

LCP
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PROFESSIONAL

SYLLABUS

C
C++
Data Structure
Core Java
Advance Java
Oracle
Project

C
C++
Data Structure
.Net
Advance .Net
PHP
Oracle
Project

Core Java
Advance Java
Framework
Android
Oracle
Project

C
C++
Data Structure
Embedded System
VLSI
Oracle
Project

Choose your
Career Path



SYLLABUS

COVERAGE

- Introduction to Programming
- Fundamentals in C
- Operators and Expressions
- Data types
- Input-Output Library Functions
- Control statements
- Function
- Storage class
- Pointer
- Pointer and Function
- Array
- Pointer and array
- Array and function
- Dynamic memory allocation
- String
- String and function
- Command line arguments
- Preprocessor
- Structure
- Structure and function
- File Handling
- ODBC Programming
- Process and threads
- Graphics
- Socket and Network programming
- Project

SYLLABUS IN DETAILS

Introduction to Programming

- Program and Programming
- Programming Languages
- Types of software's
- Operating Systems
- Dos commands
- Basic Linux commands and vi editor
- Compiler, Interpreter, Loader and Linker

Fundamentals in C

- History of 'C'
- A Simple C Program
- Program execution phases
- Backslash character constants
- Character set
- Constants
- Number systems
- Format specifiers
- Identifiers

- Keywords
- Variables
- Data Types
- Declaration of Variable
- Assigning Values to Variables
- Initialization
- Comments
- Const Qualifier
- Basic Structure of a 'C' program
- Programming Examples

Operators and Expressions

- Dealing with all 45 operators
- Arithmetic operators
- Increment and decrement operators
- Relational operators
- Logical operators
- The bitwise operators

- The assignment operators
- The conditional operator
- The size of operator
- The comma operator
- Type casting operator
- Other operators
- Precedence and order of evaluation
- Programming Examples
- FAQ's

Data types

- Modifiers
- Format specifiers
- Dealing with each data types
- Memory representation of each type
- Programming Examples

Input-Output Library Functions

- Unformatted I-O Functions
- Single Character Input-Output
- String Input-Output
- Formatted I-O Functions
- printf() Width Specifier
- scanf() Width Specifier
- Programming Examples

Control statements

- Conditional Control Statements
- if
- if-else
- nested if-else
- else-if ladder
- Multiple Branching Control Statement
- switch-case
- Loop Control Statements
- while
- do-while
- for
- Nested Loops
- Jump Control statements
- break
- continue
- goto
- exit
- return

- Programming Examples
- FAQ's

Function

- What is function?
- Why function?
- Advantages of using functions
- Function Prototype
- Defining a function
- Calling a function
- Return statement
- Types of functions
- Recursion
- Nested functions
- main() function
- Library Function
- Local and global variables
- Programming Examples
- FAQ's

Storage class

- Types of storage class
- Scoping rules
- Dealing with all storage classes
- Programming Examples
- FAQ's

Pointer

- Def of Pointer
- Declaration of Pointer Variables
- Assigning Address to Pointer Variables
- De-referencing Pointer Variables
- Pointer to Pointer
- Pointer Arithmetic
- Pointer comparisons
- De-reference and increment pointer
- pointer to const data
- const pointer
- const pointer to const data
- Void pointer or Generic Pointer
- Null pointer
- wild pointer
- Programming Examples
- FAQ's

Pointer and Function

- Parameter Passing Techniques – call by value, call by address
- Using Pointers as Arguments
- Function Returning value
- Returning More than one value From A Function
- Functions Returning Address
- Function Returning Pointers
- Dangling pointer
- Pointer to a Function
- Calling A function through function pointer
- passing A function's address as an Argument to other function
- Functions with variable number of arguments
- Programming Examples
- FAQ's

Array

- One dimensional arrays
- Declaration of 1D arrays
- Initialization of 1D arrays
- Accessing element of 1D arrays
- Reading and displaying elements
- Two dimensional arrays
- Declaration of 2D arrays
- Initialization of 2D arrays
- Accessing element of 2D arrays
- Reading and displaying elements
- Programming Examples

FAQ's Pointer and Array

- Pointer and one dimensional arrays
- Subscripting pointer variables
- Pointer to an array
- Array of pointers
- Pointers and two dimensional arrays
- Subscripting pointer To an array
- Programming Examples
- FAQ's

Array and Function

- 1D array and function
- Passing individual array elements to a function
- passing individual array elements address to a function
- passing whole 1d array to a function
- 2D array and function
- Passing individual array elements to a function
- passing individual array elements address to a function
- passing whole 2d array to a function
- using arrays of function pointer
- Programming Examples
- FAQ's

Dynamic memory allocation

- malloc()
- calloc()
- realloc()
- free()
- Core dump
- Memory leak
- Dynamic 1D and 2D Arrays
- Programming Examples
- FAQ's

Strings

- strings versus character arrays
- Initializing strings
- Reading string
- Displaying string
- The %s format specifier
- The gets() and puts() functions
- string handling functions
- string pointers
- Two-dimensional character arrays or array of string
- array of pointers to strings
- Programming Examples
- FAQ's

Command line arguments

- what is command prompt?
- why command line?
- What are command line arguments?
- Programs using command line

Preprocessor

- What is preprocessing?
- Macro expansions
- File inclusions
- Conditional compilation
- The stringification(#)and token passing operator
- (##) operators
- Programming Examples
- FAQ's

Structure

- Why is structure used?
- What is structure?
- Advantages of structures
- Defining a Structure
- Declaration of Structure Variables
- Initialization of Structure Variables
- Accessing Structure Members
- Storage of Structures in Memory
- Size of Structures
- Reading and Displaying Structure Variables
- Assignment of Structure Variables
- Pointers to structures
- Array of structures
- Arrays within structures
- Nested structures
- Self-referential structures
- memory link(linked list)
- Bit fields
- Programming Examples
- FAQ's

