CENTRE FOR DISTANCE AND ONLINE EDUCATION

MCA - I SEMESTER

SELF LEARNING MATERIALS (SLM)

Sl. No.	Subject Code	Name of the Subject
1.	MAD 6188	Mathematical Foundation for Computer Applications
2.	CAD 6121	Computer Organization and Operating System
3.	CAD 6122	Database Management Systems
4.	CAD 6123	Computer Networks
5.	CAD 6124	Data Structures and Algorithms using C/C++
6.	CAD 6125	Object Oriented Software Engineering
7.	CAD 6126	Data Structures and Algorithms Laboratory using C/C++
8.	CAD 6127	Programming in C and C++ Laboratory
9.	CAD 6128	DBMS Laboratory

MAD 6188 Mathematical Foundation for Computer Applications

UNIT - I

Lesson 1

CONTENTS

Learning Objectives

This lesson is intended to

- Know the importance of Number System for computing
- Understand the conversions in Number System

Learning Outcomes

At the end of studying this lesson, you should be able to:

- Implement the knowledge of number system in designing
- Infer the need of conversions

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

MAD 6188 Mathematical Foundation for Computer Applications

Lesson 2

CONTENTS

Learning Objectives

This lesson is intended to

- Identify the combinatorial problems

- Enumerate the possible solutions

Learning Outcomes

At the end of studying this lesson, you should be able to

- Articulate Combinatorics

- Interpret the knowledge to find the possible solution

- Apply the concepts in Optimization

UNIT - II

Lesson 3

CONTENTS

Learning Objectives

This lesson is intended to:

- Highlight and relate the various concepts of mathematical logic
- Formulate and solve the logical statements

Learning Outcomes

At the end of studying this lesson, you should be able to

- Infer theoretically logical statements
- Interpret the knowledge in validating the arguments

Overview

MAD 6188 Mathematical Foundation for Computer Applications

Lesson 4

Learning Objectives

This lesson is intended to:

- Familiarize the concepts in Inference Theory

- Explain the various motivational theories and its applications

Learning Outcomes

At the end of studying this lesson, you should be able to

- Identify the importance of Predicate Calculus

- Develop the knowledge of quantifying the arguments.

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

MAD 6188 Mathematical Foundation for Computer Applications

UNIT - III

Lesson 5

CONTENTS

Learning Objectives

This lesson is intended to:

- Impart the knowledge on Matrices

- Get familiarize with basic operations in Matrices

Learning Outcomes

At the end of studying this lesson, you should be able to

- Formulate the problems in Matrix expression

- Understand the Basic Concepts in Matrices

Overview

Summary
Keywords
Self-Assessment Questions
Further Reading

MAD 6188 Mathematical Foundation for Computer Applications

Lesson 6

CONTENTS

Learning Objectives

This lesson is intended to:

- Impart the knowledge on Characteristic Equation
- Solve the problems in Eigen Values

Learning Outcomes

At the end of studying this lesson, you should be able to

- Realise the need of solving Eigen Values and Eigen Vectors

Overview

MAD 6188 Mathematical Foundation for Computer Applications

UNIT - IV

Lesson 7

CONTENTS

Learning Objectives

This lesson is intended to:

- Get familiarize with the concept of Set Theory

- Widen the knowledge on Basic concepts in Set Theory

Learning Outcomes

At the end of studying this lesson, you should be able to

- Identify the set operations

- Implement the basic laws in real time problems

MAD 6188 Mathematical Foundation for Computer Applications

Lesson 8

CONTENTS

Learning Objectives

This lesson is intended to:

- Highlight the concepts of Relations

- Formulate and relate the concepts of relations

Learning Outcomes

At the end of studying this lesson, you should be able to

- Analyse the properties of relation

- Visualize the Partial Order Relation

MAD 6188 Mathematical Foundation for Computer Applications

UNIT - V

Lesson 9

CONTENTS

Learning Objectives

This lesson is intended to:

- To give insight of basic concepts in Graph Theory

- Apply the knowledge in optimization

Learning Outcomes

At the end of studying this lesson, you should be able to

- Illustrate the concepts graphically

- Optimize the results

Overview

MAD 6188 Mathematical Foundation for Computer Applications

Lesson 10

CONTENTS

Learning Objectives

This lesson is intended to:

- Sketch the representation of trees and its notations

- Apply the knowledge in algorithms

Learning Outcomes

At the end of studying this lesson, you should be able to

- List various types of trees

- Correlate the results with real time problems

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6121 - Computer Organization and Operating System

UNIT I

Lesson 1

CONTENTS

Learning Objectives

This lesson is intended to

- Identify the instruction sets and operations of processor.

