

PDAC - PROFOUND - DIPLOMA IN ADVANCED COMPUTING

DURATION : 5 Months (Full Time)

PRE-REQUISITES :

Basic Knowledge of Computers

ELIGIBILITY :

BE | BTech | MCA | MCS | MCM | MSc | BCA | BCS
| BSc etc

COURSE OVERVIEW

01- PROGRAMMING FUNDAMENTALS	02- WEB FUNDAMENTALS
OS Fundamentals & Networking Database, SQL, PL-SQL Programming in C Programming in C++	HTML 5.0 CSS 3.0 JavaScript XML
03- JAVA TECHNOLOGIES	04- WEB PROGRAMMING
Core JAVA Advanced JAVA JAVA Frameworks	PHP with MySQL
05 - SOFTWARE TESTING TECHNIQUES & TOOLS	06 - UPCOMING TECHNOLOGIES
Manual Testing Test Management Tools Defect Tracking Tools Selenium WebDriver	Android Programming AngularJS Big Data & Hadoop



PDAC- COURSE CONTENTS

01- Programming Fundamentals

Introduction to OS & Networking

- Overview of Operating System
- Concept of Process and Thread
- Memory Management
- Network Basics
- Classification of Networks
- Network Topologies
- Network Communication and Protocols
- TCP/IP fundamentals

Database Fundamentals & SQL

- Database fundamentals, Normalization
- SQL / PL-SQL
- Stored Procedure, Function
- Triggers

Programming in C

- Introduction to Programming
- Data Types, Operators
- Compilation, Linking, Execution, Debugging
- Integrated Development Environment
- Console Input and Output
- Control Structures
- Functions
- Pointers
- Storage classes, Dynamic Memory allocation
- Arrays, Strings
- File IO
- Structures and Unions
- Command Line arguments
- Macros

C++

- Concepts of Object Oriented Programming
- Class and Object
- C++ as a better C
- Constructor, Constructor Overloading
- Static Data Member
- Static Member function, Inline function, Friend function
- Operator Overloading
- Inheritance
- Polymorphism
- File IO
- Exception Handling
- RTTI, Type Casting
- Templates
- Namespaces

02- Web Fundamentals

HTML

- HTML Basics: Structure, Elements and Attributes
- Various Input fields in html
- Tables, Frames, Lists, Layouts
- Fonts, Colors
- Images
- HTML Forms
- Cascading Style Sheet

Java Script

- Java Script Language basics
- Variables, Data Types, Functions, Operators
- Control flow using conditional and Iterative statements
- Managing HTML DOM and Events
- Java Script Objects

XML

- XML Basics : Structure
- Elements and Attributes

03- Java Technologies

Core Java

- Introduction To Java
 - What is Java?
 - Need of Java Language
 - Features of Java Language
 - Setting Java Environment
- Working with Java
 - Java architecture
 - Concept of class Loader, JVM, JIT
 - First Java Application

- Basics of Java
 - Data types
 - Variables, Literals etc.
 - Operators in Java
 - Java statements & types.
- OOP's Concept
 - What is OOP's
 - Why we need OOP's
 - What is Object?
 - Object Characteristics
 - Concept of Classes & Object creation in Java
- OOP's Features
 - Abstraction & Encapsulation
 - Explore java.lang package
 - Access modifiers, static concept
 - String Handling in Java
 - Package programming
- OOP's Features
 - Polymorphism & Inheritance
 - Method overloading
 - Inheritance & types using extends, super keyword.
 - Method overriding, final keyword
 - Abstract class & Interface
- Java Misc Concept
 - Inner class
 - Reflection in Java
 - Wrapper classes
- Exception Handling
 - What is Exception
 - Exception type & hierarchy
 - Handling Exception using try-catch
 - throw & throws
 - Custom Exception
 - Assertion
- Multithreading in Java
 - Concept of Multitasking
 - What is Thread
 - Thread Lifecycle & State

