

INSTITUTE OF SCIENCE, NAGPUR.

(An Autonomous Institute of Government of Maharashtra)

Department of Computer Science



B.Sc. Computer Science

Program Structure

And

Syllabus

(TO BE IMPLEMENTED FROM 1 JULY 2021)



INSTITUTE OF SCIENCE, NAGPUR
(An Autonomous Institute of Government of Maharashtra)
Department of Computer Science

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INSTITUTE OF SCIENCE, NAGPUR
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Department of Computer Science

Program and Course Codes

Semester	Paper	Name of the Paper	Paper Code
I	I	PROGRAMMING IN C	BCSFS11
	II	FUNDAMENTALS OF INFORMATION TECHNOLOGY	BCSFS12
	Laboratory Coursework Practical	PRACTICAL -1 BASED ON PROGRAMMING IN C	BCSFS13
II	I	OBJECT ORIENTED PROGRAMMING USING 'C ++'	BCSFS21
	II	SYSTEM ANALYSIS AND DESIGN	BCSFS22
	Laboratory Coursework Practical	PRACTICAL -2 BASED ON Object Oriented Programming using 'C ++'	BCSFS23
III	I	DATA STRUCTURES	BCSSS31
	II	OPERATING SYSTEMS	BCSSS32
	Laboratory Coursework Practical	PRACTICAL -3 BASED ON DATA STRUCTURE (USING C++)	BCSSS33
IV	I	JAVA PROGRAMMING	BCSSS41
	II	LINUX OPERATING SYSTEM	BCSSS42
	Laboratory Coursework Practical	PRACTICAL -4 BASED ON JAVA PROGRAMMING	BCSSS43
V	I	VISUAL BASIC PROGRAMMING	BCSTS51
	II	DATABASE MANAGEMENT SYSTEM	BCSTS52
	Laboratory Coursework Practical (if applicable)	PRACTICAL -5 BASED ON VISUAL BASIC PROGRAMMING	BCSTS52
VI	I	COMPILER CONSTRUCTION	BCSTS61
	II	SQL AND PL/SQL	BCSTS62
	Laboratory Coursework Practical (if applicable)	PRACTICAL -6 BASED ON SQL AND PL/SQL (ORACLE)	BCSTS63



INSTITUTE OF SCIENCE, NAGPUR
(An Autonomous Institute of Government of Maharashtra)
Department of Computer Science

UG Structure
Bachelor of Science (B. Sc.) Computer Science
Implemented from
Academic Year 2021 -2

Semester	Paper	Name of the Paper	Paper Code	Credits
I	I	PROGRAMMING IN C	BCSFS11	06
	II	FUNDAMENTALS OF INFORMATION TECHNOLOGY	BCSFS12	
	Laboratory Coursework Practical	PRACTICAL -1 BASED ON PROGRAMMING IN C	BCSFS13	
II	I	OBJECT ORIENTED PROGRAMMING USING 'C ++'	BCSFS21	06
	II	SYSTEM ANALYSIS AND DESIGN	BCSFS22	
	Laboratory Coursework Practical	PRACTICAL -2 BASED ON Object Oriented Programming using	BCSFS23	
III	I	DATA STRUCTURES	BCSSS31	06
	II	OPERATING SYSTEMS	BCSSS32	
	Laboratory Coursework Practical	PRACTICAL -3 BASED ON DATA STRUCTURE (USING C++)	BCSSS33	
IV	I	JAVA PROGRAMMING	BCSSS41	06
	II	LINUX OPERATING SYSTEM	BCSSS42	
	Laboratory Coursework Practical	PRACTICAL -4 BASED ON JAVA PROGRAMMING	BCSSS43	
V	I	VISUAL BASIC PROGRAMMING	BCSTS51	06
	II	DATABASE MANAGEMENT SYSTEM	BCSTS52	
	Laboratory Coursework Practical (if applicable)	PRACTICAL -5 BASED ON VISUAL BASIC PROGRAMMING	BCSTS52	
VI	I	COMPILER CONSTRUCTION	BCSTS61	06
	II	SQL AND PL/SQL	BCSTS62	
	Laboratory Coursework Practical (if applicable)	PRACTICAL -6 BASED ON SQL AND PL/SQL (ORACLE)	BCSTS63	

Marking Scheme of Syllabus

Faculty of Science B.Sc. Semester-I to VI (Computer Science)

Semester	Paper	Total Periods / Week		Marks		Total Marks	Total Marks
				Theory / Practical	Internal		
I to II	I	3	01	50	10	60	150
	II	3	(Tutorial)	50	10	60	
	Laboratory Course (Practical)	06		30	--	30	
III to VI	I	3	01	50	10	60	150
	II	3	01	50	10	60	
	Laboratory Course (Practical)	06		30	--	30	

1. Th = Theory; Pr = Practical; Tu = Tutorial; IA = Internal Assessment; @ = Tutorials wherever applicable; * = If required, for two days.

2. Minimum marks for passing will be 40% of the total marks allotted to that paper / practical.

3. Candidate has to pass theory papers and practical separately

Guidelines for Internal Assessment, Theory paper pattern and Practical

a) The internal assessment marks assigned to each theory paper as mentioned shall be awarded on the basis of assignments like class test, attendance, project assignments, seminar, group discussions or any other innovative practice / activity.

b) There shall be one / two assignments (as described above) per Theory paper.

c) The theory question papers shall be of 3 hours duration and comprise of 5 questions with equal weightage to all units.

d) The pattern of question papers is

- Each theory paper will be of 50 marks
- All questions are compulsory and will carry equal marks.

- Question paper for any theory paper will comprise of five questions of 10 marks
- Question No. 1 to 4 will be from four units each with an internal choice. The questions can be asked in the form of long answer type for 10 marks or two questions / short notes of 5 marks each or four questions / short notes of 2½ each
- Question No. 5 shall be compulsory with three questions / notes of very short answer type from each of the four units having 1 mark each. The student shall have an option of answering any 10 questions out of the 12 questions.

e) Practical:

Practical exam shall be of 4 to 8 hours duration for one or two days, depending on subject and number of students.

Valuation Pattern-

In practical examination a student has to perform any one exercise from the list prescribed in the syllabus and it is to be executed on machine.

The valuation scheme of practical examination will be as under.

Record	-	06
Viva	-	06
Writing	-	09
Execution	-	09
TOTAL	-	30

INSTITUTE OF SCIENCE, NAGPUR

(An Autonomous Institute of Government of Maharashtra)

DEPARTMENT OF COMPUTER SCIENCE



Bachelor of Science (B.Sc.) Semester Pattern

Computer Science Syllabus

(COM/UG/2021/01)

(To be Implemented from 2021-2022)

SUBJECT: COMPUTER SCIENCE

B.SC. –I SEMESTER - I

BCSFS11: PAPER- I (PROGRAMMING IN ‘C’)

OBJECTIVES:

1. The objective of this course is to make the student understand programming language concepts, mainly control structures, reading a set of data, stepwise refinement, function, control structure and arrays.
2. After completion of this course, the student is expected to analyze the real life problem and write a program in ‘C’ language to solve problem. The main emphasis of the course is on problem solving aspect that is, developing proper algorithms.