- Illustrate the structure, function and characteristics of computer systems.

Learning Outcomes

At the end of studying this lesson, you should be able to:

- Demonstrate instruction execution cycle.

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6121 - Computer Organization and Operating System

Lesson 2

CONTENTS

Learning Objectives

This lesson is intended to

- To learn Controls, Pipelining and Hazards ideas.

Learning Outcomes

At the end of studying this lesson, you should have

- Gained knowledge on Pipelining and Hazards concepts

Overview

CAD 6121 - Computer Organization and Operating System

UNIT II

Lesson 3

CONTENTS

Learning Objectives

This lesson is intended to:

- To learn memory management.

- Discuss different types of memories and their properties.

Learning Outcomes

At the end of studying this lesson, you should be

- Categories various memory types according to their properties.

- Describe the principles of memory management.

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6121 - Computer Organization and Operating System

Lesson 4

Learning Objectives

This lesson is intended to:

- Introduce basics of Parallel Computer Architecture.

Learning Outcomes

At the end of studying this lesson, you should be able to

- Explain how interrupts are used to implement I/O control and data transfers.

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6121 - Computer Organization and Operating System

<div align="center">

UNIT III

</div>

Lesson 5

CONTENTS

Learning Objectives

This lesson is intended to:

- Recognize the concepts and principles of operating systems.

Learning Outcomes

At the end of studying this lesson, you should be able to

- Identify basic components of operating system.
- Understands the different services provided by Operating System at different level.

Overview

CAD 6121 - Computer Organization and Operating System

Lesson 6

CONTENTS

Learning Objectives

This lesson is intended to:

- Impart on process and scheduling techniques.

Learning Outcomes

At the end of studying this lesson, you should be able to

- Know more about Process and communication concepts.

Overview

CAD 6121 - Computer Organization and Operating System

<div align="center">

UNIT IV

</div>

Lesson 7

CONTENTS

Learning Objectives

This lesson is intended to:

- To learn different process scheduling algorithms and techniques to achieve better performance of a computer system.

Learning Outcomes

At the end of studying this lesson, you should be able to

- Simulation of CPU Scheduling Algorithms. (FCFS, RR, SJF).

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

Lesson 8

CONTENTS

Learning Objectives

This lesson is intended to:

- Study the concepts of Semaphores and Monitors.

Learning Outcomes

At the end of studying this lesson, you should be able to

- Know to apply Semaphores and Monitors concepts.

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6121 - Computer Organization and Operating System

UNIT V

Lesson 9

CONTENTS

Learning Objectives

This lesson is intended to:

- To know virtual memory concepts.

- To make aware of different types of Operating System and their services.

Learning Outcomes

At the end of studying this lesson, you should be able to

- Learn different memory management techniques like paging, segmentation and demand paging etc.

- Apply the various methods in memory allocation and page replacement algorithm.

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6121 - Computer Organization and Operating System

Lesson 10

CONTENTS

Learning Objectives

This lesson is intended to:

- Explore the techniques for managing files.

Learning Outcomes

At the end of studying this lesson, you should be able to

- Exposure to some details of major OS concepts

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6122 Database Management Systems

Unit - I

Lesson 1

CONTENTS

Learning Objectives

This lesson is intended to

• Provide an introduction on database and its operations.

Learning Outcomes

At the end of studying this lesson, you should be able to:

• List the importance of DBMS and differentiate how DBMS is better than traditionalfile processing systems.

Overview

Lesson 2

CONTENTS

Learning Objectives

This lesson is intended to

• Provide an introduction on database and its operations.

Learning Outcomes

At the end of studying this lesson, you should be able to:

• List the importance of DBMS and differentiate how DBMS is better than traditionalfile

processing systems.

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6122 Database Management Systems

Unit - II

Lesson 3

CONTENTS

Learning Objectives

This lesson is intended to:

• Explain the fundamentals of relational systems including data models, database architectures and database manipulations.

