

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES
DEVI AHILYA UNIVERSITY, INDORE**

M.C.A. (6 Years)

IV SEMESTER



JANUARY – MAY 2019

Sub. Code	Subject Name	L	T	P	C
IC-401C	Data & computer Communication	3	1	0	4
IC-402A	Discrete Mathematics	3	1	0	4
IC-403C	Micro processor and Assembly Language programming	3	1	0	4
IC-406C	Data Base Management Systems	3	1	0	4
IC-407A	Mini Project	0	0	0	4
IC-408A	Data Base Management System Lab	0	0	4	2
IC-410B	Micro processor and Assembly Language programming Lab	0	0	4	2
IC-409	Comprehensive Viva	0	0	0	4
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INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE

MCA(6 Years) IV SEMESTER

IC – 401C : Data and Computer Communication

Aim of Course: To gain an understanding of the fundamentals of data communications networks.

Objectives: The course is designed to make students:

- Understand basic data communication components.
- Understand the fundamentals of signaling and data transmission.
- Study data link layer and data link protocols.
- Study Network layer, MAC sub layer, LAN and its standards.

Course Contents:

UNIT- I

Introduction & Overview of Communication Systems:

Basis for Data Communication, Guided Transmission Media: Twisted Pair; Coaxial Pair; Fiber Optics, Multiplexing Techniques: FDM; WDM; TDM; STDM, Unguided Transmission Media: Wireless Communication; Cellular Radio; Satellite Communication.

UNIT- II

Network Model: The OSI model :layered Network Architecture,peer-to-peer Processes,Layers in the OSI Reference model,The TCP/IP Model,Addressing :Physical,Logical ,Port and specific addressing,Comparing and Contrasting-OSI & TCP/IP Model.

UNIT- III

Physical Layer and Media:

Digital Data, Digital Signal: NRZL; NRZI; Bipolar AMI; Pseudo Ternary; Manchester; Differential Manchester; B8ZS; HDB3, Digital Data, Analog Signal: ASK; FSK; PSK, Analog Data, Digital Signal: PCM; PAM; DM; ADM, Analog Data, Analog Signal: AM; FM; PM, Switching: Circuit switch networks, Datagram Networks, Virtual Circuit networks, Multiplexing techniques:FDM,WDM,TDM,STDM.

UNIT- IV

The Data Link Layer:

Data Link Layer Design Issue: Framing; Character Count; Character Stuffing; Bit Stuffing; Physical Layer Coding Violation: Error Control; Flow Control; Error Correcting Codes; Error Detecting Codes; Hamming Codes; CRC Code. Protocols: Stop & Wait Protocol, Unrestricted Stop & Wait Protocol, Simplex Stop & Wait Protocol, Protocol for Noisy Channel, Sliding Window Protocol, Go Back N, Selective Repeat, Verification using File State, HDLC Data Link Protocol, ISDN, ATM.

UNIT-V

The Medium Access Protocols:

The Medium Access Sub Layer: Channel Allocation; Static; Dynamic, Multiple Access Protocols: ALOHA; CSMA, Collision Free Protocols, Limited Connection Free Protocols, WDMA, Wireless LAN Protocols, Digital Cellular Radio. Overview of IEEE Standards.

Text Books:

1. Data Communications and Networking (IV Edition). B.A. Forouzan (Tata McGraw Hill Publications)

Reference Books:

1. Computer Networks (IV Edition), A.S. Tanenbaum (PHI Publications)
2. Data and Computer Communications, William Stallings (PHI Publications)
3. Data Communications and Networks, Achyut S. Godbole (Tata McGraw Hill Publications)

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE
MCA (6 Years) IV SEMESTER
IC-402A : Discrete Mathematics

Aim of Course: To familiarize the students with mathematical concepts that underline much of computer science, and to help them develop the skills to solve problems using them, whether they are in a more advance course, doing research, or working.

Objectives:

The course is designed to make students:

1. Enhance mathematical reasoning of students.
2. To understand Discrete Mathematics such as sets, permutations, relations, graphs, trees and finite-state machines.
3. Enhance algorithmic thinking of students.

Course Contents:

UNIT I

Set theory: Introduction, sets and elements, universal set and empty set, subsets, Multiset, Countable and uncountable sets, Venn diagrams, Set operations, Algebra of sets, Power sets, Partitions, Inclusion and exclusion, Mathematical induction, Ordered pair, Cartesian product, Computer representation of sets.

