Advance Diploma in Software Engineering

CCE offers many job oriented computer courses."Advance Diploma in Software Engineering" is one of the CCE approved course. The detailed contents of this course are in the attachment.

COURSE CODE: CCE-D3

ELIGIBILITY: Graduation

DURATION: 1 Year

SYLLABUS

Semester-I

Computer Organization

Computer Evolution & Arithmetic

- A Brief History of computers , Designing for Performance , Von Neumann Architecture , Hardware architecture , Computer Components , Interconnection Structures , Bus Interconnection , Scalar Data Types , Fixed and Floating point numbers , Signed numbers , Integer Arithmetic , 2's Complement method for multiplication , Booths Algorithm , Hardware Implementation , Division , Restoring and Non Restoring algorithms , Floating point representations , IEEE standards , Floating point arithmetic.

The Central Processing Unit

- Machine Instruction characteristics , types of operands , types of operations , Addressing modes , Instruction formats , Instruction types , Processor organization , Intel 8086 as example , Programmers model of 8086 , max/min mode , Register Organization ,

Instruction cycles , Read Write cycles , 8086 assembly instruction examples to explain addressing modes.

The Control Unit

- Single Bus Organization , Control Unit Operations : Instruction sequencing , Micro operations and Register Transfer. Hardwired Control : Design methods – State table and classical method , Design Examples - Multiplier CU. Micro-programmed Control: Basic concepts , Microinstructions and micro - program sequencing

Memory Organization

- Characteristics of memory systems , Internal and External Memory , Types of memories : ROM : PROM , EPROM , EEPROM , RAM : SRAM , DRAM , SDRAM , RDRAM High-Speed Memories : Cache Memory , Organization and Mapping Techniques , Replacement Algorithms , Cache Coherence , MESI protocol.Virtual Memory : Main Memory allocation , Segmentation , Paging , Address Translation Virtual to Physical.

I/O Organization

- Input/Output Systems , Programmed I/O , Interrupt Driven I/O , 8086 Interrupt structure , Direct Memory Access (DMA) , 8237 features Buses and standard Interfaces : Synchronous , Asynchronous , Parallel I/O 8255 features , Serial I/O 8251 features , PCI , SCSI , USB Ports Working mechanisms of Peripherals : Keyboard , Mouse , Scanners , Video Displays , Touch Screen panel , Dot Matrix , Desk-jet and Laser Printers.(features and principles)

Windows 7

- Introduction To Window 7 And Its Features , Hardware Requirements Of Windows , Window Structure,Desktop,Taskbar,Start Menu , Working ,With Recycle Bin –Restoring A Delete File ,Emptying The Recycle Bin , Managing Files, Folders And Disk Navigating Between Folders ,Manipulating Files And Folders ,Creating New Folder ,Searching Files And Folder My Computer Exploring Hard Disk ,Copying And Moving Files And Folder from One Drive To Another Formatting Floppy Drive ,Windows Accessories-Calculator ,Notepad ,Paint, Wordpad ,Character Map,Paint

Windows Fundamental

- Windows is an operating system , Windows 7 Active desktop , Multi user account , Data protection features , Playing MP3 Sound and 7 , Windows desktop fundamental , Desktop , Taskbar , Icons , My computer , My Document , Recycle bin , Folder.

Windows 8

- Introduction To Window 8 Microsoft Windows 8! It's a robust, powerful operating system that gives you an efficient way to manage all the apps, programs, files, and folders you use regularly. In this course, you'll learn the basics so you can make the most of this operating system for both work and fun.

  You'll start by exploring how to move around within Windows 8 with the new Start screen, Charms bar, and desktop. You'll find out how to manage apps and programs on the Start screen and how to customize the Start screen and desktop areas.

  Finding files and folders on your Windows 8 system is easy, and you'll learn how, whether you're looking for files stored on your hard drive or on an external drive. You'll also see how to create basic text documents using WordPad and discover how to organize, manage, and edit photos in Windows 8. Finally, you'll gain an understanding of how to protect your files, update Windows 8, and access the Internet with Windows 8's new Internet Explorer browser.

  By the time you finish this course, you'll be ready to have more fun with Windows 8 and be more productive in your work.