Learning Outcomes

At the end of studying this lesson, you should be

• Illustrate the difference between a relational database and anon-relational (NOSQL) database

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

Lesson 4

Learning Objectives

This lesson is intended to:

• Explain the fundamentals of relational systems including data models, database architectures and database manipulations.

Learning Outcomes

At the end of studying this lesson, you should be

• Illustrate the difference between a relational database and anon-relational (NOSQL) database

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

Unit - III

Lesson 5

CONTENTS

Learning Objectives

This lesson is intended to:

• Train the students to construct simple and moderately advanced database queriesusing structured query language and apply normalization techniques.

Learning Outcomes

At the end of studying this lesson, you should be able to

• Construct and normalize conceptual data models, analyze the basic structure of database and recognize the different views of the database.

Overview

Summary
Keywords
Self-Assessment Questions
Further Reading

Lesson 6

This lesson is intended to:

• Train the students to construct simple and moderately advanced database queriesusing structured query language and apply normalization techniques.

Learning Outcomes

At the end of studying this lesson, you should be able to

• Construct and normalize conceptual data models, analyze the basic structure of database and recognize the different views of the database.

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6122 Database Management Systems

Unit - IV

Lesson 7

CONTENTS

Learning Objectives

This lesson is intended to:

• Educate the concept of database storage & file structure.

Learning Outcomes

At the end of studying this lesson, you should be able to

• Describe the concepts of data storage and indexing, query evaluations andoptimization techniques.
Overview

SummaryKeywords

Self-Assessment Questions

Further Reading

CAD 6122 Database Management Systems

Lesson 8

CONTENTS

Learning Objectives

This lesson is intended to:

• Educate the concept of database storage & file structure.

Learning Outcomes

At the end of studying this lesson, you should be able to

• Describe the concepts of data storage and indexing, query evaluations andoptimization

techniques.

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6122 Database Management Systems

Unit - V

Lesson 9

CONTENTS

Learning Objectives

This lesson is intended to:

• Explore the concept of transaction management and origins of No SQL databases and the characteristics that distinguish them from traditional relational database management systems.

Learning Outcomes

At the end of studying this lesson, you should be able to

• Handle transaction management queries in SQL in real time scenario

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6122 Database Management Systems

Lesson 10

CONTENTS

Learning Objectives

This lesson is intended to:

• Explore the concept of transaction management and origins of No SQL databases and the characteristics that distinguish them from traditional relational database management systems.

Learning Outcomes

At the end of studying this lesson, you should be able to

• Handle transaction management queries in SQL in real time scenario

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6123 - Computer Networks

<div align="center">**UNIT- I**</div>

Lesson 1

CONTENTS

Learning Objectives

This lesson is intended to

- Explore the expectations from a computer network
- Understand the layered tasks involved in data communication
- Identify the different hardware components needed to build a network.

Learning Outcomes

At the end of studying this lesson, you should be able to:

- Explain how a computer network fulfils the requirements of different work group.
- Discuss various tasks involved in computer communication.
- Demonstrate the Evolution of different Network Devices.

Overview

Summary

- We explored how the computer network satisfies the expectations of various workgroups like application programmer, network designer and network operator.
- We discussed the computer network architecture through OSI and TCP/IP Model.
- We learned the evolution of different network devices on the basis of the needs.

Keywords

ISO, OSI, Internet, TCP/IP, Host, Hub, Switch, Router

Self-Assessment Questions:

Further Reading

Web Pages:

- http://www.ietf.org/ rfc.html - RFC documents related to TCP, UDP and IP

- http://www.ietf.org/: information about the IETF, its working groups,standards, etc.