Structure and Function

- Passing structure member to a function
- Passing structure variable to a function

- Passing structure variable address to a function
- Passing array of structure to a function
- Returning a structure variable from function
- Returning a structure variable address from function
- Returning structure variable from a function
- Programming Examples
- FAQ's

Union and Enumeration and typedef

- What are unions?
- Structures versus unions
- Working with unions
- Initializing unions
- Advantages of unions
- enum keyword
- typedef keyword
- Programming Examples
- FAQ's

File Handling

- Using files in C
- Buffer and streams
- Working with text files and Binary Files
- File operations using std. library and system calls
- File management I/O functions
- Random Access Files
- Programming Examples
- FAQ's

ODBC Programming

- ODBC rules and regulation
- Introduction to MYSQL and Oracle
- Creating, inserting and retrieving records for different Data bases.
- Programming Examples
- FAQ's

Process and Threads

- What is process & Threads
- Use of fork, vfork
- Daemon process
- Programming Examples
- FAQ's

Graphics & Curses

- Graphics using Glade interface with GTK+
- Working with GTK Widgets, Event handling
- Developing Application Interface
- Programming Examples
- FAQ's

Socket and Network programming

Project

SYLLABUS

COVERAGE

- Introduction to Programming
- Fundamentals in C++
- Control statements
- Pointer array Reference
- Function
- Introduction to oops
- Classes and Objects
- Constructors and Destructors
- Operator Overloading
- Inheritance and Composition
- Polymorphism
- Exception handling
- Input / Output in C++: Streams
- File handling
- Working with String
- Command line arguments
- Namespace
- Templates
- Data Structures(introduction)
- STL
- Process and Threads
- Graphics
- WEB development
- Project

SYLLABUS IN DETAILS

Introduction to Programming

- Program and Programming
- Programming Languages
- Types of software's Operating Systems
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- Compiler, Interpreter, Loader and Linker

Fundamentals in C++

- History of 'C++'
- Migrating from procedural oriented language to object oriented languages Program
- Keywords
- Variables
- Constants
- Data type
- Operators

- Manipulators and uses
- Basic Structure of a 'C++' program

Control statements

- Conditional Control Statements
- if
- if-else
- nested if-else
- else-if ladder
- Multiple Branching Control Statement
- switch-case
- Loop Control Statements
- while
- do-while
- for
- Nested Loops
- Jump Control statements

- break
- continue
- goto
- exit
- return
- Programming Examples
- FAQ's

Pointer array Reference

- pointer variable
- Reference variable/alias variables?
- Reference to Reference variable?
- Reference to array?
- Reference vs normal variable?
- Reference vs pointer variable?
- 1D and 2D Arrays
- What is dynamic memory allocation?
- The new and delete operator
- new vs malloc
- delete vs free
- Dynamic 1D and 2D Arrays

Function

- What is function ?
- Why function ?
- Advantages of using functions
- Function Prototype
- Defining a function
- Calling a function
- Actual and Formal Arguments
- Types of functions
- Parameter Passing Techniques
- Call by Value
- Call by Reference
- Call by Pointer
- Return statement
- Returning More than one value From A Function
- Return by value mechanism
- Return by pointer mechanism
- Return by reference mechanism
- Inline Functions
- Default Arguments

- Function Overloading
- Lambda function.
- Recursion

Introduction to oops

- c structure vs c++ structure
- c++ class vs c++ structure
- Class
- Object
- Encapsulation
- Abstraction
- Polymorphism
- Inheritance
- Message Passing

Classes and Objects

- Declaring / defining classes
- Data members and member functions
- Access specifiers : public and private and protected
- Creating objects of a class
- Pointers to object
- Implicit this pointer
- Static data members
- Static member functions
- Passing objects to a member function
- Returning objects from a member function
- Friend functions
- Friend classes
- Nested classes
- Local classes
- The const member functions
- The const objects
- Array of objects
- static objects
- What are inline functions?

Constructors and Destructors

- Defining Constructor
- Defining Destructor
- Comparing Constructor Member Function
- Default Constructor

- Argument Constructor
- Copy Constructor
- Constructor Overloading
- Default Argument in Constructor
- Anonymous object
- Private Constructor and Destructor
- Local vs Global object

Operator Overloading

- Need of Overloading
- Defining Operator Overloaded Function
- Operator Overloading Rules
- Overloading Binary Operators
- Overloading Binary Operators using Friend
- Overloading Other Operators
- Overloading Unary Operators
- Overloading Unary Operators using Friend

Inheritance and Composition

- What is inheritance?
- The is-a relationship
- Single Level Inheritance
- Multilevel Inheritance
- Multiple Inheritance
- Name ambiguities under multiple inheritance
- Hierarchical Inheritance
- Hybrid Inheritance
- Multipath Inheritance
- Why virtual base classes?
- Constructor and Destructor in Inheritance.
- Common constructor.
- Delegation
- What is composition?
- The has-a relationship

Polymorphism

- About polymorphism
- Compile time and runtime polymorphism
- Virtual functions.
- Pure virtual function and abstract base class.
- What is RTTI (Run-time Type Information)?
- VPTR and VTABLE.

- Difference between member Function Overloading and Overriding
- Object slicing.
- Constructor and virtual function.
- Virtual destructor.
- Destructor with virtual function.