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- Thread API
- Thread Priority
- Synchronization in Multithreading
- Inter thread communication
- I/O Programming & File Handling
 - What is Stream?
 - Types of Stream in Java
 - ByteStream & concern classes
 - CharacterStream & concern classes
 - Serilization in Java
 - Overview on java.nio package
- GUI Programming
 - What is GUI?
 - Need of GUI Programming.
 - Explore java.awt package
 - Event Handling
 - Layout management
 - Swing programming
 - Enhanced componenet of Swing.
- Collection Framework
 - What is collection Framework?
 - Need of Collection
 - Collection using Generics
 - Set & impemented classes
 - List & implemented classes
 - Map & implemented classes
 - Comparable Vs Comparator
- JDBC Programming
 - What is JDBC?
 - Need of JDBC
 - JDBC Driver & types
 - JDBC architecture
 - JDBC API
 - Statement Vs PreparedStatement
 - JDBC Transaction
- Networking in Java

Advanced Java

- Advance JDBC
 - What is Stored Procedure?
 - JDBC using Stored Procedure

- ResultSetMetaData API
- DatabaseMetaData API
- Data Access Object Design Pattern
- JDBC application using Swing, DAO.
- HTML & XML
 - Overview on HTML
 - HTML form tag & implementation
 - Overview on XML
- CSS & JavaScript
 - Overview on CSS
 - Implementing CSS in HTML
 - Overview on JavaScript.
- Overview on JEE
 - Concept of Web Application
 - Structure of Web Application
 - Setting up Web application with Apache Tomcat
- Servlet Basics
 - What is Servlet?
 - Servlet Structure & LifeCycle
 - Servlet API
 - GenericServlet Vs HttpServlet
 - Deployment Descriptor
 - First Servlet application
- Servlet API
 - ServletConfig vs ServletContext
 - Servlet using JDBC
 - RequestDispatcher & methods.
- Session Tracking in Java
 - What is Session Tracking?
 - Why we need Session Tracking?
 - Session Tracking mechanism
 - Cookies
 - URL rewriting
 - Hidden Form Field
 - HttpSession
 - ServletFiler API
- Java Server Pages (JSP)
 - Introduction to JSP
 - JSP Features over Servlet
 - JSP Lifecycle
 - JSP API

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- JSP Tag
 - JSP Scripting Element
 - Declaration, Scriptlett, Expression tag
 - JSP Directive Tag
 - Page, include, taglib tag
 - JSP Action tag
 - JSP implicit object
- JSP Specification
 - Custom tag
 - Expression Language
 - JSTL in JSP
- Concept of MVC
 - MVC Model 1
 - MVC Model 2
- Frameworks in Java
 - Struts2.x Framework
 - ORM tool - Hibernate
 - Spring Framework

Java Frameworks

Struts 2.x

- Introduction to Struts2.x
 - Overview on MVC model
 - MVC Model-1
 - MVC Model-2
 - Web Application Framework
 - What is Struts 2
 - Setting Up Struts 2 in Eclipse
 - Writing a Struts 2 Hello World Application
 - Struts 2 Workflow
 - Practical on above point.
- Struts2.x Action
 - Concept of POJO
 - Action interface
 - ActionSupport class
 - Responsibilities of Action
 - Aware interfaces
 - Practical on above point.
- Struts2.x Tag
 - UI Tag
 - Data Tag
- Practical on above point.
- Validation in Struts2.x
 - Validation in Action
 - Validation Framework
 - Custom Validators
 - Practical on above point.
- Interceptor in Struts2.x
 - Built-in Interceptor
 - Custom Interceptor
 - Practical on above point.
- Struts2.x Misc Concept
 - ValueStack
 - ActionContext
 - OGNL
 - Result Type
 - Big picture of Struts2.x
 - Practical on above point.