- http://dblp.uni-trier.de/db/index.html: a searchable bibliography of computer science research papers

Books:

- Holzmann and Pehrson's *The Early History of Data Networks*

- *Realizing the Information Future: The Internet and Beyond*, Computer Science and Telecommunications Board of the National Research Council

CAD 6123 - Computer Networks

Lesson 2

CONTENTS

Learning Objectives

This lesson is intended to

- Introduce you about the various experiments conducted in Hawthorne Plant

- Highlight the outcomes of the experiment conducted in Hawthorne studies

Learning Outcomes

At the end of studying this lesson, you should have

- Gained the insights about the Hawthorne studies

- Learnt the limitations and outcome of the Hawthorne Studies

CAD 6123 - Computer Networks

UNIT - II

Lesson 3

CONTENTS

Learning Objectives

This lesson is intended to:

- Introduce you the LAN Architecture

- Highlight the different LANs

Learning Outcomes

At the end of studying this lesson, you should be

- Able to understand MAC and LLC control of LAN

- Identify the different LANs and their merits and demerits

Overview

Summary

- We have discussed the MAC and LLC layers' functionality of LAN
- We have explored different LANs and their merits and demerits.

Keywords

LAN, MAC, LLC , Topology, wireless

Self-Assessment Questions

Further Reading

CAD 6123 - Computer Networks

Lesson 4

Learning Objectives

This lesson is intended to:

- Introduce the two popular LAN Technologies

- Highlight the various latest LAN Technologies

Learning Outcomes

At the end of studying this lesson, you should be able to

- Analyse the Ethernet and Token Rings Technologies

- Know the facilities provided by latest LAN Technologies

1.1   Ethernet

    1.1.1   MAC

1.2   Token Rings

    1.2.1   MAC

1.3   Latest Technologies

    1.3.1   WiFi

    1.3.2   Bluetooth

    1.3.3   Cellular Technology

Summary

- We have discussed the mostly used LAN technologies.
- We have explored the latest LAN Technologies.

Keywords

Ethernet, IEEE, Token Ring, WiFi, Bluetooth, Cellular

Self-Assessment Questions

Further Reading

UNIT - III

Lesson 5

CONTENTS

Learning Objectives

This lesson is intended to:

- Explain the functions of switches, bridges and routers

- Discuss Internet Protocol (IP) for interconnecting networks

Learning Outcomes

At the end of studying this lesson, you should be able to

- Demonstrate the switching and routing

- Discuss about the different network layer protocols

Overview

CAD 6123 - Computer Networks

Lesson 6

CONTENTS

Learning Objectives

This lesson is intended to:

- Explain the different intra domain routing protocols

- Discuss the different internet routing protocols

Learning Outcomes

At the end of studying this lesson, you should be able to

- Know the importance of routing protocols
- Demonstrate how the different routing protocols create the routing table and the merits and demerits of them.

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

UNIT- IV

Lesson 7

CONTENTS

Learning Objectives

This lesson is intended to:

- Get familiarize with the connectionless and connection oriented protocols

- Know how the end to end flow control is done

Learning Outcomes

At the end of studying this lesson, you should be able to

- Discuss the simplicity of UDP and its needs

- Explain the how the TCP protocol provides a connection oriented service

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6123 - Computer Networks

Lesson 8

CONTENTS

Learning Objectives

This lesson is intended to:

- Explain the various congestion control and avoidance mechanisms.

- Discuss how congestion is controlled by TCP

Learning Outcomes

At the end of studying this lesson, you should be able to

- Discuss various ways of controlling and avoiding congestion

- Demonstrate the TCP congestion control mechanism.

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

UNIT - V

Lesson 9

CONTENTS

Learning Objectives

This lesson is intended to:

- Highlight the different compression techniques

- Explain the two types of cryptographic algorithms

Learning Outcomes

At the end of studying this lesson, you should be able to

- Discuss how different types of data are compressed.

- Explain the merits and demerits of RSA and DES algorithms

Overview

Summary

Keywords

Self-Assessment Questions

CAD 6123 - Computer Networks

Further Reading

Lesson 10

CONTENTS

Learning Objectives

This lesson is intended to:

- To give insights about various network services

- Highlight the importance of Software Defined Networks

Learning Outcomes

At the end of studying this lesson, you should be able to

- Discuss the different services provided by network

- Explain the need of software defined networks

Overview

CAD 6124 Data Structures and Algorithms using C/C++

UNIT - I

Lesson 1

CONTENTS

Learning Objectives

This lesson is intended to

- Learn the classification of data structure
- Understand the concepts memory allocation

Learning Outcomes

At the end of studying this lesson, you should be able to:

- Summarize different categories of data structure
- Enlist the significance of dynamic memory management

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6124 Data Structures and Algorithms using C/C++

Lesson 2

CONTENTS

Learning Objectives

This lesson is intended to

- Familiarize the operations of Stack and Queue

- Understand prefix, infix, and postfix expression formats.

