DIPLOMA IN ADVANCED COMPUTING

1. Opertaring System

Linux Commands, Vi editor, Shell Scripting, Overview of OS, Processes, Scheduling & Synchronization, Memory management, File Systems, Case Study with Linux System Programming: Process, Signals, Semaphores & Mutex, Inter – Process Communication, POSIX Threads

2.OOP C++

Revision of C Programming, Pointers, Functions (Call by value and reference), Recursion, Arrays using Pointers, Structures, Union, Enumeration and Typedef, File handling,Discussion on Object oriented concepts:Classes and Objects, Access Specifiers, Overloading, Inheritance, Polymorphism,Beginning with C++,C++ Tokens, Initialization, C++ Operators,Static Members, Constant Members,Expressions,Control Structure,Functions in C++,Constructors, Encapsulating into an object,Destructors,Associations, Inner Classes,Memory Management and pointers,Inheritance, Virtual Functions, Polymorphism,Interfaces,Exception Handling,Managing Console I/O operations,Working with files,Advance Topics in C++ :Object Design and Templates,STL (Standard Type Libraries),RTTI (Run Time Type Identification),Advanced Typecasting,new data types,new operators,class implementation,namespace scope,operator keywords,new headers,C++ Containers

3.Algorithm & Data Structure

Define the problem, Identify the problem, Introduction to Problem Solving, Problem solving basics, Defining creativity v/s innovation, Find Creative Solutions using creativity tools

Effective problem solving approaches, Critical thinking and information analysis, Brainstorming, Reverse Brainstorming, Imagineering, Mind Mapping, Six Thinking Hats: A Tool to Strengthen Critical Thinking, Collaboration

Evaluate and Select solution :Pro's and Con's, Force field analysis, Feasibility/Capability Analysis, Decision analysis, evaluating problems, Choosing among alternatives, Qualitative analysis, discussing qualitative analysis techniques, Establishing objectives,

Algorithm & Data Structures: Introductory Concepts, Algorithm Constructs, OO design: Abstract Data Types (ADTs)

Basic Data Structures: Arrays, Stacks, Queues, Linked lists

Introduction to trees, Abstract trees, Tree traversals, Binary trees, Search trees, AVL trees

Searching & sorting algorithms: Objectives of Searching, The Sequential Search, The Binary Search, Introduction to sorting, Insertion sort, Bubble sort, Heap sort, Merge sort, Quick sort

Graph algorithms: Introduction to graph theory, Graph data structures, Graph traversals

Algorithm design: Greedy algorithms, Divide-and-conquer algorithms, Dynamic programming, Backtracking algorithms, Branch-and-bound algorithms, Application of Data structures

4.S/W Application Devlopement Tools & Techniques

Object Oriented Analysis and Design,UML,Software Engineering,Brief concept of Software Life Cycle Models,Agile Techniques for software development :Agile Principle and Mindset,Value-Driven Delivery,Stakeholder Engagement,Team Performance,Adaptive Planning,Problem Detection And Resolution,Continuous Improvement ,Brief of Tools and technologies,Software Development Tools & Techniques,Software Quality Assurance,Introduction to Coding Standards,Software Testing,Different Testing Tools,Test Driven Development (TDD),Project Management,Risk Analysis and Management,Case Study

5.Advance Web Programming

HTML 5:Elements ,Objects ,Events ,Canvas,Audio & Video Support,Geo-location Support

CSS: Styling HTML with CSS,Inline Styling (Inline CSS),External Styling (External CSS),CSS Fonts,The CSS Box Model,The id Attribute,The class Attribute,HTML Style Tags,

PHP: Introduction to PHP,Working with arrays,Functions,Forms,Handling date and Times,Working with Files,Session and state management,Database operations from PHP.

XML & Web Security :XML:Introduction to XML,XML Validation,Reason for XML,XML Tree Structure,XML DOM,XML DTD,XML Schema, XML style language,XML and XSLT,XML Parsing,XML parsers (DOM & SAX),XML WSDL,RSS Feed, Web Security:SQL Injection, Cross-Site Scripting (XSS), Security standards (OWASP),

AJAX: Introduction to Ajax,Web services and Ajax,Ajax using HTML, CSS, JavaScript,Ajax Framework and DOM,XMLHttpRequest,Ajax Architecture,

JSON: Introduction,Need of JSON, JSON Syntax Rules,JSON Data - a Name and a Value,JSON Objects,JSON Arrays,JSON Uses JavaScript Syntax,JSON Files,JSON & Security Concerns.