Exception handling

- What is an exception?
- Throwing an exception
- Catching an exception
- Trying for an exception
- Order of catch blocks
- Catching all exceptions
- Nested try blocks
- Rethrowing an exception
- Exception specifications
- What is stack unwinding?
- Exceptions in ctors and dtors
- The unexpected() function
- The terminate() function
- The standard exceptions
- Creating our own exception classes

File handling

- Hierarchy of File Streams
- Using constructor method
- Using open and close member function method.
- Object as file stream reader and writer
- Both sequential and random file accessing mechanism.
- Different error handling mechanism in files

Input / Output in C++: Streams

- Hierarchy of I/O Streams
- Fundamental stream classes and objects
- Standard input and output functions
- Formatting flags and manipulators

Working With String

- Different C string handling library
- string handling using relational operator
- Different string handling function

Namespace

- Creating name space
- Using name space
- Nested namespace and anonymous namespace

Command line arguments

- what is command prompt?
- why command line?
- What are command line arguments?
- Programs using command line

Data Structures

- Introduction
- Single Linked List
- Circular Linked List
- Doubly Linked List
- Stacks
- Queues

Templates

- What is generic programming?
- Need of Template
- What are function templates?
- Argument deduction and template parameters
- Overloading function templates
- What are class templates?
- Specializations of class templates

STL

- STL Components
- Containers
- Iterators
- Algorithms
- Common container operations

- Vectors
- Deques
- Lists
- Sets and multisets
- Maps and multimaps
- Implementing reference semantics
- When to use which container?
- Special STL Containers
- Stacks
- Queues
- Priority Queues
- Bitsets
- STL Iterators
- Input iterators
- Output iterators
- Forward iterators
- Bidirectional iterators
- Random access iterators

Database operation

- What is database?
- SQL for relational database.
- About API connect to database.
- Database connectivity MySQL.
- Database manipulation using C++
- Process and Threads
- Graphics
- WEB development
- Web basics.(HTML, java script, CSS).

Project



COVERAGE

- Introduction
- Array
- Pointer
- Function
- Structure
- Pointer, Structure with Function
- Stack
- Applications of Stack
- Linear Queue & its Operations
- Circular Queue & its Operation
- Linked List (Single, Double, Circular, Header)
- Tree
- Graph
- Hashing & Searching
- Sorting

SYLLABUS IN DETAILS

Introduction:

- Concept Data Structure
- Example
- Need of Data structure
- Advantages of using DS

Algorithm & Pseudocode:

- Algorithm Definition
- Characteristics of algorithm
- Elements of algorithm
- Pseudocode example
- Difference of Algorithm & Pseudocode

Function:

- What is function
- Types of function
- How function works
- Function recursion and how it works.

Array:

- Concept of Array
- Types of array
- Basic Programs
- Array with Functions

- Single & 2-dimensional array in function argument.

Pointer:

- Pointer Basics
- Pointer with functions
- Call by reference
- Array of pointers & pointer to array & Programs

Structure:

- Understanding about Structure
- Pointer structure variable
- Structure as function argument
- using call by member value
- hole structure and call by
- passing reference of structure.

Stack:

- Operations on Stack
- Array & Linked Representation
- Programs on stack
- Push & Pop operations
- Traversing.

Applications of Stack :

- Arithmetic Expression Evaluation
- Notations, Infix
- Postfix, Prefix
- Conversion infix to post fix
- Conversion postfix to infix
- Evaluation of Postfix and Pre fix using stack.

Queue:

- Operations on Queue
- Array & Linked Representation
- Programs on stack
- Insert & Delete operations
- Circular queue
- Rrepresentation
- Deque
- Priority Queue
- Application of queue.

LinkedList:

- Concept of linked list
- Difference of linklist & array
- Single linked list
- Representation
- Operations
- Traversing
- Insertion(first node, last node, at a position, after a node value)
- Deletion(first node, last node, at a position, after a node value)
- Double linked list
- Representation
- Operations, traversing
- Insertion (first node, last node, at a position, after a node value)
- Deletion (first node, last node, at a position, after a node value)
- Circular link list & header link list example

Tree:

- Tree terminology
- Binary tree
- Complete Binary Tree

- Binary search tree
- Tree Traversals
- Creation of Binary Tree from traversal methods
- Expression Tree & expression Manipulation
- Binary Search Tree
- Insertion & deletion in BST(Program)
- AVL Tree, M-way Search Tree
- B+ tree, Insertion & deletion.

Graph:

- Graph terminology
- Representation of graphs
- Path matrix
- Graph Traversal
- BFS (breadth first search)
- DFS (depth first search)
- Minimum spanning Tree
- Kruskal's Algorithm & Prim's Algorithm
- Warshall's algorithm (shortest path algorithm).

Hashing & Searching:

- Linear and binary search methods
- Hash functions
- Hashing techniques & Chaining.

Sorting:

- Bubble sort
- Selection sort
- Insertion sort
- Quick sort
- Merge sort
- Heap sort
- Radix sort



COVERAGE

- Introduction.
- OOPS
- Package
- Exception Handling.
- Multithreading
- Applet, AWT, Event Handling
- Using NetBean, Eclipse.
- Input Output Streams, Serialization
- Networking
- Collection Framework, classes & interfaces of java.util, generics
- Introduction to Swing (Java Foundation Classes).
- Remote Method Invocation, Implementation of RMI.
- JDBC (Java Data Base Connection), Types of Driver
- Project

SYLLABUS IN DETAILS

History

- Computers... How a Program uses Computers?
- Java... Why? What? How(Green Project)? When?
- Where?
- Different Java Versions.
- How Java is different from other Technologies

Fundamentals of Java Programming

- Naming convention of Java language
- Comments
- Statements
- Blocks (Static, Non-static/instance)
- Identifiers
- Keywords
- Literals
- Primitive Data Types, Range
- Reference(User defined) Data type
- Variables (Primitive, Reference)

- Type Casting, Default Value
- Operators
- Problem Solving

Introduction to Java Programming Environment

- How to Install & set Path.
- A Simple Java Program
- Compiling & executing Java Program
- Phases of Java Program
- Analysis of a Java Program
- Understanding Syntax and Semantic Error,
- Runtime Exception
- Name of a Java Source File
- Platform Independency
- Java Technology(JDK, JRE, JVM, JIT)
- Features of Java
- Text Editors
- Consoles
- Problem Solving.