OUTCOMES:

By the end of this Programme, the students will be able to:

1. Understand programming structures like Sequence, Selection, Iteration and Modular.
2. Understand development tools such as algorithm, flowchart and pseudo code for any problem to solve them programmatically.
3. Understand basic concepts of programming in C such as character set, Operators, Functions etc.
4. Understand arrays, strings, functions, structures, unions and pointers.
5. Understand the file handling, sequential access and random access programmatically.

Unit-I

(7.5 Hrs)

Programming Structure-Sequence, Selection, Iteration and Modular. Problem Solving techniques:
Development Tools: Algorithm, Flowcharts and Pseudo code (Definition and its characteristics)
Developing Algorithm and Drawing flowcharts

Unit-II

(7.5 Hrs)

C Character set, Tokens, Identifier, Keywords, Variables, Data types, Qualifiers. Operators and Expressions: Arithmetic, Relational, Logical, Bit-Wise, Increment, Decrement, Conditional and Special operators. typedef, Type Conversion, Constants, Declaring Symbolic Constants, Character Strings, Enumerated Data Types, Operator Precedence and Associativity. Library functions. : Maths, string handling Functions. Control Structure: Compound Statement, Selection Statement: if, if-else, Nested if, switch. Iteration statement: for, while, do..while, Nested loops, Jump statement: break, continue, goto. (Special emphasis on problem solving)

Unit-III

(7.5 Hrs)

Arrays- Need, Types: Single and Two Dimensional Array, **Strings-** Strings Manipulation, Arrays of Strings, Evaluation order, **Function-** Function Components, Return Data type, Parameter Passing, Return by Reference, Default Arguments, Recursive Functions, Arrays with Functions, Storage Classes. (Special emphasis on problem Solving)

Unit-IV

(7.5 Hrs)

Structure- Declaration, Definition, Accessing structure members, Initialization, Nesting of Structures, **Union:-** Unions, Differences between Structure and Union, **Pointer:-** Introduction, Address Operator (&), Pointer variables, void pointers, Pointer Arithmetic, Pointers to Pointers, **File handling:-** Hierarchy of File Stream Classes, Opening & closing a file, Testing for errors, File Modes, File pointers and their manipulations, Sequential Access, Random Access , Command Line arguments.

SUBJECT: COMPUTER SCIENCE

B.SC. –I SEMESTER - I

BCSFS12: PAPER- II (FUNDAMENTALS OF INFORMATION TECHNOLOGY)

OBJECTIVES:

1. Fundamentals of Computing provides a clear, concise introduction to the fundamentals of computer science.
2. The course contents generate excitement, curiosity, and enthusiasm in students to learn more about the fascinating world of computing.

OUTCOMES:

By the end of this Programme, the students will be able to:

1. Understand the meaning and basic components of a Digital computer system
2. Understand the role of CPU, BUS, Number System, and Language Evaluation
3. Understand the concept of Compilers, Interpreters and Assembler
4. Understand the concepts and need of primary and secondary memory, different storage devices
5. Explain input devices and output devices.
6. Explain Network concepts, LAN, WAN Man, Network protocols etc.

Unit-I

(7.5 Hrs)

(A) Basic Components of Digital Computers- Block Diagram. CPU: Functions of Each Unit: Primary Memory, ALU and CU, Instruction format. Bus: Data, Control and Address Bus Number Systems: Binary, Octal, Decimal, HexaDecimal, Their Conversions, Binary Arithmetic. ASCII, BCD, EBCDIC.

(B) Language Evolution- Generation of Languages : Machine, Assembly, High Level Languages. Characteristics of Good Language Translators : Compiler, Interpreter and Assembler. Source and Object Program.

Unit-II

(7.5 Hrs)

(A) Memory- Static & dynamic, RAM, ROM, PROM, EPROM, EEPROM, flash and Cache.

(B) Storage Devices:- Hard Disk, Zip Disk and Optical Disk. Pen Drive, Blue Ray

Unit-III

(7.5 Hrs)

(A) Input Devices- Keyboard, Mouse, Light Pen, Touch Screen, Voice Input , MICR, OCR, OMR, Barcode Reader and Flatbed Scanner.

(B) Output Devices:- VDU, Printers: Dot Matrix, Laser and Inkjet. Plotters: Drum, Flat-Bed and Inkjet.

Unit-IV

(7.5 Hrs)

(A) Network- Network terminology, Topologies : Linear, Circular, Tree and Mesh. Types of Networks: LAN, WAN, MAN. Repeaters, Bridge, Routers, Brouters and Gateway. Modem for Communication between pc's, wi-fi network, Introduction of Bluetooth and Infrared devices. Network protocols.

(B) Architecture- Peer-to-Peer, Client/Server.

BCSFS13: LABORATORY COURSE PRACTICAL LIST

- 1) Program to Compute Fibonacci series
- 2) Program to find if a given number is prime or not.
- 3) Program to accept a number and display it in words
- 4) Program to find the sum of digits of any entered no.
- 5) Program to reverse the digit.
- 6) Program to find the frequency of occurrence of a given number from an array of N elements.
- 7) Program to reverse the array.
- 8) Program to Insert an element in One dimensional Array at a given position.
- 9) Program to Delete an element from One dimensional Array.
- 10) Program to Arrange string data (name of students) in alphabetical order using bubble sort.
- 11) Program to search the element in an array of N elements using
 - a) Linear search method
 - b) Binary search
- 12) Program to
 - a) Multiply two Two dimensional Array's (3 X 3 matrix)
 - b) Find largest element in Two dimensional Array (3 X 3 matrix).
- 13) Program
 - a) To Check if given String is Palindrome or not
 - b) To calculate number of blanks, vowels and words from entered phrase.
- 14) Program to
 - a) compute Cosine series : $\cos x = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \dots$
 - b) Compute Sine series : $\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$
- 15) Program to find Factorial of a number using recursive function.
- 16) Program using function to find sum of two numbers
 - a) With no argument & no return values
 - (b) With argument & no return values
 - (c) With argument & return values
- 17) Program to demonstrate passing structure to functions. Fields are empno, name, Basic
 - a) Call by Value
 - b) Call by reference
- 18) Program to
 - a) swap values of two variables by passing pointers.

- b) Read two integers and determine bigger of the two with the help of function big() returning an integer pointer.
- 19) Create a sequential file and perform following operation fields are Roll, Name, M1, M2, M3
 - a) Add records
 - b) Process & Display output.

Text Books:

1. The Art of programming through flowcharts & algorithm by Anil B. Chaudhari Firewall Media, Laxmi publication, New Publication.
2. Programming in C by E. Balagurusamy TMH Publications.
3. Information technology concepts by Dr. Madhulika Jain, Shashank & Satish Jain, [BPB Publication, New Delhi.]
5. Fundamentals of Information Technology By Alexis And Mathews Leon [Leon Press, Chennai & Vikas Publishing House Pvt Ltd, New Delhi]

Reference Books:

1. C Programming - Kernighen Ritche
2. Programming with C – Y. Kanetkar.
3. C Programming – Holzner, PHI Publication.
4. Programming in C – Ravichandran.