Responsive Web Design: Introduction,The Best Experience for All Users:Desktop,Tablet,

Mobile Bootstrap :Overview of Bootstrap,Need to use Bootstrap,Bootstrap Grid System, Grid Classes, Basic Structure of a Bootstrap Grid,Typography,Tables, Images, Jumbotron, Wells, Alerts, Buttons.

6.JavaScript Framework

Introduction to JavaScript Variable, statements, Operators, Comments, constructs, Functions, expressionsJavascript consoleScope, Events, Strings, String Methods, Numbers, Number Methods, Dates, Date Formats, Date MethodsArrays, Array Methods

Object Oriented Programming: Method, Constructor, Inheritance, Encapsulation, Abstraction, Polymorphism,

Javascript Validations,Document Object Model, Document and Events (DOM Manipulation), Security in Java Script

Jquery: Basics of jQuery, jquery selection and events, jQuery Effects, jquery traversal and manipulation,Data attributes and templates, jQuery Plugins, Jquery / Google Web Toolkit.

Node.js: Introduction to Node.js,Node modules, Developing node.js web application, Event-driven I/O server-side JavaScript,Express: Introduction to Express,First Express Application,Application, Request and Response Objects,Implementing MVC Pattern,Express application configuration,Rendering Views.

AngularJS: Introduction to AngularJS, Structuring AngularJS application, MVC in AngularJS, AngularJS routing, AngularJS services,

Testing Web Applications: Introduction to JavaScript Testing,Testing Express Applications,Testing AngularJS Applications

7.Database Technoloies

Database Concepts: Client/Server Computing,RDBMS Technologies,Codd's Rules,Data Models,Normalization Techniques,ER Diagrams,

SQL : Overview of OORD,Introduction SQL*Plus,DDL, DML and DCL,Tables, Indexes and Views,Clusters, Sequences and Snapshots,Cursors,Stored Procedures, Triggers, Packages, Introduction to No SQL, MongoDB (Virtual DB)

8.Java Technologies-I(Core Java)

Data Types, Operators and Language, Constructs, Inner Classes and Inheritance, Interface and Package, Exceptions, Collections, Threads, Java.lang, Java.util, Java.awt, Java.io , Java Persistent, Servlets, Java Virtual Machine

9.Java Technologies-II(Web Based Java)

Java Server Pages, JDBC, JavaBeans, Java Security,Naming Services,Java Annotations, Java Mail, Java Messaging Services,Transactions, Apache maven, Introduction to Struts Framework, Introduction to hibernate, HQL, Hibernate, Spring Framework, Hands on Web services – JSON/XML/oData (data format conversation)

10.Microsoft.Net Technologies

Introduction to NET 4.5 Frameworks: Application Domain,Language Interoperability,.NET Framework Class Library,Assemblies,Introduction of Windows Presentation Foundation,Introduction of Windows Communication Foundation.

C# .NET 4.5: Need of C#,Operators,Namespaces & Assemblies,Arrays,Preprocessors,Delegates and Events,Boxing and Unboxing,Regular Expression,Collections ,Exceptions Handling,Introduction to win forms.

ASP .NET 4.5: Building .NET components,ADO.NET 4.5,Querying with LINQ,Custom Control,Master Pages, Themes and skins,Introduction to Web Services,MS.NET MVC Framework,Enterprise Services,Personalization and Localization,Deployment

11.Application Security & Testing

Web Application Security challenges, Advanced Web application attacks and remedy, Secure Software Development Life Cycle (SDLC), Web server security, Security standards (OWASP), Ways to strengthen web application security, Database testing: SQL Injection, Security testing, Performance testing

12.Upcoming Technology(Parallel Computing)

Architecture for software,What is a thread, Strategies of Multi-Threading,Task/Data Parallelism, OpenMP, OpenMP Programming Model, OpenMP constructs