Control Structures

- Working with Control Structures
- Types of Control Structures
- Decision Control Structure (if, if-else, if else if, switch –case)
- Repetition Control Structure (do –while, while, for)
- Problem Solving

Keyboard Input in Java

- Java program inputs from Keyboard
- Methods of Keyboard inputs
- Scanner, Buffered Reader
- JOption Pane
- Problem Solving
- Java Array
- What is Array
- Array Declaration in java vs C and C++.
- Instantiation of an Array
- String vs character array. Accessing Array Elements, Default Value,
- for-each loop, varargs.
- Length of an Array (What is
- ArrayIndexOutOfBoundsException).
- Increasing, Decreasing the Size
- and Copy of an Array
- Multi-Dimensional Arrays
- Problem Solving

Command-Line Arguments

- What is a Command-Line Argument?
- Java Application with Command-Line Arguments
- Conversion of Command-Line Arguments
- Passing Command-Line Arguments
- Using methods (Static , Non Static)
- Problem Solving

Integrated Development Environment

- Using various Editors
- Program Compilation, Execution in Editor
- Using Eclipse IDE
- Project Set Up
- Source File Generation
- Application Compilation and Run

- Difference between C and C++ with Java,
- Problem Solving
- Application Compilation and Run
- Difference between C and C++ with Java,
- Problem Solving
- Interview related Question and Answer.
-

Object Oriented Programming

- Procedural Vs Object Oriented Program
- Different type of Program Procedural Vs Object Oriented.
- Top Down Vs Bottom Up Approach.
- Introduction to Object Oriented Programming
- Abstraction, Encapsulation, Inheritance, Polymorphism.
- Introduction to Classes and Objects
- Custom Class Definition
- Instance and Static Variables
- Different ways to create Object Instance 5
- Types of Class 3-5
- Instance Variable and it's role in a Class
- Constructors, types of Constructor,
- Constructor Rule, Constructor Overloading.
- Static Variable and it's use.
- Methods and their behavior.
- Constructor vs Methods
- Constructors
- "this" Keyword.
- Java Access Modifiers (and Specifiers)
- Explanation of psvm() , sopl()
- Problem Solving

Inner Class

- First View of Inner Class
- Outer Class Access
- Types of Inner Class
- Problem Solving

Inheritance

- A Little knowledge on Inheritance
- Sub-Classes
- Object Classes
- Constructor Calling Chain
- The use of "super" Keyword
- The use of "private" keyword inheritance.
- Reference Casting
- Problem Solving

Abstract Classes and Inheritance

- Introduction to Abstract Methods,
- Abstract Classes and Interface
- Interface as a Type
- Interface v/s Abstract Class
- Interface Definition
- Interface Implementation
- Multiple Interfaces' Implementation
- Interfaces' Inheritance
- How to create object of Interface
- Problem Solving

Polymorphism

- Introduction to Polymorphism
- Types of Polymorphism
- Overloading Methods
- Overriding Methods
- Hiding Methods
- Final Class and Method
- Polymorphic Behaviour in Java
- Benefits of Polymorphism
- "Is-A" vs "Has-A"
- Association Vs Aggregation
- Problem Solving
- Interview related Question and Answer.

Package

Package and Class path and its use

- First look into Packages
- Benefits of Packages
- Package Creation and Use
- First look into Classpath
- Classpath Setting

- Class Import
- Package Import
- Role of public, protected, default and private w.r.t package
- Namespace Management
- Package vs. Header File
- Creating and Using the Sub Package
- Sources and Class Files Management

Using Predefined Lang package & other Classes

- Java.lang Hierarchy
- Object class and using toString(), equals(), hashCode(), clone(), finalize() etc
- Using Runtime Class, Process Class to play music, video from Java Program
- Primitives and Wrapper Class
- Math Class
- String, StringBuffer, StringBuilder Class
- String Constant Pool.
- Various usage and methods of String, StringBuffer, StringBuilder
- Wrapper Classes
- System Class using gc(), exit(), etc.

New Concepts in package

- Autoboxing and Autounboxing
- Static import.
- Instanceof operator.
- Enum and its use in Java
- Working with jar

Garbage Collection

- Garbage Collection Introduction
- Advantages of Garbage Collection
- Garbage Collection Procedure
- Java API
- Interview related Question and Answer.

Exception Handling

- Introduction to Exceptions
- Effects of Exceptions
- Exception Handling Mechanism
- Try,catch,finally blocks

- Rules of Exception Handling
- Exception class Hierarchy, Checked & Unchecked Exception
- Throw & throws keyword
- Custom Exception Class
- Chained Exception.
- Resource handling & multiple exception class.
- Problem Solving
- Interview related Question and Answer.

Multithreading

- Introduction
- Advantages
- Creating a Thread by inheriting from Thread class
- Run() and start() method.
- Constructor of Thread Class
- Various Method of Thread Class
- Runnable Interface Implementation
- Thread Group
- Thread States and Priorities
- Synchronization method, block
- Class & Object Level Lock
- Deadlock & its Prevention
- Interthread Synchronization
- Life Cycle of Thread
- Deprecated methods : stop(), suspend(), resume(), etc
- Problem Solving
- Interview related Question and Answer.

GUI :

- Applet, AWT, Event Handling

Applet(java.applet)

- Introduction & Advantage of Applet
- How to create and run an Applet in browser and appletviewer
- Life Cycle of Applet
- Using Graphics, Color, Font and other classes in Applet to draw Shapes, String, Images
- Creating Banner in Applet

- AppletContext interface. Using AudioClip interfaces to play music.
- Problem Solving

Abstract Window Toolkit (java.awt)

- AWT Hierarchy
- Using Component classes like Button, TextArea, TextField, Checkbox, Label, Choice, List, etc
- Using Container classes like Applet, Panel, Frame, Window, Dialog(Open & Save Dialog)
- Using Layout Manager to organize component on a container.
- Using Borders, Menus, Toolbars, Dialogs
- Using setBounds() to place component on Frame/Applet. Problem Solving

GUI Event Handling(java.awt.event)

- Delegation Event Model
- What is Events and steps for Event Handling
- Using different Event Classes to generate event
- Handling different events by respective Event Listeners
- Using Event in Applet & Event
- Handling the event in different ways.
- Adaptor Classes
- Problem Solving

Using Applet and Frame

- Passing Parameter from HTML to Applet
- Inter Applet Communication
- Communication between Frame.
- Customizing TextField, Frame, etc
- Using NetBean IDE
- Problem Solving
- Interview related Question and Answer.