SUBJECT: COMPUTER SCIENCE

B.SC. –I SEMESTER - II

BCSFS21: PAPER- I (OBJECT ORIENTED PROGRAMMING USING ‘C++’)

OBJECTIVES:

1. The objective of this course is to make the student understand advanced programming language concepts, and apply those concepts to solve complex real-life problems.
2. Also, the advanced topics in C++ language are covered

OUTCOMES:

By the end of this Programme, the students will be able to:

1. Understand key structured programming, constructs declaration sequence, selection, repetition evaluating expression.
2. Understand C++ functions and the concepts related to good modular designs.
3. Understand pointers and reference parameters; understand the creation of class and objects.
4. Handle files programmatically creating dynamic objects.
5. Understand inheritance virtual functions, need and pure virtual functions.
6. Understand mechanism of inline function, constructors, destructors, operator overloading and exception handling.

Unit-I

(7.5 Hrs)

(A) Object Oriented Methodology- Elements of Object Oriented programming, Objects, Classes, OOPs features.

(B) Classes & Objects- Specifying a Class, Creating Objects, Accessing Class members, Defining member function, Outside Member Functions as inline, Accessing Member Functions within the class, Static data member, Access Specifiers: Private, Protected and Public Members.

Unit-II

(7.5 Hrs)

(A) Constructors & Destructors- Introduction, Parameterized Constructors, Constructor Overloading, Constructors with Default Arguments, Copy Constructor, Destructor, Order of Construction and Destruction, Static data members with Constructor and Destructors.

(B) Operator Overloading- Definition, Overloadable Operators, Unary Operator Overloading, Unary & Binary overloading, Rules for Operators Overloading.

Unit-III

(7.5 Hrs)

(A) Dynamic Objects- Pointers to Objects, Creating and Deleting Dynamic Objects: New and Delete operators, Array of Objects, Array of Pointers to Objects, Pointers to Object Members, this Pointer.

(B) Inheritance- Defining, Abstract classes, Single, Multilevel, Multiple, Hierarchical, Hybrid Inheritance, Constructor and Destructor in Derived Classes.

Unit-IV

(7.5 Hrs)

(A) Virtual Functions- Need for Virtual Functions, definition, Pure Virtual Functions, Abstract Classes, Rules for Virtual Functions.

(B) Exception Handling- Exception Handling Model, List of Exceptions, Handling Uncaught Exceptions, Fault Tolerant Design Techniques, Memory Allocation Failure Exception, Rules for Handling Exception Successfully.

SUBJECT: COMPUTER SCIENCE

B.SC. –I SEMESTER - II

BCSFS22: PAPER- II (SYSTEM ANALYSIS AND DESIGN)

OBJECTIVES:

1. The objective of this course is to cover the structure of an organization, importance of information and the systems needed for effective capture, store, retrieve, process and analyse information.

OUTCOMES:

By the end of this Programme, the students will be able to:

1. Carry Feasibility Study of system, Gather data to analyze and specify requirements of a system
2. Design system components and environment
3. Develop data flow diagram and decision tables to design system
4. Understand the concept of Implementation, Testing and Conversion of system
5. Work as an effective team member on assigned projects.
6. Understand the concept of Software Reliability and Quality Management.

Unit-I

(7.5 Hrs)

(A) Introduction- System, Subsystems, Components of Computerized Information System, Systems Analysts, SDLC, Prototyping.

(B) Feasibility Study and Analysis- Identifying Problems, Organizing Feasibility Analysis: Economic, Financial, Organizational and Technological. Feasibility Decision, Choice of a solution.

(C) Data Collection- Interviews, Brain Storming, Questionnaires, Document Search, Observation.

Unit-II

(7.5 Hrs)

(A) Structured tools and techniques of Data analysis- Structured English, Process Charts, SOP, Decision Tables and Decision Trees, Data Flow Diagram, Data Dictionary (Special emphasis on problem solving)

(B) System Design- Input design: Input Validation, Human factor Consideration, Messages, System Tolerance. Output design: Categories of output, Design Principles, Control of Output. **(C) Forms-** Principles of Form Design, Ways to ensure Quality Forms.

(D) Codes- Types, Physical Representation of Codes, Principle of Code Design.

Unit-III

(7.5 Hrs)

(A) Implementation- Training, Operational Training and Related Activities, Planning to Implement Change, Change Strategies.

(B) Testing- Preparation for Testing, Test Execution: Levels of Testing, Component, Function, Subsystem, System, Test Evaluation, Acceptance.

(C) Conversion- Cold Turkey, Parallel, Pilot, Modular and Sequential Methods. Conversion Period Length. System Evaluation.

Unit-IV

(7.5 Hrs)

(A) Project Planning, Metrics for Project Size Estimation, Project Estimation Techniques, Scheduling- Work Breakdown Structure, Activity Networks and CPM, Gantt Charts, PERT Charts, Project Monitoring and Control. Risk Management, Software Configuration Management: Necessity, Configuring Management Activities

(B) Software Reliability and Quality Management- Software Reliability, Software Quality, ISO 9000. Software Maintenance: Characteristics of Software Maintenance, Maintenance Process Models, Estimation of Maintenance Cost.

(C) Software Reuse- What can be reused, Why no reuse so far, Basic Issues

BCSFS23: LABORATORY COURSE PRACTICAL LIST

- 1) Demonstrate the usage of Constructor and Destructor.
 - i) Define a class data with data member acct_no, balance containing constructor data to initialize data member and a member function display for output.
- 2) Program to demonstrate usage of a constructor and Destructor function. Declare a class with public data member count. The class containing one constructor and destructor to maintain updated information about active objects i.e. i) No of objects created. ii) No of objects Destroyed.
- 3) Program to accept the distance between city 1st & 2nd, city 2nd & 3rd. calculate the distance between city 1st & 3rd. Define a class road with private data member km, m, d1, d2, d3 containing member function getdata to accept values of d1, d2 and calculate for calculating distance.
- 4) Demonstrate the use of operators overloading (string manipulation: + for concatenation and relational operators for alphabetical comparison).
- 5) In a bank N depositor deposit the amount, write a program to find total amount deposited in the bank. Declare a class deposit with private data member Rupee and Paisa containing member function getdata, putdata.
 - i) Use array of objects
 - ii) Use Operator '+' overloading.
- 6) Declare class event and accept time of first event and second event and find the difference between 1st and 2nd event. Containing public member function getdata and display with private data member hour, minute, second and total.
 - i) Use Operator '-' overloading.
- 7) Program to demonstrate Single Inheritance. Declare a class B and derive publically class D from B.
 - i) The class B contains private data member a, public data member b with member function get_ab, get_a, show_a.
 - ii) The derived class D contains data member c with member function mul and display.
- 8) Program to demonstrate Multiple Inheritances. Declare class M and N and derive publically class P from M and N.
 - i) Declare a class M with protected data member m and public member function get_m.