- Learn different types of Queue

Learning Outcomes

At the end of studying this lesson, you should be able to

- Use stacks to convert expressions from infix to postfix.

- Implement stack and queue operations

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6124 Data Structures and Algorithms using C/C++

UNIT - II

Lesson 3

CONTENTS

Learning Objectives

This lesson is intended to:

- Learn the concepts of Linked List

- Introduce to different types of Linked List

Learning Outcomes

At the end of studying this lesson, you should be

- Able to represent and understand the pros and cons of Linked List

- Identify the appropriate Linked List to be used

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6124 Data Structures and Algorithms using C/C++

Lesson 4

Learning Objectives

This lesson is intended to:

- Familiarize the operations on Singly Linked List

Learning Outcomes

At the end of studying this lesson, you should be able to

- Modify the Linked List

- Have knowledge on Data Structures basic operations like insert, delete, search, update and traversal

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6124 Data Structures and Algorithms using C/C++

UNIT - III

Lesson 5

CONTENTS

Learning Objectives

This lesson is intended to:

- Learn the concepts of searching and sorting

Learning Outcomes

At the end of studying this lesson, you should be able to

- Summarize searching and sorting methods

- Appropriately choose the searching algorithm for an application

Overview

Summary
Keywords
Self-Assessment Questions
Further Reading

CAD 6124 Data Structures and Algorithms using C/C++

Lesson 6

CONTENTS

Learning Objectives

This lesson is intended to:

- Learn about different sorting algorithms

Learning Outcomes

At the end of studying this lesson, you should be able to

- Appropriately choose the sorting algorithm for an application
- Develop ability to implement different sorting methods

Overview

CAD 6124 Data Structures and Algorithms using C/C++

UNIT - IV

Lesson 7

CONTENTS

Learning Objectives

This lesson is intended to:

- Get familiarize with the concept of organization structure
- Identify the differences between organization culture and climate and its role in functioning of organization

Learning Outcomes

At the end of studying this lesson, you should be able to

- Identify the determinants of organization structure
- Demonstrate different methods for traversing trees

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6124 Data Structures and Algorithms using C/C++

Lesson 8

CONTENTS

Learning Objectives

This lesson is intended to:

- Represent data using graph data structure
- Learn graph traversals

Learning Outcomes

At the end of studying this lesson, you should be able to

- Able to define the basic concepts of graphs, directed graphs, and weighted graphs.
- Implement the algorithms to construct breadth first search and depth first search spanning trees of a connected graph.
- Appropriately choose the algorithm to find the minimum weight spanning tree

CAD 6124 Data Structures and Algorithms using C/C++

UNIT - V

Lesson 9

CONTENTS

Learning Objectives

This lesson is intended to:

- Demonstrate familiarity with major algorithms and data structure

Learning Outcomes

At the end of studying this lesson, you should be able to

- Synthesize divide and conquer algorithm and analyse it

- know a variety of dynamic-programming algorithms, how to apply them via both memorization and tables, and recognize when a dynamic-programming approach might yield a good solution to a problem

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

Lesson 10

CONTENTS

Learning Objectives

This lesson is intended to:

- Provide solid foundations to deal with variety of computational problems

- Why analysing a problem and its complexity is important

- Understanding the concepts of time and space complexity, worst case, averagecase and best case complexities and the big-O notation

Learning Outcomes

At the end of studying this lesson, you should be able to

- Apply knowledge of computing and mathematics to algorithm design

- Analyze the asymptotic performance of algorithms.

- Analyze worst-case running times of algorithms using asymptotic analysis.

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6125 Object Oriented Software Engineering

UNIT - I

Lesson 1

CONTENTS

Learning Objectives

This lesson is intended to

- Provide basic concepts of software engineering and software life cycle

- Give an insight into the concepts of modeling and notations of the different UML diagrams

Learning Outcomes

At the end of studying this lesson, you should be able to:

- Know the importance & implications of organizational behaviour

- Explain the role of Scientific Management in organizational behaviour

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6125 Object Oriented Software Engineering

Lesson 2

CONTENTS

Learning Objectives

This lesson is intended to

- Provide basic concepts of software engineering and software life cycle

- Give an insight into the concepts of modeling and notations of the different UML diagrams

At the end of studying this lesson, you should have

- Compare the different software life cycle models and select the appropriate model for a real time project

- Analyze different UML concepts and illustrate the UML design for real-time Project

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6125 Object Oriented Software Engineering

UNIT - II

Lesson 3

CONTENTS

Learning Objectives

This lesson is intended to:

Explore the techniques for requirement gathering design and specification

Learning Outcomes

At the end of studying this lesson, you should be

- Identify the software requirement specification and formulate project planning in real time scenario.

