert and retrieve the elements of the matrix.
17. Write a program to design a class representing complex numbers and having the functionality of performing addition & multiplication of two complex numbers using operator overloading.
18. Write a Program to overload operators like *, <> using friend function. The following overloaded operators should work for a class vector.
19. Write a program for developing a matrix class which can handle integer matrices of different dimensions. Also overload the operator for addition, multiplication & comparison of matrices.
20. Write a program to overload new/delete operators in a class.
21. Write a program in C++ to highlight the difference between overloaded assignment operator and copy constructor.
22. Write a Program illustrating how the constructors are implemented and the order in which they are called when the classes are inherited. Use three classes named alpha, beta, gamma such that alpha, beta are base class and gamma is derived class inheriting alpha & beta.
23. Write a program to maintain the records of person with details (Name and Age) and find the eldest among them. The program must use this pointer to return the result

MCA SEMESTER – II
MCA225P - PROGRAMMING IN C++

Objectives: The primary objective for Programming in C++ is to Introduces the principles of data abstraction, class, inheritance and polymorphism, principles of virtual functions .

Course Content:

LIST OF EXPERIMENTS:-

1. 1. Program illustrating basic input/output operations using CIN, COUT.
2. Implementing class and objects.
3. Implementing function overloading.
4. Implementing various constructors and destructor
5. Program illustrating overloading of various operators.
6. Program illustrating use of Friend, Inline, Static Member functions, default arguments.
7. Program illustrating various forms of Inheritance
8. Program illustrating use of virtual functions, virtual Base Class.
9. Program illustrating use of file handling
10. Write a Program to design a class having static member function named show count () which has the property of displaying the number of objects created of the class
11. Write a Program which creates & uses array of object of a class.(for eg. implementing the list of Managers of a Company having details such as Name, Age, etc..).
12. Write a Program to find Maximum out of Two Numbers using friend function. Note: Here one number is a member of one class and the other number is member of some other class.
13. Write a Program to swap private data members of classes named as class_1, class_2 using friend function.
14. Write a Program using copy constructor to copy data of an object to another object.
15. Write a Program to allocate memory dynamically for an object of a given class using class's constructor.
16. Write a Program to design a class to represent a matrix. The class should have the functionality to insert and retrieve the elements of the matrix.
17. Write a program to design a class representing complex numbers and having the functionality of performing addition & multiplication of two complex numbers using operator overloading.
18. Write a Program to overload operators like *, <> using friend function. The following overloaded operators should work for a class vector.
19. Write a program for developing a matrix class which can handle integer matrices of different dimensions. Also overload the operator for addition, multiplication & comparison of matrices.
20. Write a program to overload new/delete operators in a class.
21. Write a program in C++ to highlight the difference between overloaded assignment operator and copy constructor.
22. Write a Program illustrating how the constructors are implemented and the order in which they are called when the classes are inherited. Use three classes named alpha, beta, gamma such that alpha, beta are base class and gamma is derived class inheriting alpha & beta.
23. Write a program to maintain the records of person with details (Name and Age) and find the eldest among them. The program must use this pointer to return the result.

24. Write a Program to illustrate the use of pointers to objects which are related by inheritance.
25. Write a program illustrating the use of virtual functions in class.
26. Write a program to show conversion from string to int and vice-versa.
27. Write a program showing data conversion between objects of different classes.
28. Write a program showing data conversion between objects of different classes and conversion routine should reside in destination class.
29. Write a program to copy the contents of one file to another.
30. Write a program to perform read/write binary I/O operation on a file (i.e. write the object of a structure/class to file).
31. Write a program to maintain a elementary database of employees using files.
32. Write a program for reading and writing data to and from the file using command line arguments
33. Write a program showing implementation of stack class having the functionality of push, pop operations.
34. Write program to implement a queue class with required operations/ functions.
35. Write a program to implement circular queue class with required operations/ functions.

COURSE OUTCOMES:

After completion of the Course, the student will be able to

- Have skill in developing applications for a range of problems using Programming in C++ techniques.

Reference Books:

1. David Parsons; Object oriented programming with C++; BPB publication
2. Object oriented programming in C++ by Robert Lafore: Galgotia
3. Balagurusamy; Object oriented programming with C++; TMH
4. Herbert Shildt, "The Complete Reference C++", Tata McGraw Hill publication

MCA SEMESTER – II
MCA226P - DBMS (ORACLE/MY SQL)

Objectives: The primary objective for DBMS (ORACLE/MY SQL) lab to explain basic database concepts, applications, data models, schemas and instances.

Course Content:

LIST OF EXPERIMENTS:-

1. Study of DBMS, RDBMS and ORDBMS.
2. To study Data Definition language Statements.
3. To study Data Manipulation Statements.
4. Study of SELECT command with different clauses.
5. Study of SINGLE ROW functions (character, numeric, Data functions).
6. Study of GROUP functions (avg, count, max, min, Sum).
7. Study of various type of SET OPERATORS (Union, Intersect, Minus).
8. Study of various type of Integrity Constraints.
9. Study of Various type of JOINS.
10. To study Views and Indices.
11. Implementation of DDL commands of SQL with suitable examples
    - Create table
    - Alter table
    - Drop Table
12. Implementation of DML commands of SQL with suitable examples
    - Insert
    - Update
    - Delete
13. Implementation of different types of function with suitable examples
    - Number function
    - Aggregate Function
    - Character Function
    - Conversion Function
    - Date Function
14. Implementation of different types of operators in SQL
    - Arithmetic Operators
    - Logical Operators
    - Comparison Operator
    - Special Operator
    - Set Operation
15. Implementation of different types of Joins
    - Inner Join
    - Outer Join
    - Natural Join etc.
16. Study and Implementation of
    - Group By & having clause

- Order by clause
- Indexing

17. Study & Implementation of
    - Sub queries
    - Views Study & Implementation of different types of constraints.
18. Study & Implementation of Database Backup & Recovery commands. Study & Implementation of Rollback, Commit, Savepoint.
19. Creating Database /Table Space • Managing Users: Create User, Delete User • Managing roles:- Grant, Revoke.
20. Study & Implementation of PL/SQL.
21. Study & Implementation of SQL Triggers.

COURSE OUTCOMES:

After the completion of the Course, the student will be able to

- Apply the basic concepts of Database Systems and Applications.
- Use the basics of SQL and construct queries using SQL in database interaction Design a commercial relational database system (Oracle, MySQL) by writing SQL using the system.
- Analyze and Select storage and recovery techniques of database system.

Reference Books:

- Elmasri, Navathe, "Fundamentals Of Database Systems", Addision Wesley.
- Korth, Silbertz, Sudarshan, "Database Concepts", McGraw Hill.
- Toledo; Data base management systems; TMH.
- Ashutosh Kumar Dubey "Data Base Management Concepts" Katson Publication.