- ii) Declare a class N with protected data member n containing member function get_n.
- iii) Declare class P containing member function display.
- 9) Program to demonstrate Multilevel Inheritance. Declare a class student and derive publically a class test and derive publically class result from class test.
 - i) The class student contains protected data member roll_number with public member functions get_number and put_number.
 - ii) The class test containing protected data member sub1, sub2 with public member function get_marks and put_marks.
 - iii) The class result contains data member total and public member function display.
- 10) Program to demonstrate Hierarchical Inheritance. Declare a class Side and derive publically class Square from base class side and also derive publically class cube from base class side.
 - i) Class Side contains protected data member L with a member function set_values.
 - ii) Class Square contains member function sq.
 - iii) Class Cube contains member function cub.
- 11) Program to demonstrate usage of normal virtual function and pure virtual Function with abstract class.
- 12) Program to determine whether the input is +ve or –ve through exception.
- 13) Program to raise exception if an attempt is made to perform divide-by-zero.

Text Books:

1. Mastering C++ by K R Venugopal Tata McGraw-Hill , New Delhi.
2. Information Systems Analysis, Design and Implementation By K. M. Hussain Donna 3. Hussain [Tata McGraw-Hill Publishing Company Ltd, New Delhi]
4. Fundamentals of Software Engineering by Rajib Mall [PHI Publication]
5. Workbook on Systems Analysis & Design by V. Garg [PHI Publication]

Reference Books:

1. The C++ Programming Language –Bjarne Stroustrup
2. Programming with C++ - Ravichandran
3. Programming with C++ - Robert Lafore
4. Object Oriented Programming with C++ by E. Balagurusamy, McGraw Hill
5. System Analysis and Design- Don Yeates, shiebls, Helmy (M).

6. System Analysis & Design - Edward –TMH
7. System Analysis and Design – Satzinger, Robert Jackson and Stephen Burd, Thomson Learning
8. Introduction to Systems Analysis Design, Igor Hawryszkiewicz, PHI

SUBJECT: COMPUTER SCIENCE
B.SC. – II SEMESTER - III
BCSS31: PAPER- I (DATA STRUCTURES)

OBJECTIVES:

1. To learn the systematic way of solving problem and to understand the different methods of organizing large amount of data
2. To efficiently implement the different data structures and to efficiently implement solutions for specific problem

OUTCOMES:

By the end of this Programme, the students will be able to:

1. Determine appropriate data structure as applied to specified problem definition.
2. Understand the concept of Linked List, Double linked List and their representation
2. Explain the different mechanism involved in memory Mgt.
3. Understand the concept of avoidance, detection and prevention of Deadlock.
4. Explain Trees in Memory, Definition and Representation of Graphs in Memory

Unit-I

(7.5 Hrs)

Linked List- Linked List, Representation of Single, Double, Header, Circular Single and Double Linked list, All possible operations on Single and Double linked List using Dynamic representation, Polynomial Representation and its Manipulation.

Unit-II

(7.5 Hrs)

Stacks- Stacks terminology, Representation of Stacks in Memory, Operation on Stacks, Polish Notations, Translation of infix to postfix & prefix expression, Infix to Postfix Conversion, Evaluation of Postfix Expression, Recursion, Problems on Recursion, Quick Sort and Tower of Hanoi Problem.

Unit-III

(7.5 Hrs)

(A) Queue- Representation of Queues in Memory, Circular Queue. Dequeue and Priority Queue. Operations of above Structure using Array and Linked Representation.

(B) Sorting And Searching- Selection Sort, Insertion Sort, Merge Sort, Efficiency of Sorting Methods, Big-O Notations. Hash Tables, Hashing Technique, Collision Resolution Technique.

Unit-IV**(7.5 Hrs)**

(A) Trees- Basic Terminologies, Representation of Binary Trees in Memory, Traversing of Binary tree, Binary Search Tree, Operation on Binary Search Tree, Heap Tree, Operation on Heap Tree, Heap Sort Method

(B) Graphs- Basic Terminologies, Definition and Representation of Graphs in Memory: Linked List and Matrix Representation. Traversing graphs : BSF, DFS Method.

SUBJECT: COMPUTER SCIENCE

B.SC. – II SEMESTER - III

BCSS32: PAPER- II (OPERATING SYSTEMS)

OBJECTIVES:

The objective of this course is

- 1) To make student learn the basic functions & structure of operating systems and various commands & operations.
- 2) To understand design issues related to process management and various related algorithms
- 3) To understand design issues related to memory management and various related algorithms
- 4) To understand design issues related to File management and various related algorithms

OUTCOMES:

By the end of this Programme, the students will be able to:

1. Understand the basic of Structure of Operating System, Characteristics of Modern OS
2. Understand the anatomy of Process Management, CPU Scheduling Algorithm
3. Understand the concept of deterministic Modelling, Dead Lock Prevention, Dead Lock Detection, Recovery from Deadlock
4. Explain paging, segmentation, Segmentation with paging. Protection
5. Understand file management, Buffering.

Unit-I

(7.5 Hrs)

(A) Operating System:- Structure of Operating System, Operating System functions, Characteristics of Modern OS.

(B) Process Management- Process states, Creation, Termination, Operations on Process, Concurrent process, Processes Threads, Multithreading, Micro Kernels

(C) CPU Scheduling- Schedulers, Scheduling Methodology, CPU Scheduling Algorithm: FCFS, SJF, RR, Priority Scheduling.

Unit-II

(7.5 Hrs)

(A) Performance comparison- Deterministic Modeling, Queuing analysis, Simulators.

(B) Deadlock and Starvation- Resource Allocation Graph, Conditions for Dead Lock, Dead Lock Prevention, Dead Lock Detection, Recovery from Deadlock.

Unit-III**(7.5 Hrs)**

(A) Memory Management- Logical Vs. Physical Address Space, Swapping, Memory Management Requirement, Dynamic Loading and Dynamic Linking,

(B) Memory Allocation Method- Single Partition allocation, Multiple Partitions, Compaction, paging, segmentation, Segmentation with paging. Protection.

Unit-IV**(7.5 Hrs)**

(A) I/O Management- I/O hardware, I/O Buffering, Disk I/O, Raid, Disk Cache.

(B) File Management- File Management system, File Accessing Methods, File Directories, File Allocation Methods, File Space Management, Disk Space Management, Record blocking.

(C) Protection Mechanisms- Cryptography, Digital Signature, User Authentication.

BCSS33: LABORATORY COURSE PRACTICAL LIST

- 1) Program to insert a node at the beginning, at the end and in the middle of the given linked list.
- 2) Program to delete a node at the beginning, at the end and in the middle of the given linked list.
- 3) Program to create a linked list of customer names and their telephone numbers. (Using Menu Driven and include features of adding a new Customer and deleting an existing Customer.)
- 4) Program to reverse a linked list.
- 5) Program to search a value in the given linked list.
- 6) Program to insert a node at the beginning, at the end or in the middle of a given doubly linked list.
- 7) Program to delete a node from the beginning, at the end or in the middle of a given doubly linked list.
- 8) Program to create, insert and delete a node in Circular linked list.
- 9) Program to push and pop an element into / from a stack implemented using linked list.
- 10) Program to push and pop an element into / from a stack implemented using Array.
- 11) Program to evaluate postfix expression.
- 12) Program to sort an array using quick sort.
- 13) Program to solve Towers of Hanoi problems using recursion.
- 14) Program to perform insertion and deletion operation in linear queues.
- 15) Program to perform insertion and deletion operation on circular queues.
- 16) Program to sort an array using Insertion sort.
- 17) Program to sort an array using Selection sort.
- 18) Program to insert an element in a binary search tree.
- 19) Program to traverse inorder of a binary tree.
- 20) Program to traverse preorder of a binary tree.
- 21) Program to traverse postorder of a binary tree.