Overview

CAD 6125 Object Oriented Software Engineering

Lesson 4

Learning Objectives

This lesson is intended to:

Explore the techniques for requirement gathering design and specification

Learning Outcomes

At the end of studying this lesson, you should be able to

- Identify the software requirement specification and formulate project planning in real time scenario.

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6125 Object Oriented Software Engineering

UNIT - III

Lesson 5

CONTENTS

Learning Objectives

This lesson is intended to:

- Give an insight into the concepts of modeling and notations of the different UML diagrams.

Learning Outcomes

At the end of studying this lesson, you should be able to

- Analyze different UML concepts and illustrate the UML design for real-time project.

Overview

Summary
Keywords
Self-Assessment Questions
Further Reading

CAD 6125 Object Oriented Software Engineering

Lesson 6

CONTENTS

Learning Objectives

This lesson is intended to:

- Give an insight into the concepts of modeling and notations of the different UML diagrams.

Learning Outcomes

At the end of studying this lesson, you should be able to

- Analyze different UML concepts and illustrate the UML design for real-time project.

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6125 Object Oriented Software Engineering

UNIT - IV

Lesson 7

CONTENTS

Learning Objectives

This lesson is intended to:

Explain the strategies behind designing a project and track progress.

Learning Outcomes

At the end of studying this lesson, you should be able to

Execute the object-oriented and software reusability concepts.

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6125 Object Oriented Software Engineering

Lesson 8

CONTENTS

Learning Objectives

This lesson is intended to:

Explain the strategies behind designing a project and track progress.

Learning Outcomes

At the end of studying this lesson, you should be able to

Execute the object-oriented and software reusability concepts.

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6125 Object Oriented Software Engineering

UNIT - V

Lesson 9

CONTENTS

Learning Objectives

This lesson is intended to:

Provide knowledge on software configuration management.

Learning Outcomes

At the end of studying this lesson, you should be able to

- Implement and test software configuration management techniques in Software engineering environment.

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6125 Object Oriented Software Engineering

Lesson 10

CONTENTS

Learning Objectives

This lesson is intended to:

- Provide knowledge on software configuration management.

Learning Outcomes

At the end of studying this lesson, you should be able to

- Implement and test software configuration management techniques in software engineering environment.

Overview

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6126 Data Structures and Algorithms using C/C++ Laboratory

CAD 6126 - DATA STRUCTURES AND ALGORITHMS USING C/C++ LABORATORY

OBJECTIVES:

The objective of this course is to

- Explain various sorting and searching algorithms.
- Explore linear and non-linear data structures
- Design and implement algorithms for searching and sorting
- Design and implement operations on stacks, queues, and linked lists
- Introduce the Binary Search Tree implementation.

CAD 6126 Data Structures and Algorithms using C/C++ Laboratory

LIST OF PROGRAMS

1. Write a C program to create a Stack and do the following operations using arrays and linked lists (i) Push (ii)Pop
2. Create a Queue and do the following operations using arrays and linked lists
   i)   Add (ii) Remove
3. Write a C program to implement doubly linked list
4. Write a C program to sort a list of N elements of integer type using quick sort Algorithm
5. Write a C program to sort a list of N elements using Bubble sort Technique
6. Write a C program to search for an element in an array using Binary search
7. Write a C++ program to implement insertion sort method to sort a givenlist of integers in descending order.
8. Write a C++ program to implement selection sort method to sort a given list of integers in descending order.
9. Write a C++ program to Create a binary search tree and do the following traversals
   i) In-order (ii) Pre order (iii) Post order .
10. Perform the following operations in a given graph (i)Depth first search (ii)Breadth first search
11. Find the shortest path in a given graph using Dijkstra algorithm.
12. Apply the divide and Conquer technique to arrange a set of numbers
13. Construct optimal binary search trees using dynamic programming method of problem solving.
14. Implement knapsack problem using backtracking
15. Find the solution of traveling salesperson problem using branch and bound Technique.

