



# DR. APJ ABDUL KALAM UNIVERSITY, INDORE

B.Sc. Under Graduate Semester wise Syllabus  
(w.e.f. session 2017-2018)

**Class: - B.Sc.**

**Semester: - III Semester**

**Subject: - Computer (BSS 301 T)**

**Paper: - DATA STRUCTURE USING C**

**Marks 85+15 CCE**

## Unit- I

**Introduction to Data Structures:** Definition of Data structure and Abstract data type

**Classification of Data structures:** Linear, non-linear, homogeneous, non-homogeneous, static & dynamic.

**Arrays:** Definition & types of array, Memory representation of one & two dimensional array, Operations: Insertion, Deletion, Traversal

**Sparse Matrix:** Definition & memory representation.

## Unit- II

**Stack:** Definition, Array implementation of stack (static stack) : Operations PUSH, POP, TRAVERSE.

**Applications of stack:** Infix, Prefix, Postfix representation and evaluation using stack, Use of stack in recursive implementation.

**Queue:** Definition, Array implementation of queue (static queue): Operations INSERT, DELETE, TRAVERSE.

**Introduction to Circular queue:** Definition & implementation, Priority queue, Double ended queue

**Applications of queue**

## Unit- III

**Introduction to Linked List:** Definition, advantages, Types of linked list: single, doubly, circular linked list

**Operations:** Creation, insertion, deletion & traversal of linked list

## Unit- IV

**Complexity of Algorithms:** Time & space complexity, Best-case, worst-case, average-case, Big -oh notation.

**Searching Algorithm:** Linear or sequential search, Binary search, Interpolation search using array. Complexity of Linear search, Binary search, Interpolation Search

**Sorting Algorithm:** Bubble sort, Selection sort, Insertion sort, Merge sort Complexity of sorting algorithm.

## Unit- V

**Introduction to Tree:** Definition, Binary tree: Definition, representation



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**Operations:** Traversal, insertion, deletion

**Binary search Tree (BST):** Definition and creation, Search using BST

**Introduction** to B-Tree & B+ tree.

## **Text Books:**

1. Yedidyah Langsam Moshe J. Augenstein, Aaron M. Tenenbaum, “**Data Structures using C & C++**”, PHI New Delhi, 2<sup>nd</sup> Edition.

## **Reference Books:**

1. G.S.Baluja, “**Data Structures Through C**”, Dhanpat Rai & Co., 4<sup>th</sup> Edition
2. Seymour Lipschutz, “**Data Structures**”, Schaum’s Outline Series, Tata Mc Graw Hill Publishing Company Ltd.
3. Adam Drodzsek, “**Data Structures & Algorithm in C++**”, 2<sup>nd</sup> Edition



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## Practical

**Subject: - Computer (BSS 301 P)**

**Paper: - Practical exercise on Data Structure using C**

1. Write a program for address calculation of an element in one and two dimensional array (row major order and column major order).
2. Write a program for insertion, deletion and traversal of elements of an array.
3. Write a program for sparse matrix implementation.
4. Write a program for complete implementation of stack using array with push, pop and traversal operations.
5. Write a program for conversion of an infix expression into postfix representation and evaluation of that postfix form.
6. Write a program for complete implementation of queue using array with insertion, deletion and traversal operations.
7. Write a program for complete implementation of circular queue using array with insertion, deletion and traversal operations.
8. Write a program for complete implementation of double ended queue using array with insertion, deletion and traversal operations.
9. Write a program to create singly link list (creation, insertion, deletion and traversal).
10. Write a program to create doubly link list (creation, insertion, deletion and traversal).
11. Write a program to create circular singly link list (creation, insertion, deletion and traversal).
12. Write a program to create circular doubly link list (creation, insertion, deletion and traversal).
13. Write a program for complete implementation of stack using link list with push, pop and traversal operations.
14. Write a program for complete implementation of queue using link list with insertion, deletion and traversal operations.
15. Write a program for implementation of binary tree (creation, insertion, deletion), with preorder, inorder and postorder traversal.
16. Write a program for implementation of binary search tree (creation, insertion, deletion), with preorder, inorder and postorder traversal.
17. Write a program for implementing graphs and showing depth first search and breadth first search traversals.
18. Write a program for linear search.
19. Write a program for Binary search.
20. Write a program for interpolation search.
21. Write a program for bubble sort.
22. Write a program for selection sort.
23. Write a program for insertion sort.
24. Write a program for merge sort.
25. Write a program for quick sort.