Text Books:

1. Classical Data Structures : D. Samanta. PHI, New Delhi.
2. DATA STRUCTURE : LIPSCTUZ SCHUM OUTLINE SERIES
3. Operating Systems by P. Balakrishna Prasad [Scitech Publication]

Reference Books:

1. Data structure Using C++ : Y. Kanetkar
2. Data Structures Using C++: Tennenbaum
3. Data structures by Tremblay Sorenson
4. Data structures by Bhagat singh Naps
5. Operating System Concept : Silbershaz (Addision Education)
6. Operating Systems - H.M. Deitel - Addision Wesley.
7. Operating Systems- John J. Donovan.
8. Operating System : A.S.Godbole (TMH)
9. Modern Operating Systems : Tenenenbaum (Pearson Education)
10. Operating System : Peterson.

SUBJECT: COMPUTER SCIENCE
B.SC. – II SEMESTER - IV
BCSSS41: PAPER- I (JAVA PROGRAMMING)

OBJECTIVES:

To learn Object Oriented Programming language To handle abnormal termination of a program using exception handling To create flat files To design User Interface using Swing and AWT

OUTCOMES:

By the end of this Programme, the students will be able to:

1. Understand model of Java Programming language such as Operators, tokens etc.
2. Creating a class & subclass, Understand Data members, Invoke a method, passing arguments to a method, calling method.
3. Explain Method overloading, Constructor overloading. Java class library
4. Understand Decision making & loops, Creating an array, String array,
5. Explain the concept of Inheritance and Interfaces
6. Evaluate user requirement for software functioning.
7. Solve given problems using Java programming.
8. Create GUI applications

Unit-I

(7.5 Hrs)

(A) Introduction to Java- History of Java, features of Java, getting started with Java.

(B) Java programs- Introduction of Application & Applets. Variables: -Variable naming, variable initialization, assign values, Rules of variables, Scope of variable.

(C) Operators- Arithmetic, Assignment, Unary, Comparison, Shift, Bit- Wise, Logical, Conditional, New, Special, Relational. Data types:-Integers, Char, String, Float etc. Typecasting:

(D) Tokens- Java tokens Order of precedence of operators Streams: - Input and output.

Unit-II

(7.5 Hrs)

(A) Creating a class & subclass- Declaring a class, Naming class, Rules to assign Class & Subclass, Creating a new object, Class of an object. Data members: -Declaring data member, Naming variables, using class members.

(B) Methods- Using data members, Invoke a method, passing arguments to a method, calling method. Access Specifier & Modifiers: -Public, Private, Protected, Static & Final. Overloading: -Method overloading, Constructor overloading. Java class library: - Different types of classes.

(C) Decision making & loops- If-then-else, Switch, ? : operator, While-loop, do-while loop, for. Array: -Creating an array, one-dimensional array, two-dimensional array. String: - String array, string methods. Inheritance: -Single & multiple inheritances Interfaces: - Defining interfaces, extending interfaces, implementing interfaces.

Unit-III

(7.5 Hrs)

(A) Packages- Java API packages, creating packages, accessing packages, adding a class to packages. Import statement: - Introduction & implementation of import statement.

Applets:-Introduction to Applets & Application, how applets application are different creating An applet. Applets life cycle, designing a web page, creating an executable applet, running the applet, applet tags, passing a parameter to applet, HTML tag, Converting applet to application.

(B) Threads- Overview of threads, single & multiple threads, life cycle of threads, stopping & blocking threads, working with threads, priority to thread, synchronization. Exceptions & Errors:-Introduction, types of error, exception, syntax of exception, handling techniques, exception for Debugging.

Unit-IV

(7.5 Hrs)

(A) Event- Event driven programming, handling an (AWT) events. Graphic class:- Introduction, the graphic classes, drawing & filling of lines, rectangle, circle & ellipse, arcs, polygons, text & fonts, creating a font class, font objects, text, coloring object.

Streams:-Introduction, Abstract stream classes, file input & output.

(B) AWT Applications- Creating a GUI using AWT toolkit, using component class, frames. Components & Control: -Textfield, textarea class, label, button, choice, list, checkbox, class, and combo. Menus: -Creating a popup menus. Image: - Type of image, Properties of an image, Displaying an image. Layouts: -Using Window Listener interface, Different types of Layout, Layout manager, Flow manager, Grid manager. Container: -Different types of container (Frame, Dialog, Panel)

SUBJECT: COMPUTER SCIENCE
B.SC. – II SEMESTER - IV
BCSS42: PAPER- II (LINUX OPERATING SYSTEM)

OBJECTIVES:

1. To understand and make effective use of linux utilities and shell scripting language to solve problems
2. To implement in C some standard linux utilities like mv,cp,ls etc...
3. To Develop the skills the necessary for systems programming including file system programming,process and signal management and interprocess communication

OUTCOMES:

By the end of this Programme, the students will be able to:

1. Understand the basic set of commands and utilities in Linux, concept of shell
2. Understand the anatomy of Linux operating system, editor and procedure of printing files
3. Sharing Files with other Users
3. Perform backup and to create compress file and decompress them.
4. Perform operation on process.
5. Understand KDE and GNOME desktop environment.

Unit-I

(7.5 Hrs)

(A) Logging In and Logging Out, Anatomy of Linux OS, Directory Structure, /usr Directory, File Types: User datafiles, System data files, Executable files. Naming files and directories, Spawning Processes.

(B) Shell- Creating User Account, Shell Program, bash shell, Changing shell prompt. Commands: Basic Syntax for a command, Exploring the Home Directory, ls, mkdir, rmdir, stat, cat, rm, mv, cp

Unit-II

(7.5 Hrs)

(A) Editor:- Vi editor. Hooking up Hardware Devices: Formatting a Floppy Disk, Gathering important system information.

(B) Backing Up and restoring the File System- Simple Backup, gzip, gunzip, tar. Printing files: Print Spool directory, Sending files to Printer.

Unit-III**(7.5 Hrs)**

(A) Sharing Files with other Users- Maintaining User Accounts, Changing Password, Creating Group Accounts, Granting Access to files, Changing File Ownership, Protecting Files, Making a File Read-Only.

(B) Working with Processes- Types of processes, ps Command, Creating process, killing process, free command and top utility.

Unit-IV**(7.5 Hrs)**

(A) Managing Disk Space- df, du commands, Creating Additional Free Disk Space, Locating Unused Files, Setting System Clock.

(B) Communication Utilities- who, who am i, finger, mesg, write, wall, talk, Creating a message of the day. X Window System, Graphical User Interfaces: KDE and GNOME Desktop Environment.