UNIT II

Relations: Introduction to relations, Pictorial representation of relations, Domain and range, Types of relations, Composition of relations, Equivalence relations, Partially ordered relations.

Functions: Introduction to functions, functions in terms of ordered pairs, Pictorial representation of functions, Types of functions: surjective, bijective, injective etc., Recurrence relations with applications to algorithm analysis

UNIT III

Logic: Propositions and logic operations, Existential and universal quantifiers, Tautologies, Contradiction, Contingency, Logical equivalence.

Boolean algebra: Combinatorial circuits and their properties, Boolean functions and synthesis of circuits.

Lattices: Partially ordered sets, Comparability, Chains and anti chains, Representation and construction of Hasse diagrams, Special elements in Posets, Lattice.

UNIT IV

Graph Theory-I: Definition and applications, Finite and infinite graphs, Incidence and degree, Isolated vertex, Pendent vertex, Types of graph, Subgraphs and isomorphic graph, Operations of graph, Paths, Cycles and connectivity, Eulerian and Hamiltonian graph, Planar graphs, Trees, Properties of trees, pendant vertices in a tree, distance and center, rooted and binary trees, spanning trees, fundamental circuits.

UNIT V

Graph theory-II: Cut sets and their properties, connectivity and separability, Network flows, 1 and 2 isomorphism, Matrix representation of graphs: Incidence and adjacency matrices, Diagraphs and shortest path algorithms, Applications of graphs, General discussion.

Reference Books:

1. J.P.Tremblay and R. Manohar . Discrete mathematical structures with applications to computer science, Tata McGraw Hill Publication
2. C.L.Liu . Elements of Discrete Mathematics, Tata McGraw Hill Publication
3. Llipschutz and Lipson. Discrete Mathematics, Schaum's outline series, Tata McGraw Hill Publication
4. K.A.Ross . Discrete Mathematics.
5. Bernard Kolman & Robert C. Busby. Discrete mathematical structures for Computer Science

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE
MCA (6 Years) IV SEMESTER
IC-403C: Microprocessor & Assembly Language Programming

Aim of Course: To introduce the basic concepts of microprocessor and assembly language programming.

Objectives:

The course is designed to make students:

- Develop an understanding of the operation of microprocessors.
- Learn assembly language programming.
- Learn the internal organization of some popular microprocessors.

Course Contents:

UNIT I

Microprocessor–Based Systems: Hardware and Interfacing, Microprocessors, Microcomputers and Assembly Language 8085, Architecture & Memory Interfacing I/O Devices.

UNIT II

Instruction Set and Addressing modes: Data transfer, Arithmetic, Logical, Branch & Machine control instructions, related programs & Addressing modes.

Additional Programming Techniques and Stack Operations: Subroutine, Counters & time delay, Code conversion, BCD arithmetic, 16 bit data operation.

UNIT III

Interrupt & Interfacing some peripheral I/O: Interfacing data converters, Programmable Interface Devices: 8155 I/O and Timer, 8279 Keyboard / Display interface.

UNIT IV

General purpose programmable peripheral devices: 8255 (Bidirectional data transfer between two computer) 8254 (Programmable Interval Timer), 8259A Interrupt Controller, 8237 DMA, Serial I/O Communication.

UNIT V

Other eight bit, sixteen-bit Microprocessor: Z80, MC-6800, MC-68000, NSC

Introduction to advance Microprocessor: 8086, 80286, 80386, Microcontroller 8051.

Text Books:

- R.S. Gaonkar, Microprocessor Architecture Programming and Application of 8085(Latest Edition).
- A. Nagoor Kani, 8085 Microprocessor and Its Application, Third Edition

Reference Book:

- Shridhar and Ghosh, 0000 to 8085 Microprocessor.
- Intel Corporation, Microprocessors and peripheral hand book.

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE
MCA (6 Years) IV SEMESTER

IC-406C: Data Base Management Systems

Aim of Course: To handle large database system and to be able to manipulate it efficiently and carry out analysis to design the database.

Objectives:

The course is designed to make students:

- To present necessary concepts for database designing.
- Design conceptual, logical database model and physical model.
- Evaluate set of query using SQL and algebra.
- Concepts of RDBMS, and learn Object oriented modeling

Course Contents:

UNIT I

Introduction, Purpose of Database System, View of data, Three Level -Architecture of DBMS, Data independence, Data models - Physical Model, Logical Model, Conceptual Model, Hierarchical data Model, Network data Model, relational data model, Object Oriented Model and their comparison, Database Languages, Transaction Management, Storage Management, Database Administrator, Database Users, Overall System Structure.