**B.Sc. Under Graduate Semester wise Syllabus**  
(w.e.f. session 2017-2018)

**Class: - B.Sc.**

**Semester: - IV Semester**

**Subject: - Computer (BSS 401 T)**

**Paper: - DATA BASE MANAGEMENT SYSTEM**

**Marks 85+15 CCE**

**Unit – 1**

Fundamentals of DBMS: Data, Information, Database & Computers, DBMS Definition, DBMS versus file processing system, Components of DBMS Environment, Instances & Schemas, Three Levels Architecture, Data Independence, Data Dictionary, Database Users, Data Administrators.

**Unit – 2**

Modeling the Real World, Various Data Models & their Comparison, Entity Relationship Models. RDBMS – Concept, Components, Data Integrity, Keys, Relational data Manipulations and Relational Algebra, Tuple Calculus.

**Unit – 3**

Normalization: Definition, Decomposition, Basic Concepts like FD, Objectives of Normalization. Normal Forms- First, Second, Third Normal Form, BCNF, Concept of Multi Valued Dependencies & Higher Normal Forms.

**Unit – 4**

Introduction to SQL, DDL, DML, and DCL statements, Creating Tables, Adding Constraints, Altering Tables, Update, Insert, Delete & various Form of SELECT- Simple, Using Special Operators for Data Access. Nested Queries & Exposure to Joins, Aggregate Functions.

**Unit – 5**

Transaction: Concept of Transaction, Concurrency Control-Problem & its Basis, Concurrency Control - Locks & Deadlocks. Recovery-Kind of Failures, Recovery Techniques, Security-Authentication, Authorization, Access Control

**Text Book:**

1.H. F. Korth & A. Silverschatz, Database concepts, Tata McGraw Hill, New Delhi.

**Reference Books:**

1. Elmasri & Navathe, Fundamentals of Database systems, Addison & Weisely, New Delhi.
2. C. J. Date, Database Systems, Prentice Hall of India, New Delhi.
3. Hoffer, Prescott & McFadden, Modern Database Management, 8/e
4. Ivan Bayross, SQL, PL/SQL, BPB Publications , New Delhi.



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B.Sc. Under Graduate Semester wise Syllabus  
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## Practical

Semester: - IV Semester

Subject: - Computer (BSS 401 P)

Paper: - Practical on Data Base Management System

1. Write a command to create following table structure, item-master.

|                      |             |
|----------------------|-------------|
| Column name          | datatype    |
| Itemcode             | char(4)     |
| Itemdesc             | varchar(25) |
| No_of_item_available | int         |
| Price                | int.        |

Condition are:- (1) itemcode is primary key

- (2) Itemdesc is not NULL
- (3) No\_of\_item\_available is non zero .
- (4) Price value should be 200 Rs.

2. The Department of an employee Raj Sharma table changed from finance to marketing. The department code of marketing is 003 & the employee code of raj Sharma 0015.both the department code & employee code are of char data type. Write update statement to update table employee.

3. News paper attribute data type
- |                    |             |
|--------------------|-------------|
| Newspapercode      | char (4)    |
| Newspaper name     | char(25)    |
| Region             | varchar(25) |
| Type of news paper | varchar(25) |
| City               | char(20)    |
| Country code       | char(3)     |
| Phnno              | Char(15)    |
- Second table
- |                |             |
|----------------|-------------|
| Newspaperadver |             |
| Newsadvo       | varchar (4) |
| Adstart date   | dates time  |

Write SQL command for:-

- (a) Phnno should be [0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9]
- (b) Country code should be 001 by default.
- (c) News paper code should  
primary key. Modify  
table->
  - (a) Newsadvo Should be primary key



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(b) News paper code should be foreign key.

4. Write a command to display the detail of all those employee who name at least 3-5 year experience.

| Attribute       | data type |
|-----------------|-----------|
| Employ code     | char      |
| Employ name     | char      |
| Department code | char      |
| DOJ             | date      |
| YOE             | int       |
| Employ grade    | char      |

5. The employee tables contain the employee name, address, age, salary of each employ. Write SQL command for-

- (a) Display all the detail of the employee
- (b) Whose age less than 40 year.
- (c) Salary is greater than 15000.

6. In a bank the customer table store's the detail of each customer. the bank has decided to give a 10% discount on all credit card's you want to generate a list of all customer who don't available the credit card facility. How do you generate the list? The structure of customer table.

| Column          | data type |
|-----------------|-----------|
| Customecode     | char      |
| Customername    | char      |
| Customeraddress | char      |
| Credit card     | int       |

7. Consider title table with column name, title, title type pub ID of char type, while price advance, royalty, ytd-sales is off int type.