BCSS43: LABORATORY COURSE PRACTICAL LIST

- 1) a) Write a program that declares a class, object and also it access the data member of it's class.
b) Write an applet that accepts a value from the user and display it.
- 2) a) Write a program that accept marks of 5 subject, calculate total, percentage and display the grade according to their percentage.
b) Write a program that will print the multiplication table from 1 to 10.
- 3) a) Write an program to accept a set of values from the user into an array, display the values as well as their average.
b) Accept string into a text field, sort the characters in the string and display the sorted string in another text field.
- 4) a) Write a program to demonstrate the overloading & constructor.
b) Write an applet that accepts two numbers from the user and display all the numbers between them.
- 5) a) Write a program to demonstrate the single inheritance.
b) Write an applet to accept ten numbers into array, sort the array and display the sorted array. Accept the ten numbers into the ten different text fields.
c) Write a program to create a multiple selection list and also display the list of items selected by the user.
- 6) a) Write an applet to demonstrate the user menu Bar.
b) Write a sample program that will convert the applet to application.
c) Write a program to demonstrate the Interfaces.
- 7) a) Write a program for exception handling that accept two no as textfields, the values are added & their sum is displayed. The code traps the error when user could enter text instead of an numbers.
b) Write a program that would accept it input for the user & store it in a file called Test. java.
- 8) a) Write a program to implement graphic class draw (line, rectangle, fill rectangle, Circle, oval).
b) Write an applet that display a choice menu of three buttons (Add, Modify, Delete) selecting a choice from the menu should display the appropriate button Use the show () method of the layout Manager.
- 9) a) Write a java program to read & display the information from the file ABC. dat.
b) Write a program to implement the concept of loading & displaying images.

c) Write a program to demonstrate the Animation in Java.

Text Books:

1. Programming with Java a primer II edition:-E Balaguruswamy(Tata McGraw-Hill)
2. Java Programming (For absolute beginners) Russell PHI
3. SAMS Teach Yourself Linux by Craig and Coletta Witherspoon [Techmedia]

Reference Books:

1. Black Book on Java 2.Java-Complete References
2. LINUX complete reference by Richard Peterson

SUBJECT: COMPUTER SCIENCE

B.SC. – III SEMESTER - V

BCSTS51: PAPER- I (VISUAL BASIC PROGRAMMING)

OBJECTIVES:

1. The objective of the course is to cover visual basic and oracle programming skills required for modern software development.
2. To study the advantages of Controls available with visual basic

OUTCOMES:

By the end of this Programme, the students will be able to:

1. Write, compile and execute applications using various controls like text box, command button.
2. Write programs using Arrays and functions
3. Write, compile and execute applications using database connectivity like ADODC.
4. Create database using MS-Access and visual Data managers
5. Write, compile and execute Menu driven application.
6. Explain Data Environment and Data Reports.

Unit-I

(7.5 Hrs)

(A) Working with Visual Basic Window Components- Menu Bar, Tool Bar, Project Explorer Window, Form Layout Window, properties Window, Toolbox, Code Editor Window Working with Forms: Properties, Events, Methods Working with Basic Controls:Label, CommandButton, TextBox, OptionButton, Frame, CheckBox, ListBox, ComboBox, Image, Scroll, Picture, Timer, DriveListBox, DirListBox, FileListBox and Shape Controls.

(B) Basic Programming Fundamentals- Variables, Data types, Constant, Conversion Function. Scope of Variable: Public, Private Static. Operators: Logical, Arithmetic, Concatenation, Comparison. Decision Structure: If.. Then, If..Then..Else, Select Case.. End Case. Loop Structure: Do..While, While.. Wend, For.. Next, With..EndWith. DoEvents()

Unit-II

(7.5 Hrs)

(A) Arrays- Dynamic Array, Preserve and Control arrays. Procedure: General procedure, General Methods for Passing Arguments to a Procedure,

(B) Functions- User-Interaction, String, Math, Date, Conversion Functions.Modules: Form, Standard.

Unit-III**(7.5 Hrs)**

(A) Menus- Creating, Adding Menu Items, Creating Shortcut, Adding Separators Bars, Submenus, Code for Menus. Creating Popup Menu: System, Custom.

(B) Database Handling- Database Concepts, Creating and Accessing Database, Using Data Control. Using DAO: Creating Search Programs, Numeric Search and Complex Search Programs.

Unit-IV**(7.5 Hrs)**

(A) Using ADO Data Control, Data Link, ODBC Data Source name, Using Connection String, Creating Navigating buttons.

(B) Working with Advanced Data Controls- DataList Control, DataCombo Control, DataGrid Control and Msflexgrid Control.

(C) Handling Errors- Run Time, Trapping and Handling Error, ERR Object. Data Environment and Data Reports.

SUBJECT: COMPUTER SCIENCE

B.SC. – III SEMESTER - V

BCSTS52: PAPER- II (DATA BASE MANAGEMENT SYSTEM)

OBJECTIVES:

1. To grasp the different issues involved in the design of a database system.
2. To study the physical and logical database designs and database modeling like relational, hierarchical, and network models.
3. To understand essential DBMS concepts such as: database security, integrity and normalization.
4. To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling and designing a DBMS

OUTCOMES:

By the end of this Programme, the students will be able to:

1. Understand basic concepts of DBMS, its objective
2. Role of Database Administrator, Database Users, different Data models and network models
3. Understand concept of ER model.
4. Explain Relational Model, Structure and Extended Relational model
5. Understand Functional Dependency and Perform normalization of database.

Unit-I

(7.5 Hrs)

DBMS : Definition: Databases, DBMS, Problems with traditional file processing system, Objectives of the database systems, Three level architectures of DBMS, Component of DBMS, Database Administrator, Database Users, Data model, Different types of data models, Concepts of Hierarchical, Network Models.

Unit-II

(7.5 Hrs)

(A) E-R Models- Basic Concepts, Entity, Attributes, Relation Ship, Mapping, Keys, Weak and Strong Entity Set, Problems on E-R Diagrams,

(B) Extended E-R Features- Specialization, Generalization, Aggregation, Problems on Reduction of an E-R Schema to Tables, Tabular representation of Strong, Weak entity Sets and Relationship Sets.

Unit-III**(7.5 Hrs)**

(A) Relational Model- Structure, Relational Algebra, Fundamental Operations,

(B) Set– Intersection, Natural Join, Division and Assignment Operation. Extended Relational Algebra Operations, Aggregate Functions.

Unit-IV**(7.5 Hrs)**

(A) Functional Dependency- Functional Dependency, Fully Functional Dependency, Partial Dependency, Transitive Dependency, Multi Valued Dependency.

(B) Normalization- Normalization, Normal Forms (1NF, 2NF, 3NF, BCNF, 4NF, 5NF). Problems on Normal forms.