Input Output Streams

Java I/O Stream

- I/O Stream - Introduction
- Types of Streams

- Stream Class Hierarchy
- Using File Class
- Copy and Paste the content of a file.
- Byte Streams vs Character Streams
- TextFile vs Binary File
- Character Reading from Keyboard by InputStreamReader
- Reading a Line/String from Keyboard by BufferedReader
- Standard I/O Streams
- Using Data Streams to read/write primitive data
- PrintStream vs PrintWriter
- Using StreamTokenizer and RandomAccessFile.
- Using nio package.
- Problem Solving

Serialization

- Introduction to Serialization
- Using Object Streams to read/write object
- Transient Keyword
- Serialization Process
- Deserialization Process
- Problem Solving
- Interview related Question and Answer.

Networking

- Networking Basics
- What is IP Address
- What is Protocol
- What is Ports
- What is Client/Server Architecture
- What is Sockets

Java Networking

- InetAddress class
- ServerSocket and Socket Class
- DatagramSocket and DatagramPacket Class
- URL & URLConnection class
- MultiCastSocket class
- Creating chat application
- Problem Solving

- Interview related Question and Answer.

Collection Framework(Java Data Structure)

Generics(Templates)

- What is generic
- Creating User defined Generic classes

The java.util package.

- Collection
- What is Collection Framework
- List, Set & Map interfaces
- Using Vector, ArrayList, Stack, LinkedList, etc.
- Using Collections class for sorting
- Using Hashtable, HashMap, TreeMap, SortedMap, LinkedHashMap etc.
- Iterator, Enumerator.
- Using Que, Deque, SortedQueue, etc.
- Using HashSet, TreeSet, LinkedHashMap etc

- Using Random class
- Using Properties in a Java Program
- Using user defined class for DataStructure
- Using Date and Formatting Date class.
- Problem Solving
- Interview related Question and Answer.

Remote Method Invocation

(Distributed Application in Java)

Need for RMI

- RMI Introduction
- Efficiency

RMI Architecture

- Remote Interface
- Stub and Skeleton
- Remote Object

RMI Communication Model

- RMI Control Flow
- Marshaling
- Unmarshaling
- Using RRL

Implementing RIM

- Analyzing Remote interface, UnicastRemoteObject class.
- Running Different examples.
- Rmic, rmiregistry, etc.
- Using Examples.
- Problem Solving
- Interview related Question and Answer.

JDBC (Java Data Base Connection)

- Introduction to JDBC
- Databases and Drivers
- Types of Driver
- Loading a driver class file
- Establishing the Connection to different Database with different Driver.
- Executing SQL queries by ResultSet, Statements , PreparedStatement interface.
- Using CallableStatement.
- Transaction Management & BatchUpdate.
- Problem Solving
- Interview related Question and Answer.



COVERAGE

- SQL Basics
- JDBC (Java Data Base Connection)
- HTML and JavaScript
- SERVLET
- JSP (Java Server Pages)
- JSF (Java Server Faces)
- Facelets
- Web Services
- EJB (Enterprise Java Bean)
- AJAX
- Using IDE (Integrated Development Environment)
- Project

SYLLABUS IN DETAILS

SQL Basics

- JDBC What is Persistency ?
- What is JDBC, ODBC ?
- JDBC architecture.
- Loading and Connecting to database.
- Using Connection, Statement, ResultSet.
- Data Fetching, Updatable & Scrollable methods of ResultSet.
- Types of Driver, Using different types of Driver.
- Using PreparedStatement
- Using Callable Statement to invoke procedure &, functions.
- Transaction Management,
- Using ResultSetMetadata.
- Connection to different data bases like MS-ACCESS, MYSQL, ORACLE etc.
- Batch Processing
- Problem Solving & Interview Question.

HTML and JavaScript SERVLET

- Introduction to Server Side Programming..
- Web Server.

- Web Container.
- The Servlet API.
- The Servlet Interface.
- Servlet Life Cycle.
- Deployment of Web Application.
- What is Deployment Descriptor.
- Creating a servlet by inheriting from GenericServlet class.
- Creating a servlet by inheriting HttpServlet class.
- The ServletConfig Interface.
- The ServletContext Interface.
- Permanent Servlet.
- Servlet Communication.
- Servlet Chaining(Forward & Including the request).
- Send Redirect .
- Stateless and Stateful protocols.
- Session Tracking Mechanisms (HiddenField, URL Rewriting, Cookie, Session).
- Servlet Filters.
- Listeners
- Web-Security.

- Types of Variables in Servlet.
- Problem Solving & Interview Question.

JSP (Java Server Pages) Introduction to Java Server Pages.

- Architecture & Anatomy of JSP Page.
- JSP life cycle, JSP with MVC Architecture.
- Dynamic webpage Creation.
- Scripting Elements.
- Database access from JSP.
- Servlet vs JSP.
- User tracking in JSP.
- Error handling in JSP.
- Types of variables.
- Implicit object in JSP.
- Forwarding & including the request.
- Static include.
- Servlet-JSP interaction.
- Using Java Beans(Simple, Indexed, Boolean, Bound, Constraint Beans).
- Creating custom tags.
- Creating a Small Mail like project.
- Problem Solving & Interview Question.

JSF (Java Server Faces)

- Introduction to Java Server Faces.
- What Is a JavaServer Faces Application ?
- JavaServer Faces Technology Benefits.
- Creating a Simple JavaServer Faces Application.
- Problem Solving & Interview Question.