Hibernate

- Introduction
 - Limitation with JDBC
 - What is ORM?
 - What is Hibernate?
 - Hibernate Architecture
 - Understanding Hibernate First Application
 - Practical on above point.
- Hibernate Example
 - CRUD Operation Using Hibernate
 - Hibernate with Annotation
 - Hibernate Generator classes
 - Practical on above point.
- Hibernate Mapping
 - Component Mapping
 - Inheritance Mapping
 - Practical on above point.
- Collection Mapping
 - List
 - one-to-many by List
 - Set
 - one-to-many by Set
 - Map
 - many-to-many by Map

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- Practical on above point.
- HQL & Criteria
 - What is HQL?
 - Understanding HQL with Application
 - Problems with HQL
 - What is Criteria
 - Understanding Criteria with Application
 - Practical on above point.
- Caching in Hibernate
 - First level cache
 - Second level cache
 - Intergrate Struts2.x with Hibernate.
 - Practical on above point.

Spring

- Introduction
 - What is Spring?
 - Spring Features
 - Spring Modules
 - Dependency Injection
 - IoC container
 - What is Bean?
 - Spring First Application
 - Practical on above point.
- Spring Core
 - Collection Injection
 - Method Injection
 - Constructor Injection
 - InnerBean
 - Scope
 - Practical on above point.
- Spring DAO
 - Spring JDBC Template
 - Spring Hibernate Template
 - Integrate Spring with Hibernate.
 - Practical on above point.
- Spring MVC
 - Spring DispatcherServlet class
 - Spring configuration
 - Request Processing life cycle
 - Spring MVC Hello World Example

- Spring MVC Form Handling Example.
- Practical on above point.
- Spring AOP
 - What is Cross-cutting concern?
 - Solution-Spring AOP
 - AOP Terminology
 - Aspect
 - Joint Point
 - Advice etc.
 - Spring AOP Example.
 - Practical on above point.
- Enterprise Java Project level Application.

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04- PHP with MySQL

PHP with MySQL

- Basics of PHP
 - Introduction to Client Server Architecture and how PHP works.
 - Introduction to Webservers, WAMP, XAMPP, LAMP
 - What is a Web Application
 - Web Application Architecture
 - Terminology of Web Application
 - Client Side & Server Side Scripting
 - Basic PHP programs
- Fundamentals of PHP
- Basic syntax, Types, Variables, Constants, Expressions, comments
- Operators
 - ◆ Operator Precedence, Arithmetic, Assignment, Bitwise, Comparison Operators, Incrementing Decrementing, Logical, String Operators
- Control Structures
 - ◆ if_else, else_if ladder, looping statements-while, do_while, for, conditional operators, Switch
- PHP Language reference
 - Functions
 - ◆ functions using pass by value
 - ◆ pass by reference
 - ◆ use of global variables
- Arrays
 - indexed array, associative arrays, array functions
- String Handling in PHP
 - string handling functions
- Using Web Forms
- Super Global Variables
 - \$GLOBALS,\$_SERVER, \$_GET, \$_POST , \$_REQUEST

- Data validation
- Data Filtering
 - Sanitization and Validation
- Exceptions
- Session and State management
 - session , \$_SESSION, cookie ,\$_COOKIE, User Identification

01- PHP (CONTD.)

MySQL

- MySql Administration in PHP
 - Creating MySql database
 - Creating tables
 - Insert / update / Delete data from Tables
 - Retrieving data from Table(s)
 - Executing SQL queries
- Working with Databases
 - Connecting to Database
 - Retrieving records from the database
 - Retrieving data from resultset
- Handling XML
- File handling
 - Opening a file
 - Reading the contents of the file
 - Writing Contents in the file
 - closing the file
- Sending emails
- Regular Expression
- JSON
 - Basic concepts of object and classes in JSON
- AJAX using PHP
 - Ajax architecture, Ajax with PHP code
- Jquery
 - window.onload event, Ready function,wrapped set, event properties

05- Software Testing

Introduction to Software Applications

- What is Software Application
- Types of Software Applications
- Components of Software
- One Tier Architecture / Two Tier Architecture / Three Tier Architecture / Multi Tier Architecture
- Application Domains
- Application Models