Computer Applications (Word , Excel , Power Point)

Office package

- Word processor Software , Spreadsheet software , Presentation software , Database Management software

MS Word

- Introduction to Ms Office , Introduction to Ms Word , How to Start , Components of Ms Word , File Menu , Edit Menu , View Menu , Insert Menu , Format Menu , Tools Menu , Table Menu , Window Menu , Help Menu

MS Excel

- Introduction to MsExcel , Calculations , Formula , Functions , Insert Row/Columns , Create Chart , Format Sheet

Tools Menu

- Goal Seek , Scenario , Auditing

Data Menu

- Sort , Filter , Advance Filter , Sub total , Forms , Validations , Table , Consolidate , Pivot table , Window , Help

Ms PowerPoint

- Introduction , Insert New Slide , Format Slide , Slide Show

Object Oriented Programming (C++)
Introduction to programming concept

Introduction to programming concept

- Types of programming language , Low level language , High level language , Types of language processor , Header file

Structure of programming language

- Program structure :-Comment , Define columns &Rows

Data type in C

- Introduction to data type , Variables , Input statement

Operators and expression

- Arithmetic operators , Increment and Decrement operator , Relational operator , Logical operator , And operator , Or operator , Not operator , Conditional operator

Decision control structure

- Introduction to Decision Making statement , The switch statement

loop control structure

- Introduction , For loop , While loop , Do while loop , Loop termination

Arrays

- Introduction to arrays

Function

- Introduction to function , Types of function

Structure

- What is Structures , Structure in c , The dot operator , Arrays of Structure

Introduction to C++

Overviews of C++

- Object oriented Programming, concept , Advantage & ,usage of C++ . Classes and objects :classes structure and classes, union and classes, Friend function ,Friend classes, Inline function ,Scope resolution operator, Static class members, Static data members function, passing object to function, Returning objects , Object assignment.

Constructor & Destructor

- Constructor and destructor: Introduction constructor , parameterized constructor , multiple constructor in a class , constructor with default argument , copy constructor , copy constructor , Default argument ,destructor.

Operator overloading

- function & operator overloading: function overloading , overloading constructor function finding the address of an overloading function , operator overloading: creating a member operator function , Creating prefix and postfix form of the increment & decrement operator , overloading the shorthand operation (i .e. +=,-=etc) , operator overloading restrictions , operator overloading using friend function , overloading loading Some special operators , overloading [ ],(),-,comma operator , overloading <<.

Inheritance

- Base class access control , protected member , Protected base class Inheritance , Inheritance multiple base class , constructors , destructors & Inheritance , when constructor & destructor function are expected , Passing parameter to base class constructors , grating access , Virtual functions & Polymorphism: virtual function , pure virtual function , early Vs , late binding.

The C++ input /output system basic

- C++ stream , the basic stream classes: C++ Predefined stream , formatted I/o: formatting using the ios member , setting the format flags , clearing format flags , an overloaded form of self

Business Data Processing (Data Structure)
Introduction

- Basic Terminology , Elementary Data Organization , Data Structure operations , Algorithm Complexity and Time-Space trade-off

Arrays

- Array Definition , Representation and Analysis , Single and Multidimensional Arrays , address calculation , application of arrays , Character String in C , Character string operation , Array as Parameters , Ordered List , Sparse Matrices , and Vectors.

Stacks

- Array Representation and Implementation of stack , Operations on Stacks : Push & Pop , Array Representation of Stack , Linked Representation of Stack , Operations Associated with Stacks , Application of stack : Conversion of Infix to Prefix and Postfix Expressions , Evaluation of postfix expression using stack.

Recursion

- Recursive definition and processes , recursion in C , example of recursion , Tower of Hanoi Problem , simulating recursion.Backtracking , recursive algorithms , principles of recursion , tail recursion , removal of recursion.

Queues

- Array and linked representation and implementation of queues , Operations on Queue : Create , Add , Delete , Full and Empty.Circular queue , Deque , and Priority Queue.

Linked list

- Representation and Implementation of Singly Linked Lists , Two-way Header List , Traversing and Searching of Linked List , Overflow and Underflow , Insertion and deletion to/from Linked Lists , Insertion and deletion Algorithms , Doubly linked list , Linked List in Array , Polynomial representation and addition , Generalized linked list , Garbage Collection and Compaction.

Trees

- Basic terminology , Binary Trees , Binary tree representation , algebraic Expressions , Complete Binary Tree.Extended Binary Trees , Array and Linked Representation of Binary trees , Traversing Binary trees , Threaded Binary trees.Traversing Threaded Binary trees , Huffman algorithm.

Searching and Hashing

- Sequential search , binary search , comparison and analysis , Hash Table , Hash Functions , Collision Resolution Strategies , Hash Table Implementation.

Sorting

- Insertion Sort , Bubble Sorting , Quick Sort , Two Way Merge Sort , Heap Sort , Sorting on Different Keys , Practical consideration for Internal Sorting.

Binary Search Trees

- Binary Search Tree (BST) , Insertion and Deletion in BST , Complexity of Search Algorithm , Path Length , AVL Trees , B-trees.

Graphs

- Terminology & Representations , Graphs & Multi-graphs , Directed Graphs , Sequential Representations of Graphs , Adjacency Matrices , Traversal , Connected Component and Spanning Trees , Minimum Cost Spanning Trees.