OUTCOMES:

On completion of this course, students will be able to

- Apply various data structure such as stacks, queues, trees , linked list and graphs to solve various computing problems .

- Choose and implement efficient data structures and apply them tosolve problems.

- Implement and analyze various searching techniques and sorting techniques

- Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs

- Develop program that implements kruskal's algorithm, prims, binary search, all types of sorting, greedy algorithm and backtracking technique.

Course Title	:	PROGRAMMING IN C and C++ LABORATORY
Course Code	:	CAD 6127
Course Faculty	:	Dr. P. Amudhavalli
Theory / Practical	:	Practical
Semester	:	I
Academic Year	:	2021-2022
Department	:	Computer Applications
No. of Credits	:	1
Course Learning Objectives	:	• Describe the basic concepts of C constructs. • Provide knowledge on strings, pointers, functions,structures. • Explain the necessity of Object-Oriented Programming over Traditional programming. • Illustrate concepts of Object-Oriented programming language. • Demonstrate the use of file programming.
Course Pre-Requisites	:	Basic Knowledge of Programming in OOP.

CAD 6127 Programming in C And C++ Laboratory

S. No	Topic	Reference/ Source
1.	Programs using I/O statements and expressions.	T1 & T2
2.	Programs using decision-making constructs.	T1 & T2
3.	Programs using looping statements (also demonstrate the use of break and continue statements).	T1 & T2
4.	Programs using single dimensional and multi-dimensional arrays.	T1 & T2
5.	Programs using string handling functions.	T1 & T2
6.	Programs using functions and recursive functions.	T1 & T3
7.	Demonstrate the use of structure and Union	T1 & T3
8.	Demonstrate the use of Pointers.	T1 & T3
9.	Demonstrate the use of file handling.	T1 & T3
10.	Simple Programs using Data Types, Input/output statementsand Arithmetic Operators, Conditional statements and different loops	T4 & T5
11.	Programs using structures and functions	T4 & T5
12.	Programs using classes, objects and scope resolution operator	T4 & T5
13.	Programs using Constructors and destructors.	T4 & T5
14.	Demonstration of array of object.	T4 & T5
15.	Demonstration using this->pointer.	T4 & T5
16.	Application Programs using Simple, Multiple, Multilevel, Hierarchical and Hybrid Inheritance.	T4 & T5
17.	Demonstration of Virtual function, Friend function and Static function.	T4 & T5
18.	Programs to implement function overloading.	T4 & T5
19.	Programs using operator overloading for Binary, Unary and relational operators.	T4 & T5
20.	Demonstration of pointers to base class and derived class member functions.	T4 & T5
21.	Programs using Function and Class template	T4 & T5
22.	Program to access a record using file handling.	T4 & T5

Course material and References

T1. Reema Thareja, Computer Fundamentals and Programming in C, Oxford Press,2012.

T2. Programming in C , Pradip Dey, Manas Ghosh, 2nd edition Oxford UniversityPress,2013.

T3. Programming in ANSI C, E. Balaguruswamy, 5th Edition, McGrawHill, 2010.T4. B. Trivedi, "Programming with ANSI C++", Oxford University Press, 2007.

T5. Bjanne Stroustrup, The C++ Programming Language, 4th Edition, Addison Wesley,2013.

Expected outcome of the course:

- Develop C programs for simple applications making use of basic constructs, arrays andstrings.

- Develop C programs involving functions, recursion, pointers, and structures.

- Develop C++ programs using Class, Objects, array of object, function overloading, operator overloading.

- Develop C++ programs using the concepts of Object-Oriented Programming features.

- Design applications using sequential and random-access file processing.

UNIT - I

Lesson 1

CONTENTS

Learning Objectives

This topic is intended to

- Learn how to create tables which are fundamental storage blocks of data.

- Learn how to place constraints on data that is entered on tables to
  ensure data integrity.

Learning Outcomes

At the end of studying this lab, you should be able to:

• Apply iterative programming at database level.

• Write programming blocks with conditional structure, assignment structure, loop structure, etc.