Software Development Life Cycle

- Phases of SDLC in detail
- Project Team Organization Structure
- Test Team Roles & Responsibilities
- Various Application Issues
- Waterfall Model
- Iterative Model
- Spiral Model
- Agile Model

Introduction to Software Testing

- What is Software Testing ?
- 'V' model in detail
- Verification Techniques
- Reviews
- Inspections
- Walkthrough
- Validation
- Levels of Testing
- Unit Testing
- Integration Testing
- System Testing
- User Acceptance Testing

Software Testing Life Cycle

- Requirements Analysis
- Test Planning
- Test Design
- Test Execution
- Test Closure
- Economics of Testing

Testing Methodologies

- Black Box Testing
 - Advantages & Disadvantages
- White Box Testing
 - Statement Coverage
 - Decision Coverage

• Test Design

- Test Scenarios
 - Creating Test Scenarios from Use Case Diagram
- Test Cases
 - Creation from Test Scenarios
 - Test Case Template
 - Test Case Review
- Requirement Traceability Matrix
- Test Case Management Tool
- Test Data
- Test Data Creation Techniques
 - Boundary Value Analysis
 - Equivalence Class Partitioning
 - Error guessing
 - Decision Table
 - State Transition Testing
- Negative Testing
- Best Practices of Test Design

Test Execution

- Test Environment Setup
- Smoke / Sanity Testing
- Test Case Selection for Execution
- Running Test Cases
- Logging Defects
- Retesting and Regression
- Challenges in Test Execution
- Test Closure Report

PDAC - COURSE CONTENTS

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Defect Management

- What is a Defect?
- Why do bugs occur?
- Defect Reporting
- Defect Report Template
- Defect Severity & Levels
- Defect Priority & Levels
- Defect Life Cycle
- Defect Tracking Tools
- Defect Prevention

Types Of Non Functional Tests

- User Interface Testing
- Usability Testing
- Localization Testing
- Internationalization Testing
- Accessibility Testing
- Performance Testing
- Load Testing
- Endurance Testing
- Stress Testing
- Configuration Testing
- Compatibility Testing
- Installation Testing
- Security Testing

Quality

- Software Quality Factors
- Quality Management Systems (QMS)
- Quality Assurance (QA) & Quality Control (QC)
- Plan – Do – Check – Action
- Testing Metrics

Skills for a Professional Tester

TestLink

- Users, Roles and Permissions
- Test Project Management
- Managing project, Modules
- Requirements Management
- Test Plan Management
- Test Cases creation

- Test Suit creation
- Execution of Test Cases
- Reports and Charts

C) Bugzilla

- Users, Roles and Permissions
- Managing project, Modules
- Bug Life Cycle
- Logging a Bug
- Search functionality

D) Unified Functional Testing

- Basic Concepts & Overview (Slides Only)

E) Application Lifecycle Management

- Basic Concepts & Overview (Slides Only)

Selenium WebDriver

- Introduction - Web Driver: Why Web Driver
- End to End Automation Process with POC (Proof Of Concept)
- Integration - Eclipse + Web driver Installation
- Browser Handling
 - IE
 - Chrome
 - Firefox
 - HTMLUnit
- Object Identification for different web elements using
 - ID
 - Name
 - Class
 - Link
 - Tagname
 - XPath
- FirePath & FireBug Add-ons installations
- Customize Object repository
- Check Points
 - Data (single element, full page)
 - Image (full screen)
- Synchronizations
 - Implicit
 - Explicit
- Performance - Page load time , Internal page navigation
- Mouse / Keyboard events handling
- Handling of Alerts and /Pop Ups
- Handle Window handles
- TestNG
 - What is TestNG
 - Installing TestNG