File Structures

- Physical Storage Media File Organization , Organization of records into Blocks , Sequential Files , Indexing and Hashing , Primary indices , Secondary indices , B+ Tree index Files , B Tree index Files , Indexing and Hashing Comparisons.

Structured System Analysis & Design

System Concept

- Definition , characteristics , elements of System , Physical and abstract System , Open and closed systemUsers requirements an analysis , fact finding process and techniques , System Performance constraints and identification of systems , Tools of structured Analysis , logical and physical model , context diagram , data dictionary data diagram , form driven methodology , pseudo codes , flow charts , system flow charts , run flow charts , input/output and form design , menu screen design , layout consideration

Organization of EDP

- Introduction Job responsibility and duties of EDP

Semester-II
Business Computing (Oracle/ PL SQL)

- Oracle Product details , Different data base model , RDBMS components –Kernel , Data dictionary , client /server computing and oracle , Overview of oracle architecture –oracle files , system and user process , Oracle memory , system data base object , protecting data.Oracle data type , working with tables , data Constraints , column level & table level constraints , defining different constraints on the table defining integrity constraints in the ALTER TABLE command , Select Command , logical operator , Range Searching , Pattern Matching , Oracle Function , Grouping data from table in SQL , Manipulation Data in SQL Joining Multiple Tables(Equi joins) , Joining a Table to self (Self joins) , Sub queries Union , intersect & Minus clause , creating view Renaming the column of a view , granting permissions –updating , Selection , Destroying view.

Java   Programming
Introduction of Java

- What is Java? , How to Get Java , A First Java Program , Compiling and Interpreting Applications , The JDK Directory Structure

Data types and Variables

- Primitive Data types ,Declarations , Variable Names , Numeric Literals , Character Literals , String , String Literals , Arrays , Non-Primitive Data types ,The Dot Operator

Operators and Expressions

- Expressions Assignment Operator , Arithmetic Operators Relational Operators Logical Operators Increment and Decrement Operators Operate -Assign operators (+ = , etc.) The Conditional Operator Operator Precedence Implicit Type Conversions The Cast Operator

Control Flow Statements

- Statements , Conditional (if) Statements , Data types and Variables 3 , Adding an else if , Conditional (switch) Statements , while and do-while Loops , for Loops , A for Loop Diagram , Enhanced for Loop , The continue Statement , The break Statement

Methods

- Methods , Calling Methods , Defining Methods , Method Parameters , Scope , Method Parameters

Object-Oriented Programming

- Introduction to Object-Oriented Programming , Classes and Objects , Fields and Methods , Encapsulation , Access Control , Inheritance , Polymorphism

Objects and Classes

- Defining a Class , Creating an Object , Instance Data and Class Data , Methods , Constructors , Access Modifiers , Encapsulation

Using Java Objects

- Printing to the Console , StringBuilder and StringBuffer , Methods and Messages toString , Parameter Passing , Comparing and Identifying Objects , Destroying Objects

Inheritance in Java

- Inheritance , Inheritance in Java , Casting , Method Overriding , Polymorphism , Super class

Packages

- The import Statement , Static Imports , Casting , CLASSPATH and Import , Defining Packages , Package Scope

Exception Handling

- Exceptions Overview , Catching Exceptions , The finally Block , Exception Methods , Declaring Exceptions , Defining and Throwing Exceptions , Errors and RuntimeExceptions

Input/Output Streams

- Overview of Streams , Bytes vs. Characters , Converting Byte Streams to Character Streams , File Object , Binary Input and Output , PrintWriter Class , Reading and Writing Objects , Basic and Filtered Streams

Collection Framework

- The Collections Framework , The Set Interface , Set Implementation Classes , The List Interface , List Implementation Classes , The Map Interface , Map Implementation Classes

Inner Classes

- Inner Classes , Member Classes , Local Classes , Anonymous Classes , Instance Initializers , Static Nested Classes

Introduction to Threads

- Non-Threaded Applications , Threaded Applications , Creating Threads , Thread States , Runnable Threads , Coordinating Threads , Interrupting Threads , Runnable Interface , ThreadGroups

Interfaces and Abstract Classes

- Separating Interface and Implementation , UML Interfaces and Realization , Defining Interfaces , Implementing and Extending Interfaces , Runnable Threads , Abstract Classes

Serialization

- Object Serialization , Serializable Interface , Serialization API , ObjectInputStream and ObjectOutputStream , The Serialization Engine , readObject and writeObject , Externalizable Interface

Visual Computing

- Basic Concept of Visual Computing , Digital Image Processing , Digital image generation , Learning Methods of vision

Data Communication & Networking

- Overview of computer networks and Internet, the OSI model TCP/IP , Ethernet Token Ring and Wireless and the methods they use of connecting , Data Link Layer Responsibilities , Internet Protocols , TCP IP Segment, IP Packet and Data Link Frame Formats , Wireless and Mobile networks , Application used in every day network related task.