Overview

1.1   Execute a single line and group functions for a table.

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6128 DBMS Laboratory

Lesson 2

CONTENTS

Learning Objectives

This topic is intended to

- Learn how to add, change and remove data from tables.

- Learn how to select a subset of the data you want to see from the
  collection of tables and data.

Learning Outcomes

At the end of studying this lesson, you should have

- Apply iterative programming at database level.

- Write programming blocks with conditional structure, assignment structure, loop
  structure, etc.

Overview

1.1   Execute DCL and TCL Commands.

Summary   Further Reading

Keywords

Self-Assessment Questions

UNIT - II

Lesson 3

CONTENTS

Learning Objectives

This Topic is intended to:

- Learn how to add, change and remove data from tables.

- Learn how to select a subset of the data you want to see from the
  collection of tables and data.

Learning Outcomes

At the end of studying this lesson, you should be

- Use exception Handling, Transaction oriented programs, Stored procedures, functions, packages, etc.
- Implement cursors which would allow row wise access of data.

Overview

Create and manipulate various DB objects for a table.

Summary

Keywords

Self-Assessment Questions

Further Reading

Lesson 4

Learning Objectives

This Topic is intended to:

- Learn how to add, change and remove data from tables.

- Learn how to select a subset of the data you want to see from the

  collection of tables and data.

Learning Outcomes

At the end of studying this lesson, you should be able to

- Use exception Handling, Transaction oriented programs, Stored procedures, functions, packages, etc.
- Implement cursors which would allow row wise access of data.

Overview

1.1   Create views, partitions and locks for a particular DB.

Summary

Keywords

Self-Assessment Questions

Further Reading

UNIT - III

Lesson 5

CONTENTS

Learning Objectives

This lesson is intended to:

- Learn how to PL/SQL supports programmers to catch such conditions using EXCEPTION block.

Learning Outcomes

At the end of studying this lesson, you should be able to

- Use exception Handling, Transaction oriented programs, Stored procedures, functions, packages, etc.

Overview

Write PL/SQL procedure for an application using exception handling.

Summary
Keywords
Self-Assessment Questions
Further Reading

Lesson 6

CONTENTS

Learning Objectives

This Topic is intended to:

- Learn how to PL/SQL Procedure for an application using cursors.

Learning Outcomes

At the end of studying this lesson, you should be able to

- Implement cursors which would allow row wise access of data.

Overview

1.1   Write PL/SQL procedure for an application using cursors.

Summary

Keywords

Self-Assessment Questions

Further Reading

UNIT - IV

Lesson 7

CONTENTS

Learning Objectives

This Topic is intended to:

- Learn how to use the functions to prepare the reports.

Learning Outcomes

At the end of studying this lesson, you should be able to

- Use the functions for report generation for applications.

Overview

Write a DBMS program to prepare reports for an application using functions.

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6128 DBMS Laboratory

Lesson 8

CONTENTS

Learning Objectives

This Topic is intended to:

- Learn how to combine table and use functions, triggers, views and partitions.

Learning Outcomes

At the end of studying this lesson, you should be able to

- Use triggers which would allow you define pre and post actions when something change in the database tables

Overview

1.1   Write a PL/SQL block for transaction operations of a typical application using triggers.

Summary

Keywords

Self-Assessment Questions

Further Reading

UNIT - V

Lesson 9

CONTENTS

Learning Objectives

This lesson is intended to:

- Learn how to do PL/SQL block for transaction operations of a typical application using package.

Learning Outcomes

At the end of studying this lesson, you should be able to

- Use PL/SQL block for transaction operations of a typical application using package Overview

    Write a PL/SQL block for transaction operations of a typical applicationusing package.

Summary

Keywords

Self-Assessment Questions

Further Reading

CAD 6128 DBMS Laboratory

Lesson 10

CONTENTS

Learning Objectives

This lesson is intended to:

- Learn to develop an application using any front end and back end tool

  (make use of ER diagram and DFD).

Learning Outcomes

At the end of studying this lesson, you should be able to

- Use ER diagram and DFD to developing the front end and Back end tool.

Overview

1.1   Design and develop an application using any front end and back end tool(make use of ER diagram and DFD).

Summary

Keywords

Self-Assessment Questions

Further Reading