Facelets

- Introduction to Facelets.
- What Is Facelets?
- Developing a Simple Facelets Application
- Creating a Facelets Application
- Problem Solving & Interview Question.

Web Services

- Introduction to Web Services.
- Building Web Services with JAX-WS
- Building RESTful Web Services with JAX-RS
- JNDI (Java Naming Directory Interface)
- Interview Question.

EJB (Enterprise Java Bean)

- Introduction to Web Services.
- Enterprise JavaBeans Technology
- EJB Component Architecture
- Role of EJB & its life cycle.
- Types of Beans
- Stateless and Stateful beans
- Java Persistence API
- Security in Java EE.
- Problem Solving & Interview Question.

AJAX

Using IDE (Integrated Development Environment)



COVERAGE

- Introduction to Spring:
- Spring Core (Basic Concepts)
- Spring Core (Advanced Concepts)
- Spring Core (3.0 Annotations)
- Spring AOP
- Spring Transaction
- Spring JDBC
- Spring MVC
- Spring ORM
- Introduction To Hibernate
- Hibernate Annotations vs JPA Annotations:
- Hibernate Mappings
- Hibernate Query Languages and Transactions and Caching
- Spring Hibernate Integrations
- Hibernate uses in Project:

SYLLABUS IN DETAILS

Intended Audience:

- This training is designed for developers/fresher's interested in learning Spring framework

Prerequisites:

- Basic understanding of JDBC
- Knowledge on Servlet/JSP
- Basic knowledge on any application server(Tomcat)

Introduction to Spring:

- What is Spring,
- How Spring fits into the Enterprise world,
- Spring Modules

Spring Core (Basic Concepts):

- What is a Core Container
- Introduction to IOC
- Types of DI
- Setter DI vs Constructor DI
- Resolving Constructor Confusion
- Collection DI

- Bean Inheritance
- Collection Merging
- Inner Beans
- Using IDRef
- Bean Aliasing
- Bean Scopes
- Inner Beans
- Null String
- Bean Auto wiring
- Nested Bean Factories

Spring Core (Advanced Concepts):

- P – Namespace
- Dependency Check
- Depends On
- Factory Beans
- Static Factory Method
- Instance Factory Method
- Aware Interfaces
- Bean Lifecycle
- Method Replacement
- Lookup Method Injection

- Property Editors
- Bean Factory Postprocessor

Spring Core (3.0 Annotations):

- Spring VS Java Config Project
- annotations
- @Required
- @Autowired
- @PostConstruct
- @PreDestroy
- @Qualifier
- @Resource
- @Component
- @Service
- @Controller
- @Named
- Various Annotation based Post Processors
- (AutowiredAnnotationBeanPostProcessor,
- CommonAnnotationBeanPostProcessor,
- PersistenceAnnotationBeanPostProcessor,
- RequiredAnnotationBeanPostProcessor)

Spring AOP :

- AOP Concepts
- Programmatic VS Declarative AOP
- Programmatic AOP
- Types of Advices
- Types of Pointcuts
- Working with proxies
- Declarative AOP
- Using AOP 2.0 Config element
- OGNL Expressions
- Aspect J AOP

Spring Transaction :

- Aop 2.0 Configuration driven Transaction Management
- Aspect J annotation based Transaction Management

Spring JDBC:

- What is DAO pattern?
- Ways to implement Spring DAO
- Choosing an approach for JDBC database access

- JDBC Template
- Executing Statements
- Running Queries
- SQL Parameters

Spring MVC :

- Spring 3.0 features
- Introduction to Spring MVC
- Handler Mapping
- Controllers
- Validations
- Handler Interceptors
- Views
- Form tags

Spring ORM :

- Integrating with Hibernate
- Creating and Injecting Hibernate Session Factory
- Managing Transaction

Introduction To Hibernate :

- Need for Hibernate
- Hibernate and ORM (Object-Relation Mapping)
- POJOs (Plain Old Java Objects) and the Data Layer
- Hibernate Over Entity Beans
- Understanding Hibernate Architecture
- Configuration
- SessionFactory
- Session
- Query
- Criteria
- Hibernate Configuration
- Hibernate Mappings
- Persistent Classes
- Working with Hibernate to perform basic CRUD Operations
- Configuring Mappings Using Annotations.

Hibernate Annotations vs JPA Annotations:

- Getting started with Hibernate 3.X
- Using JPA annotations and XML configuration

- Hibernate Domain models
- Hibernate Persistence Context
- Mapping persistence Classes
- Hibernate Inheritance

Hibernate Mappings:

- Component Mapping
- Inheritance Mappings
- Table Per Class Hierarchy
- Table Per Sub Class
- Table Per Concrete Class
- Association Mappings
- One -to-One
- One -to-Many
- Many -to-One
- Many -to-Many

Hibernate Query Languages and Transactions and Caching:

- Using queries: HQL, criteria API, native (SQL)
- Hibernate Transaction
- Mixing Hibernate and JDBC
- Hibernate second level caching

Spring Hibernate Integrations:

- Spring Hibernate Integration
- Data source creation
- Hibernate DAO implementation using Spring Framework
- Spring – JDBC Transaction
- Spring AOP – Integration

Spring Hibernate Integrations:

- Spring Hibernate Integration
- Data source creation
- Hibernate DAO implementation using Spring Framework
- Spring – JDBC Transaction
- Spring AOP – Integration

Hibernate uses in Project:

- Design Web Application using hibernate
- Hibernate in web application(case studies)
- Project Guidance

SYLLABUS

COVERAGE

- RDBMS Concept
- DDL (Data Definition Language) Statements
- DML (Data Manipulation Language) Statements
- Select Statement
- Single Row Function
- Multiple Row Functions
- Displaying Data from Multiple Tables
- Sub query
- Other database objects –Views, Synonym, sequence
- Set operator
- Oracle Architecture
- User control
- Advance SQL
- Introduction to PLSQL
- Anonymous PLSQL
- Named PLSQL Subprograms
- Triggers
- Advance PLSQL