UNIT II

Entity-Relationship Model:- Basic Concepts, Design Issues, Mapping Constraint, Keys, Entity-Relationship Diagram, Weak-Entity Sets, Design of an E-R Database Scheme, Reduction of an E-R Schema to Tables.

UNIT III

Introduction to relational database systems, meaning of tuples, attributes, insertion, deletion, updating and retrieval in relational approach, various operations in relational approach like select, project, join, union.

UNIT IV

Structured Query Language:- Table Fundamentals, data types, creating ,viewing table, inserting, deleting, updating and modifying data in table, Applying data constraints-adding primary key, foreign key, unique key in table. Basic Structure, Set Operations, Oracle functions-string function,, numeric function, Aggregation Functions, Null Values, Nested Sub Queries, Joined Relation, Data Definition Language, Data Control Language, Data Transaction Language

Integrity Constraint:- Domain Constraint, Referential Integrity.

UNIT V

Relational Database Design:- Codd's 12 Rules, Pitfalls in Relational-Database Design, Decomposition, Functional Dependencies, Normalization up to 3NF.

UNIT VI

Introduction to VB and connectivity of database with VB.

Text Books:

- 1 A Silberschatz, H.F Korth, Sudersan "Database System Concepts" , MGH Publication.
- 2 Modern Database Management (5th Edition) (Hardcover) by Fred R. McFadden, Jeffrey A. Hoffer, Mary B. Prescott

Reference Books :

1. Elmasri & Navathe "Fundamentals of Database systems" – III ed.
2. B.C. Desai. "An introduction to Database systems" BPB.

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE
MCA(6yrs) IV SEMESTER
IC-408A DBMS Lab Assignment

Section -A

1. Study and implementation of following DDL commands:
 - a. CREATE TABLE
 - b. ALTER TABLE
 - c. DROP TABLE
 - d. RENAME
 - e. TRUNCATE TABLE
2. Study and implementation of following DML commands:
 - a. INSERT INTO
 - b. SELECT
 - c. UPDATE
 - d. DELETE
3. Study and implementation of following DCL commands:
 - a. GRANT
 - b. REVOKE
4. Study and implementation of following TCL commands:
 - a. COMMIT
 - b. ROLLBACK
 - c. SAVEPOINT

Section -B

1. Define the schema for the following databases with specific data type and constraints, the table name and its fields name are to be taken from database description which are given below :

A database is being constructed for storing sales information system.

A product can be described with a unique product number, product name, selling price, manufacturer name. The product can sale to a particular client and each client have it own unique client number, client name, client addresses, city, pin code, state and total balance to be required to paid. Each client orders to buy product from the salesman. In the order, it has unique sales order number, sales order date, client number, salesman number (unique), billed whole payment by the party or not and its delivery date.

The salesman have the name, addresses, city, pin code, state, salary of the sales man, delivery date, total quantity ordered, product rate.

- a) Draw an Entity Relationship diagram for above scenario. Make and state your assumptions where required.
- b) Convert above ER model into relational model in step by step manner.
- c) Write the SQL queries for the following –
 1. Create above tables with all constraints required and insert data into above tables.
 2. Retrieve the list of names and the cities of all the clients.
 3. List the various products available.
 4. Find the names of all clients having 'a' as the second letter in their names.
 5. List all the clients who are located in TEZPUR.
 6. Find products whose selling price is greater than 2000& less than or equal

to 5000

7. Add a new column NEW_PRICE into the product_master table.
8. Rename the column product_rate of Sales_Order_Details to new_product_rate.
9. List the products in sorted order of their description.
10. Display the order number and date on which the clients placed their order.
11. Delete all the records having delivery date before 25th August, 2008.
12. Change the delivery date of order number ON01008 to 16-08-08
13. Change the bal_due of client_no CN01003 to 1200
14. Find the product with description as 'HDD1034' and 'DVDRW'
15. List the names, city and state of the clients not in the state of 'ASSAM'
16. List of all orders that were canceled in the of March .