- (a) Display the highest advance paid.
- (b) Display the lower advance paid.
- (c) Display the total no. of book.
- (d) Display total sales of book.

8. Write appropriate SQL command for following-

- (a) Increase the price of all items by 5%.
- (b) Update the quantity hold to 500 for item code 1001.
- (c) Delete a row from the item table where item code is 1001.
- (d) Update the price of item to 20 RS .

9. Write SQL definition command for each of the following

- (a) How would you add an attribute, CLASS, to the STUDENT table.
- (b) How would you remove the IS\_REGISTERED table?



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- (c) How would you change the field for FACULTY\_NAME from 25 characters to 40 characters?
10. Consider employee table  
Employee (empno., Name, depid, Basic, HRA, Deduction, Tax)  
(a) Get the name of employee in the department 'D1' and basic pay less than 6000.  
(b) Get the average HRA of an employee.  
(c) Find the total basic pay for all the employee in the department 'D1' whose basic pay is greater than 6000.  
(d) Find the name of the employee who get the maximum and minimum basic pay.
11. Consider the following table  
Emp\_master(emp\_no, fname, mname, lname, dept, design, branch\_no) Branch\_mastr(name, branch\_no)  
List the employee details along with branch names to which they belong.
12. Consider the following table  
Cust\_mstr (custno, fname, mname, lname) Addr\_dtls  
(code\_no,addr1,addr2,city,state,pincode)  
List the customer along with their multiple address details.
13. Consider table  
Book (Bookid, title, author, Publisher, year, price) Order\_details (Orderno, bookid, quantity) Publisher (pubid, name, city, country)  
Catalog (Bookid, title, authorid, pubid, category\_id, year, price) Author (authorid, name, city, country)  
1. Get the title and price of all the books whose price is less than the average price of the books.  
2. Get the name of all authors who have more than two books in the catalog.  
3. Get the name of all the books for which an order has been placed.
14. Consider table Order (ordered, order\_detail, qty, price)  
a) Alter table Order add column amount.  
b) Modify data type of price column from character to int.
15. Consider table  
Product\_master(Product\_no,description,profit\_percent,unit\_measure,qty\_on\_hand,reorder, sell\_price, cost\_price).  
Client\_master(Clientno, name, city, pincode, state, bal\_due)  
Salesman\_master(Salesmanno, salesmanname,address1,address2, city, pincode, state, sal\_amt, tgt\_to\_get, Ytd\_sales, remark)  
1. Find out the names of all the clients.  
2. Retrieve the entire contents of the client\_master table.  
3. Retrieve the list of names and the cities of all the clients.



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4. List the various products available from the product\_master table.
5. List all the clients who are located in Bombay.
6. Find the names of the salesman who have a salary equal to Rs. 3000.

### 16. Consider table

Client\_master (Client\_no, name, city, pincode, state, bal\_due).

Product\_master (Product\_no, description, profit\_percent, unit\_measure, qty\_on\_hand, reorder, sell\_price, cost\_price).

Salesman\_master (Salesmanno, salesmanname, address1, address2, city, pincode, state, sal\_amt, tgt\_to\_get, Ytd\_sales, remark)

1. Change the city of client\_no 'C00005' to 'Bombay'.
2. Change the bal\_due of client\_no 'C00001' to Rs. 1000.
3. Change the cost price of '1.22 Floppies' to Rs. 950.00.
4. Change the city of the salesman to Mumbai.

### 17. Consider table

Product\_master(Product\_no,description,profit\_percent,unit\_measure,qty\_on nd, reorder, sell\_price, cost\_price).

Client\_master(Clientno, name, city, pincode, state, bal\_due)

Salesman\_master(Salesmanno, salesmanname,address1,address2, city, pincode, state, sal\_amt, tgt\_to\_get, Ytd\_sales, remark)

1. Delete all salesman from salesman\_master whose salaries are equal to Rs. 3500.
2. Delete all products from product\_master where the quantity on hand is equal to 100.
3. Delete from client\_master where the column state hold the value 'Tamil Nadu'.

### 18. Consider employee table

Employee (empno, name, depid, basic, hra, deduction, tax)

1. Get the number of rows in a table
2. Find the department wise average pay of the employees.
3. Find the name of the employees whose basic pay is greater than the average basic pay.
4. Find the name of the employee who gets the basic pay.

19. The employee table stores the details of employees such as employee code, employee name, department code, date of joining, years of experience and the employee grade. Display only those grades in which the number of employees is more than 100.

The table structure of the employee table is shown below:

Employee(emp\_code, emp\_name, Dept\_code, Doj, Yrs\_exp, Emp\_grade)

20. Explain set operation command with example.