SYLLABUS IN DETAILS

RDBMS Concept

- Basic Introduction and Technology Awareness
- 3 Layer Architecture
- Data Models
- Entity types
- Types of Keys
- Types of attributes
- ER Modeling
- Normalization
- Assignments
- Industry (MNCs) standard examples

DDL(Data Definition Language) Statement

- Introduction to SQL
- Types of Datatype
- Create ,Alter, Drop, Trunctae commands
- Types of constraints (Primary key, Foreign key,

- Unique key, Not Null key, Check constraint)
- Assignments
- Industry (MNCs) standard examples

DML(Data Manipulation Language) statements

- Insert
- Update
- Delete
- TCI (Transaction control Statement) – Commit, Rollback , Savepoint
- Assignments
- Industry (MNCs) standard examples

Select Statement

- Simple select using from clause
- Where clause
- Using like operator

- Arithmetic operators
- Distinct Keyword
- Assignments
- Industry (MNCs) standard examples

Single Row Function

- Character Functions
- Date Functions
- Conversion functions
- Case Decode Function
- Assignments
- Industry (MNCs) standard examples

Multiple Row Functions

- Aggregate Function(Sum, Avg, Count, max, min, variance, stddev)
- Group by clause
- Having Clause
- Assignments
- Industry (MNCs) standard examples

Displaying Data from Multiple Table

- Inner join
- Right Outer join
- Left Outer Join
- Full Outer Join
- Assignments
- Industry (MNCs) standard examples
- Sub query
- Independent Sub query
- Correlated Sub query
- Assignments
- Industry (MNCs) standard examples

Other database objects –Views, Synonym, sequence

- Assignments
- Industry (MNCs) standard examples

Set operator

- Union
- Union All
- Minus
- Intersect
- Assignments Industry (MNCs) standard

examples

Quiz

- SQL quiz as per interview standard

Oracle Architecture

User control Advance SQL

- Merge Statement
- Connect by prior
- With clause
- Rownum
- Analytic functions(Rank ,dense rank,lag ,lead etc)
- Assignments
- Industry (MNCs) standard examples

Introduction to PLSQL

- PLSQL Architecture
- Use of PLSQL in industry

Anonymous PLSQL

- Types of Data type
- PLSQL Block
- Data type declaration
- Anchored declaration
- Conditional statements (if else)
- Looping (Loop, while, for)
- Using DML in PLSQL
- Exception Handling
- Cursor
- Assignments
- Industry (MNCs) standard examples

Named PLSQL Subprograms

- Local Procedure
- Local Function
- Stored Procedure
- Stored Function
- Assignments
- Industry (MNCs) standard examples
- Triggers
- Statement Level Trigger
- Row level trigger
- Instead of trigger
- Assignments

- Industry (MNCs) standard examples

Advance PLSQL

- Package
- Collection variable (Nested Table,
- Varray, Associative array)
- Ref Cursors
- Bulk Collect
- Native SQL
- Dynamic SQL
- Assignments
- Industry (MNCs) standard examples

Quiz

- SQL quiz as per interview standard



SYLLABUS

COVERAGE

Console Application

- .NET Framework
- Over view of OOPS
- Language Fundamentals
- Arrays And Procedures
- Classes and Objects
- Inheritance/Polymorphism
- Delegate
- System Defined Function
- SQL Server
- Data structure
- ADO.NET Objects
- The Data adapter object
- The data reader object
- The dataset object
- Navigating through dataset
- Updating your database by using datasets
- Managing concurrency ADO.net objects to retrieve LINQ
- Threading
- Exception handling

Windows Application

- Tools and Controls
- Threading
- Exception handling
- Event Handling
- MDI and SDI
- Graphics
- Advanced Controls

- Crystal reports
- ADO.NET Objects
- The Data adapter object
- The data reader object
- The dataset object
- Navigating through dataset
- Updating your database by using datasets
- Managing concurrency ADO.net objects to retrieve
- I/O Operation
- LINQ

Web Application

- IIS Server
- Introduction to ASP
- Web Controls
- Web application with ASP.net
- State Management
- XML
- Web service
- Ajax and Javascript
- Security
- LINQ
- WPF
- WCF
- Silverlight
- MVC
- CSS
- Deployment

SYLLABUS IN DETAILS

.NET Framework

- Architecture & its details
- Comparison between Java & .net

Over view of OOPS

- Introduction to Object
- Concept of class, Abstract class
- Data Encapsulation
- Comparison between Java & C++
- Function Template, method
- overloading and overriding

Language Fundamentals

- How to write a .net program
- examples with practical variable,
- Constants

Arrays And Procedures

- Variables
- Constants
- examples with practical
- programming with practical

Classes and Objects

- Components of class
- Procedures, functions
- system defined functions
- Constructors

Inheritance/Polymorphism

- Over loading, overriding
- Inheritance restrictions
- Types of inheritance

Delegate

- what is Delegate
- system defined functions

Windows Applications

- Windows form Designer
- The controls collection
- multiple form application
- menus
- MDI applications

Tools and Controls

- All kinds of controls and its uses
- practice

Threading

- Multitasking, Understand Multithreading, creating Threading
- implementing a runnable interface

Exception handling

- The cause of Exception and its remedies
- Types of exceptions
- Implementation of Exception
- Types of Errors
- debugging
- Throwing your own exceptions

Event Handling

- Event Handlers-1

Graphics and UI

- Comparative study of SDI,MDI

SQL

- starting with SQL 2010
- Implementing data integrity & Maintaining databases
- T-SQL
- Statement Procedure, Trigger
- Grouping Results
- Joins
- How to take back up and its details
- Fundamentals of database design
- database objects
- Stored procedures
- Normalization rules
- joins, constraints

Advanced Controls

- Tree View, Menu strip, context menu strip

Crystal reports

- Report creation
- Design the report& print Report

ADO.NET Objects

- Dataadapter,Datatable
- The datareader object
- Dataset,Command object
- Navigating through dataset