BCSS53: LABORATORY COURSE PRACTICAL LIST

1. a) Make an application in Visual Basic, which display a picture when
 - i) Command button with caption “ click here” is clicked.
 - ii) After delay time 100ms (by using Timer control)
- b) Design an Application to find
 - iii) $\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$
 - iv) $\cos x = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \dots$
 - v) Find a even/odd no.
 - vi) Find Factorial of no.
 - vii) Find if number is a Prime Or not prime
2. a) A book stall gives discount on the books as per following conditions,

No. of books purchased	Discount
≤ 5	Nil
> 5 and ≤ 10	10%
> 10 and ≤ 15	12%
> 15	20%

Create a form as follows to calculate the discount.
- b) Design a form for speed control program using scrollbars.
3. a) Design an application, which display a text and given choice to change text to bold, italic, underline (any one or in combination) using check box controls.
 - b) Write a VB code to give five choices of colors. Design an application to choose any one color using option button and change the forecolor of TextBox Caption.
- 4.a) Write a program in VB to build application to display sorted list of group A & group B student in two list boxes. Make provision to shift name (s) on either side using List Box control.
 - b) Write a program in VB to build application which display list of states. Make provision to display capital of the state and cities when a particular state is selected using combo box.
5. a) Write a VB Program to create an array of N elements. Find the frequency of element and display the positions in an array.
 - b) Create an application, which counts no. of characters and no. of words entered in TextBox.
- 6) Create Menus using menu editor as follows.

And Write appropriate code on click event of New & Exit Menu Options.

- 7) Create a database pay.mdb using Visual Database Manager with fields code number (n), Name of Employee (T), Designation (T), Address (T), Joining date (d), Basic pay (n), Status (T) [permanent / temporary], Department (T) [purchase, sales, account]. Achieve connectivity using Data control. Develop an application in V.B. to display the data of employees using MSFlexgrid control as shown below with company's logo.

EMPLOYEE INFORMATION < logo >

I.D.	NAME	ADDRESS	DESIGNATION	DEPT.	Date of Joining	Status	BASIC
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- 8) Design a Menu as shown below.

DATABASE Record

Open Append

Exit Save

Create table pay.mdb using Visual Data Manager and connect it to vb application using Data Control. Display/view records using DbGridControl.

Create an application in V.B. to open database of employee pay.mdb by using menu option "OPEN". Use APPEND and SAVE options to Add & Save records in DATABASE.

- 9) Open DataBase fees.mdb with fields: -

Name, class, fees Using Visual Data Manager. Use Data control for connectivity. Develop a menu driven application in V.B. to: -

I) Compute total fees class wise

II) Search a record of a particular student belonging to a particular class.

DATABASE Record

Open Compute total fees

Exit

Display

Search

- 10) Create a DataBase College.mdb containing fields:-

Name, Class, Marks in phy, Comp. Sc., Maths and Percentage Using Visual Data Manager. Connect database to vb application using Data Control.

Develop a Menu driven application in V.B. to

- I) Edit a records class wise.

II) Calculate class wise passing percentage where a student is declared “pass”, if he/she gets percentage ≥ 45 .

Display Class wise list of students who are placed in Ist Division. (Percentage ≥ 60)

DATABASE Edit

Create B.Sc.-I

Display B.Sc.-II

Exit B.Sc.-III

11) Create a table book.mdb using VDM containing fields:-

Name of book, subject, price, date of purchase, Name of publication, Develop a menu driven application in V.B. to: -

I) Open Database

II) Delete a record of book.

III) Display subject wise list of book in proper format.

DATABASE Record

Open Delete

Exit

Use DataControl for connectivity.

12) Create a table using VDM to store required information for computing Electricity Bill.

Charges are as follows

1) 1.25 /units for 1st 30 units

2) 2.90 / units from 31 to 300 units

3) 4.0 /units from 301 to onwards.

Develop a menu driven application . to: -

I) Open Database

II) Display Electricity Bill in proper format.

III) Delete a record of book

IV) Append a record

V) Edit record

DATABASE Record

Open Delete

Display Bill Append

Exit Edit

Use ADODC to achieve connectivity.

- 13) Create the database emp.mdb having table emp_biodata directly through MSACCESS and Display records using datagrid control.

Develop a menu driven application . to: -

- I) Open Database II) Display records using datagrid control.
III) Search a record IV) Append a record

DATABASE Record

Open

Append

Display

Search

Exit

Use ADODC to achieve connectivity.

- 14) Create an application for employee salary sheet. IF BASIC >5000

HRA=40 % OF BASIC DA=50 % OF BASIC

IF BASIC >= 2500

HRA = 35 % OF BASIC DA=45 % OF BASIC

IF BASIC >=1500

HRA = 30 % OF BASIC DA=40 % OF BASIC

OTHER WISE

HRA= 20 % OF BASIC DA =30 % OF BASIC

TA= 150

PF= 15 % OF BASIC PT = 18% OF BASIC

Develop a menu driven application in V.B. to: -Compute total Salary

Search a record of a particular employee belonging to a particular department.

DATABASE Record

Open Compute total salary

Display

Search

Exit

Use ADODC to achieve connectivity.

Note -: While designing menu MDI forms are expected wherever required.

Text Books:

- 1) VISUAL BASIC – to Advance by Soma Dasgupta [BPB Publication]
- 2) Data Base System Concepts By A SilbersChatz By Henry Korth And S.Sudarshan [Mcgraw-Hill ltd. New Delhi] 3rd Edition.
- 3) Introduction to Data Base Management by NAVEEN PRAKASH [Tata McGrawHill ltd.]

Reference Books:

1. Evangelos Petroustos, Mastering Visual Basic 6.0 BPB Publication.
2. VISUAL BASIC 6 COMPLETE REFERENCE (TMH PUB)
3. Visual Basic 6 Deitel & Deitel (Pearson Education)
4. Mastering VB 6.0 Black Book -Peter - Norton-Techmedia.
5. Bipin C. Desai, An Introduction to Database Systems, Galgotia Publications.
6. Raghu Ramakrishnan & Johannes Gerhrke, "Data Base Management Systems", Mc Graw Hill International Edition, 2000
7. Muzumdar, Introduction to Database Management Systems. TMH

SUBJECT: COMPUTER SCIENCE
B.SC. – III SEMESTER - VI
BCSTS61: PAPER- I (COMPILER CONSTRUCTION)

OBJECTIVES:

The objective of the course to understand the concept of compiler and its construction in phase manner. Students of this course learn how to build compilers.

OUTCOMES:

By the end of this Programme, the students will be able to:

1. Understand Compilers and translators and their need.
2. Explain Intermediate code Generation.
3. Define programming languages, ,High Level programming languages
4. Understand the lexical and syntactic structure of a language, the role of the lexical analyser
5. Understand Parsers, Shift-reduce parsing and DAG representation of basic blocks

Unit-I

(7.5 Hrs)

Compilers and translators, need, the structure of a compiler, Lexical Analysis, Syntax analysis, Intermediate code Generation, Optimization, Code Generation, Book keeping, Error Handling

Unit-II

(7.5 Hrs)

High Level programming languages, Definitions of programming languages, The lexical and syntactic structure of a language, Data elements, structures, Operators, Assignment Statements, Data Environments, Parameter transmission, Storage management.

Unit-III

(7.5 Hrs)

The role of the lexical analyzer, Approach to the design of lexical analyzer, Implementation of lexical analyzer, Context free grammars, Derivations and parse trees, Ambiguous grammar.

Unit-IV

(7.5 Hrs)

Parsers, Shift-reduce parsing, Operator precedence parsing, Top-down parsing, predictive parsers, Symbol Table , Code Optimization: The principal source optimization, Loop optimization, The DAG representation of basic blocks, Code Generation : A machine model, a simple code generator, Register Allocation and assignment.