06 - UPCOMING TECHNOLOGIES

Android Programming

- Introduction To Android
 - What is MAD?
 - What is Android?
 - Android Features
 - Android Architecture
- Installation & Setting
 - ADT tool
- SDK overview
 - Android Virtual Device
 - Debugger
 - Documentation
 - Sample Code
- Understanding Android Application
 - Creating First Project
 - Directory Structure
 - Application Flow
 - Introduction to Android Component
- Develop Android UI with Activity
 - Activity
 - views, layout
 - Activity lifecycle
 - Develop UI using code & XML
- Android Intent & Broadcast Receivers
 - Implicit Intent
 - Explicit Intent
 - Creating Broadcast Receiver
- Android Advance UI
 - GridView, ListView
 - Spinner
 - Menus etc.
- Notification
 - What is Notification?
 - Notification Types

- Dialog
 - Types of Dialog
- Content Providers
 - Concept of Data Storage
 - SQLite Database
 - Working with Content Providers
- Service in Android
 - What is Service?
 - Service lifecycle
 - Develop a Service in android
- Location based Services in Android
 - Using Location based services
 - Finding current location
 - Calculate longitude & latitude
- Multimedia in Android
 - Media Player class
 - Develop simple media playback
- Sensor Application
 - Concept of Sensor
 - Types of Sensor
 - Sensor API
- Android Device
 - Camera
 - Bluetooth
 - WiFi

BIG Data & Hadoop

- Introduction of Big Data & Hadoop Architecture

03 - AngularJS [48 hrs]

- **Basics**

- Angular JS Introduction & history
- Core Features of AngularJS
- MVC Architecture

- **Angular Expressions**

- AngularJS Numbers, Strings, Objects, Arrays
- AngularJS expressions v/s Javascript expressions

- **Filters**

- Built-in Filters
- Adding Filters to Expressions
- Adding Filters to Directives
- Custom Filters
- **Directives**
- Introduction to Directives
- Using AngularJS built-in Directives
- Creating new Directives
- Data binding
- Isolating Directive scope
- Handling events with Directives

- **Controllers**

- AngularJS Controller s
- Controller methods
- Controllers in External files
- Attaching properties and functions to scope
- Nested Controllers
- Using filters in Controllers
- Controllers in External Files
- Controllers & Modules

- **Modules**

- Introduction to AngularJS Modules
- Creating Module
- Adding a Controller
- Adding a Directive
- Bootstrapping AngularJS

- **Forms**

- Working with Angular Forms
- Model binding
- Form controller
- Form Validation
- Form State and Input State
- Custom validation
- Form events
- \$error object

- **Scopes**

- What is scope and how to use it?
- Two way data binding
- Scope inheritance
- Scope & controllers
- Scope & directives
- \$apply and \$watch
- Rootscope
- Scope broadcasting
- Scope events

- **Services**

- What is a Service?
- Using AngularJS built in Services
- Creating custom Service
- Use custom Service inside a Filter
- Ajax

- **Tables, SQL**

- Displaying data in a Table
- Fetching data from a PHP Server running MySQL
- Fetching Data from an ASP,NET server running SQL
- Cross-site HTTP Requests
- AngularJS Dependency Injenction
- Value, Factory, Service, Provider, Constant

- **Single Page Application**

- What is SPA
- Pros & Cons of SPA
- Installing the ngRoute module
- Configure routes
- Passing parameters
- Changing location
- Resolving promises
- Create a Single Page Application

- Animations
 - What is an Animation?
 - What ngAnimate Module do?
 - CSS transforms
 - CSS transitions
 - Applying animations
 - Directives supporting animation
- Routing
 - What is Routing & its need
 - Controllerse
 - Otherwise method
 - Template
- Includes
 - Include AngularJS code
 - Include Cross Domains
- Testing
 - An introduction to Unit Testing
 - Testing AngularJS application

07 - Softskills

- Importance of Comm Skills in Profession
- How to develop effective verbal communication?
- Importance of Listening
- Manners and Etiquettes
- SWOT analysis
- Time management
- Group Discussions- Techniques, DOs and DON'Ts
- Interviews- Techniques, FAQs, DOs and DON'Ts
- Presentation Skills
- Resume Writing, Email Writing, Telephone Etiquettes

08- Project

- Design
- Development