2. Consider the schema for the following databases with specific data type and constraints, the table structure is given below:

1.Employee F_Name varchar2(15) NOT NULL
 LName varchar2(15) NOT NULL,
 Emp_id varchar2(5) Primary Key,
 city varchar(10),
 Gender char(1) ,
 Emp_hire_date date
 Job_code varchar(5)
 Supervisor_id varchar(5)
 Dept_no number(4)
Constraint- Emp_id pK
Emp CHECK (Sex IN ('M', 'm', 'F', 'f')),
Supervisor_id Foreign key references emp_id of employee
Dept_no foreign key references Dep_no of Department

2.Department DName varchar(15) ,
 DepNo unumber(4)
 Mgr_id char(9) NOT NULL
Constraints- unique(DName),
Primary Key (DepNo),
Foreign Key (Mgr_id) REFERENCES employee (emp_id)

3.Project PName varchar(15) not ,
 PNumber number(5) not null,
 DepNo number(4),

Constraints - Primary Key (PNumber),
Foreign Key (DepNo) REFERENCES department (DepNo)

4.Works_on emp_id varchar(5) ,
 PNo number(5)

Constraints - Primary Key (ESSN, PNo),
Foreign Key (emp_id) REFERENCES employee (emp_id)
Foreign Key (PNo) REFERENCES project (PNumber)

5. Dependent

Emp_id varchar(5),
Dependent_Name varchar(15) not null,
gender char(1)

Constraints - Primary Key (emp_id, Dependent_Name),
Check (Gender IN ('M', 'm', 'F', 'f')),
Foreign Key (emp_id) REFERENCES employee (emp_id)

Write SQL queries for following:

1. Create above tables with all constraints mentioned.
2. Insert data into above tables.
3. Write the SQL code to change the job code to 501 for the person whose emp_id is '888665555'. After you have completed the task, examine the results, and then reset the job code to its original value.
4. Write the SQL code that lists all details of employees with a job code of 502.
5. Write the SQL code to delete the row for the person named William Smithfield, who was hired on June 22, 2004, and whose job code classification is 500. (*Hint*: Use logical operators to include all the information given in this problem.)
6. List the names of all employees who work in department 508.
7. Add a new column named salary in employee table.
8. List names and salaries of all employee ordered by salary.
9. List the name of employees whose salary is between 30000 and 50000.
10. List the name of employees who lives in Houston.
11. List department number and number of employees in each department, ordered by number of employees in each department
12. List department number and number of employees in departments that have more than 2 employees, ordered by department number.
13. List the emp_id of employees who works on project 3388 or project 1945.
14. list department with their manager name(join)
15. List the name of all female employees.
16. List the first name of all employee whose last name begins with letter 'sm'
17. Find the total no of departments.
18. Find the name of senior most employee (max(hire date))

19. Display from the Employees table the first name (fname), last name (lname), employeeID(emp_id) and job level (job_lvl) columns for those employees with a job level greater than 200; and rename the column headings to: "First Name," "Last Name," "IDENTIFICATION#" and "Job Level."
20. Show all the different projects for which employee work. Display only projects in which more than four employees are employed.
21. find emp_id of all employees working in the project in department named research
22. list employees who joined on the date on which 'john' joined.
23. Find the emp_id who works on project named 'projectF'
24. list the name of female dependents of employee named 'maria'
25. Execute query 23 using join.
26. List employee details along with their dependent's details(use join)
27. List employee details along with their dependent's details and also include employees those do not have dependents
28. List employees with their supervisor name.
29. Change the name of table employee to employee_details
30. List the name of employees who doesn't has supervisor
31. increase salary of employee with emp_id 5 by 10%
- 32 delete all the tables.

Section -C

1. Study and implementation of basic controls and their properties of Visual Basic 6.0 with help of designing simple forms.
2. Design a form for entering, storing and displaying employee details in employee table mentioned in question no. 2.

SQL Quick Reference

	Syntax
AND / OR	SELECT column_name(s) FROM table_name WHERE condition AND OR condition
ALTER TABLE	ALTER TABLE table_name ADD column_name datatype or ALTER TABLE table_name DROP COLUMN column_name