SUBJECT: COMPUTER SCIENCE
B.SC. – III SEMESTER - VI
BCSTS62: PAPER- II (SQL AND PL/SQL)

OBJECTIVES:

1. To gain a basic understanding of database access and management using data controls.
2. To facilitate the learner to understand basic concepts of PL/SQL Programming

OUTCOMES:

By the end of this Programme, the students will be able to:

1. Understand CODD'S Rules, Oracle Database Objects, data types, operators
2. Create tables, derive table from existing table, altering, dropping of Tables.
3. Check Integrity Constraints and Adding and Dropping Constraints
4. Understand types of Views, Create Views, Drop Views, Insert, Update and Delete Data using Views,.
5. Understand basic concepts of PL/SQL Programming
6. Create cursors, triggers and Exception Handling

Unit-I

(7.5 Hrs)

CODD'S Rules, Oracle Database Objects, Sub Languages of SQL, Data types, Operators. DDL Statement: Creating Tables, Deriving Table from existing table, Altering, Dropping Tables. Integrity Constraints, Specifying Names for the Constraints, Viewing Integrity Constraints, Adding and Dropping Constraints. DML Statements: SELECT statement, Insert, Update, Delete, Working with Sequences and Synonyms. Built-in functions: Arithmetic, Date, Character, Conversion, Single row, Aggregate, Decode.

Joins, Set Operators and Sub queries. DCL and TCL Statements: Grant, Revoke, Commit, Rollback and Savepoints.

Unit-II

(7.5 Hrs)

VIEWS: Creating Views, Dropping Views, Inserting, Updating and Deleting Data using Views, Types of Views. PL/SQL Programming: PL/SQL Data Types, Identifiers, Operators and Expressions, Iterative Statements, Conditional Statements, emphasis on Problems

Unit-III

(7.5 Hrs)

Exception Handling: Predefined Exceptions, User defined Exceptions. Cursors: Declaring Cursors, Opening and Retrieving Records, Closing cursors. Attributes of Explicit and Implicit Cursors,

Parameter Passing in Cursors. Procedures : Create and Drop Procedure, Creating Procedures with Parameters, Calling Procedures, Granting the EXECUTE Permission Problems on Exception Handling, Cursors and Procedures.

Unit-IV

(7.5 Hrs)

Function: Creating and Dropping Function, Purity Levels in Functions, Executing Functions. Triggers: Create Triggers, Type of Triggers, Creating BEFORE and AFTER Triggers, INSTEAD-OF Triggers, Trigger Predicates, Inserting, Updating and Deleting Triggers, Enabling , Disabling and Dropping Triggers. Problems on Functions and Triggers

BCSS63: LABORATORY COURSE PRACTICAL LIST

1) DDL Statements :

1.a) Create the table Invoice with fields inv_no(char, Primary key), mv_no(number), cust_id(char), issue_date(date), return_date(date).

Insert data in the table invoice as follows:

Inv_no	mv_no	cust_id	issue_date	return_date
I01	1	a01	21-Dec-06	25-Dec-06
I02	3	a02	19-Oct-06	30-Oct-06
I03	5	a03	14-Jul-06	1-Aug-06
I04	5	a04	15-Sep-06	30-Sept-06
I05	6	a05	19-Oct-06	21-Oct-06
I06	7	a06	1-Jan-06	15-Jan-06
I07	8	a07	15-Aug-06	30-Aug-06
I08	2	a05	1-Oct-06	15-Oct-06
I09	4	a01	12-sep-06	19-Sep-06
I10	9	a02	1-Dec-06	15-Dec-06
I11	6	a05	2-feb-06	14-feb-06
I12	3	a06	1-Jan-06	10-Jan-06

1.b) Modifying Table Structure by adding the new field price (number) and increasing the size of inv_no.

1.c) Add and Drop Constraints

- i) Add primary key constraint
- ii) Drop primary key constraint
- iii) Add Unique key constraint
- iv) Drop Unique key constraint
- v) Add check constraint

2) DML Statements:

2.a) Add a records in above table

2.b) i)Change inv_no of I12 with 'I111'.

ii) Change issue_date of customer of cust_id 'a01' to '22-Dec-06'. iii)Change movie no of cust_id 'a05' to 11.

- iv) Display all movies with issue_date between 01-jan-06 to 01-sep-06 v) Display information for cust_id 'a01' & 'a02'.
- 2.c) i) Delete records with inv_no 'I11' from invoice table. ii) Delete records having return date <='20-Jan-06'.
- 3) DCL and TCL Statements
 - i) Grant insertion and deletion privileges on invoice table to another user XYZ.
 - ii) revoke the deletion privileges from user XYZ.
 - iii) after insertion of 2 records in invoice table create savepoint A.
 - iv) delete a record and create savepoint B.
 - v) rollback to A
- 4) Create the table Movie with fields mv_no(number, Primary Key), title(Char), Type(char), star(char), price(number), releasedate(date)
 - i) Add few records in above table
 - ii) Count total number of customer
 - iii) Calculate total price of all the movies.
 - iv) Calculate average price of all the movies.
 - v) Determine the maximum & minimum movies prices and rename the title as MAX-PRICE and MIN-PRICE.
 - vi) Count the number of movies having price greater than or equal to 150.
 - vii) display total no. of movies released in the current year.
 - viii) display all the movie which start with letter 'K'.
- 5) i) Create a View of table Invoice with following column inv_no(char, Primary key), mv_no(number), cust_id(char)
 - ii) Insert and delete records
 - iii) drop view
- 6) PL/SQL Programming:
 - Write a PL/SQL block
 - i) to find largest of 2 numbers
 - ii) to reverse the number
- 7) Cursor
 - i) Write a Cursor to fetch all rows of table invoice

- ii) Write a Cursor to display all movies with issue_date between 01-Jan-06 to 01- sep-06. If no record is found then use Exception to display the proper message.
- iii) Write a PL/SQL to accept the name and age of the student and insert it into table STUD after validating age not less than 18 otherwise raise an exception
- 8) Create Procedure
 - i) to swap two values
 - ii) to display the cust_id, mv_no and call the procedure through the main program
- 9) Create Function
 - i) to find gcd of two numbers.
 - ii) to find the total price of all the movies starts with the letter 'K' and call the function through the main program
- 10) Create Trigger
 - i) that restricts the user from performing a DML on the movie table on 'Monday'
 - ii) Covert all the movie names into the upper case on insertion of each row.

Text Books:

1. Principles of Compiler Design - A.V. Aho, J. D.Ullman : Pearson Education.
2. Understanding ORACLE By Ivan Bayross [BPB Publication]

Reference Books:

1. Modern Compiler Design- Dick Grune, Henry E. Bal, Cariel T. H. Jacobs, Wiley dreamtech.
2. Engineering a Compiler-Cooper & Linda, Elsevier.
3. Compiler Construction, Louden, Thomson.
4. Database System Using Oracle: A Simplified Guide to SQL & PL-SQL: Nilesh Shah, PHI Publication.
5. Database Management Systems (Complete practical approach) by Sharad Maheshwari & Ruchin Jain, Firewall media
6. Dr. P.S.Deshpande SQL & PL/SQL for Oracle 10g Black Book
7. Scott Urman Programming PL/SQL TMH