AS (alias)	SELECT column_name AS column_alias FROM table_name or SELECT column_name FROM table_name AS table_alias
BETWEEN	SELECT column_name(s) FROM table_name WHERE column_name BETWEEN value1 AND value2
CREATE DATABASE	CREATE DATABASE database_name
CREATE TABLE	CREATE TABLE table_name (column_name1 data_type, column_name2 data_type, column_name2 data_type, ...)
DELETE	DELETE FROM table_name WHERE some_column=some_value or DELETE FROM table_name (Note: Deletes the entire table!!) DELETE * FROM table_name (Note: Deletes the entire table!!)
DROP DATABASE	DROP DATABASE database_name
DROP TABLE	DROP TABLE table_name
GROUP BY	SELECT column_name, aggregate_function(column_name) FROM table_name WHERE column_name operator value GROUP BY column_name
HAVING	SELECT column_name, aggregate_function(column_name) FROM table_name WHERE column_name operator value GROUP BY column_name HAVING aggregate_function(column_name) operator value
IN	SELECT column_name(s) FROM table_name WHERE column_name IN (value1,value2,..)
INSERT INTO	INSERT INTO table_name VALUES (value1, value2, value3,...) or INSERT INTO table_name (column1, column2, column3,...) VALUES (value1, value2, value3,...)
INNER JOIN	SELECT column_name(s) FROM table_name1 INNER JOIN table_name2

	ON table_name1.column_name=table_name2.column_name
LEFT JOIN	SELECT column_name(s) FROM table_name1 LEFT JOIN table_name2 ON table_name1.column_name=table_name2.column_name
RIGHT JOIN	SELECT column_name(s) FROM table_name1 RIGHT JOIN table_name2 ON table_name1.column_name=table_name2.column_name
FULL JOIN	SELECT column_name(s) FROM table_name1 FULL JOIN table_name2 ON table_name1.column_name=table_name2.column_name
LIKE	SELECT column_name(s) FROM table_name WHERE column_name LIKE pattern
ORDER BY	SELECT column_name(s) FROM table_name ORDER BY column_name [ASC DESC]
SELECT	SELECT column_name(s) FROM table_name
SELECT *	SELECT * FROM table_name
SELECT DISTINCT	SELECT DISTINCT column_name(s) FROM table_name
SELECT INTO	SELECT * INTO new_table_name [IN externaldatabase] FROM old_table_name <i>or</i> SELECT column_name(s) INTO new_table_name [IN externaldatabase] FROM old_table_name
SELECT TOP	SELECT TOP number percent column_name(s) FROM table_name
TRUNCATE TABLE	TRUNCATE TABLE table_name
UNION	SELECT column_name(s) FROM table_name1 UNION SELECT column_name(s) FROM table_name2
UNION ALL	SELECT column_name(s) FROM table_name1 UNION ALL SELECT column_name(s) FROM table_name2
UPDATE	UPDATE table_name SET column1=value, column2=value,... WHERE some_column=some_value
WHERE	SELECT column_name(s) FROM table_name WHERE column_name operator value

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IC-410B Microprocessor and Assembly Language Programming Lab Assignment

1. Exchange of two variables through

(a) Memory Location (b) Two Register (c) Register and Memory location

2. Program to add 2 numbers from

(a) Two Memory Location (b) Two Register (c) Register and Memory location

3. Program to subtract 2 numbers from

(a) Two Memory Location (b) Two Register (c) Register and Memory location

4. Program to OR contents of register and accumulator.

5. Program to XOR contents of register and accumulator.

6. Program to check equality of 2 numbers.

7. Program to divide decimal 42 by 5 and store result in register D.

8. Program to multiply decimal 04 and 05.

9. Program to generate Fibonacci series at memory location from 2050 to 2059.

10. Program to find square root of decimal 36.

11. Program to find factorial of any number.

12. Program to find minimum of 10 numbers.

13. Program to find maximum of 10 numbers.

14. Program to add contents of memory location 2050 and 2051 and store result at 2090.

15. Program to find minimum of 2 numbers.

16. Program to AND contents of register and accumulator.

17. Program to multiply 2 decimal numbers in which result is greater than 8 bits.

18. Program to check 4th bit of a 8 bit number.

19. Program to add two 16 bit numbers.

20. Program to find summation ($n*n$) where n varies from 1 to 8.
21. Program to add 2 BCD numbers.
22. Program to arrange numbers in ascending order stored which are at memory location: 2050 to 2059.
23. Program to arrange numbers in descending order which are stored at memory location: 2050 to 2059.
24. Program to subtract two 16 bit numbers.
25. Program to demonstrate use of ADC.
26. Program to exchange contents of DE and HL register pair.
27. Program to implement UP counter.
28. Program to implement DOWN counter.
29. Program to convert a number from hexadecimal to binary.
30. Program to implement above question with help of sub routine.
31. Program to compliment contents of the accumulator.
32. Program to find smallest element in the array.
33. Program to find largest element in the array.
34. Program to arrange array in ascending order.
35. Program to arrange array in descending order.