The Dataadapter object

- The Dataadapter object

The datareader object

- The datareader object

The dataset object

- The dataset object

Navigating through dataset

- Navigating through dataset

Updating your database by using datasets

- Updating your database by using datasets

Managing concurrency ADO.net objects to retrieve

- Managing concurrency ADO.net objects to retrieve

IIS Server

- Web Server mechanisms

Introduction to ASP

- What is ASP.net?
- Need of ASP.net.
- What does asp.net do?
- fundamentals of ASP.net.
- Creating your 1st application

Web Controls

- Controls with server side objects
- Code behind programming
- Program/form Layout

Web application with ASP.net

- Coding ASP.net pages
- Inline login project
- Testing the login project
- code behind web forms
- data input with asp.net
- accessing data in asp.net
- connecting to database
- Running data in asp.net

State Management

- Working with Cookies, Caching
- Cache Dependency

XML

- Working with XML Tag
- Adrotator
- Converting XML to Dataset and Dataset to Xml with example

Web service

- Working with web service

Ajax and Javascript

- Working with ajax & Jscript & HTML

Security

- web.config and machine.config

LINQ

- LINQ Introduction and implementation
- Database connection using LINQ

WPF

- Introduction
- Controls and form design and implementation

WCF

- different Services

Silverlight

- Silverlight Application

MVC

- Architecture and role
- Application on MVC

CSS

- Different Type of CSS and its Implementation

Deployment

- Deployment

COVERAGE

- Web Application Overview
- Language Fundamental
- HTML
- Java script
- CSS
- Form Processing
- File Handling
- Session Management
- PHP – MySQL
- SQL Injection
- AJAX
- OOPS
- PDO
- Cake PHP
- Bootstrap
- Angular JS

SYLLABUS IN DETAILS

Introduction

- Web Application
- Understanding client/server roles
- XAMPP Installation
- Apache, PHP, MySQL

PHP Language Fundamental

- Basic syntax
- Data Types
- Variables
- Constants
- Operators
- Control Structures
- Loops
- Array
- Function

HTML

- Introduction
- Basic Tags
- Text Formatting Tags
- Entities
- Lists
- Images
- Links
- Tables

CSS

- Style sheet Basics
- Various selectors
- Properties
- Values of each property

Java Script

- Introduction
- Variables
- Data Types

- Operators
- Control Structures
- Functions
- Events
- Document Object Model
- Form Validations
- Regular Expressions

Forms

- Frames
- Special Tags
- Head part
- Designing website using div

Form Processing

- Get and Post Method
- \$_GET and \$_POST Array
- \$_REQUEST Array
- Form Validation
- File Uploading
- File Downloading

File Handling

- Understanding file& directory
- Opening and closing a file
- File Operation
- Working with directories

Encryption Mechanism

- md5
- sha1
- crc32
- base64_encde
- base64_decde

MySQL Database

- Introduction SQL (DDL, DML, DQL, TCL,

DCL)Data types
Functions KeysJoinProcedure

PHP – Database Application

- Connect to MySQL Server
- CURD Operation
- Registration Application
- Login Application
- SQL Injection

Session Management

- URL Rewriting
- Hidden Field
- Cookie
- Session

PHP – AJAX Application

- Introduction to AJAX
- Features of AJAX
- Creating First AJAX Application
- Assignment

PHP OOPS

- Introduction
- Declaring a class
- Objects
- constructor
- Destructor
- Public ,private, protected
- Static properties and method
- Inheritance
- Polymorphism
- Parent:: & self:: keyword
- Instanceof operator
- Abstract method and class
- Interface
- Exception Handling

String

- Strings and Patterns
- Matching
- Extracting
- Searching Replacing
- Formatting

MySQLi and PHP Data objects

- Introduction
- Installation
- Connection with MySQL
- Create a MySQL database
- Create a MySQL tables
- Perform CURD Operation
- Login Module implementation
- Registration Module implementation

Cake PHP

- Introduction
- Installation
- Folder Structure
- Model
- View

- Controller
- Core Libraries
- Global Constants and Function
- Helpers
- Plug-in

Bootstrap

- Introduction
- Grid
- Tables
- Images
- Button
- Button Group
- Progress Bar
- Pagination
- Forms
- Modal
- Tooltip

Angular JS

- Introduction
- Expression
- Directive
- Controllers
- Filters
- Modules
- Events



COVERAGE

- Android Overview and History
- Android Architecture
- Designing The User Interface
- Activity
- Intent
- Service
- Broadcast Receiver
- Content Provider
- Multimedia in Android
- Files
- SQLite database
- Telephony and SMS API
- Networking
- Maps, Geocoding and Location-Based
- Services
- Phone Gap
- Android Overview and History
- What is Android?
- Importance of Android
- Version History
- Android Architecture
- Install Android Studio
- Android Emulator
- Android Building Blocks
- Activities
- Services
- Content Providers
- Broadcast Receivers

SYLLABUS IN DETAILS

Developing and Running Android Application

- Hello World App
- Project structure
- The manifest file
- Layout resource
- Running your app on Emulator and Device

Designing the User Interface

- Form widget
- Spinner
- List View
- Gallery
- Auto complete Text View
- Selection components
- Adapters
- Complex UI components
- Building UI for performance
- Menus and Dialogs
- Graphics & animations
- Web View
- Intent
- Introduction
- Implicit Intent
- Explicit Intent
- Phone call
- Send SMS
- Capture Image
- Audio Recording
- Video Recording
- Returning Results from Activities

Files

- Shared preference
- Internal Storage
- External Storage

SQLite database

- Introduction to SQLite
- Opening and closing a database
- Creating tables
- Cursor
- CRUD Operation

Telephony and SMS API

- SMS
- Calls
- Emails
- Email using Java Mail API

Maps, Geocoding and Location Based

Services

- Introduction to Google Maps
- MapView
- MapFragment
- Markers
- Get Google Places API Access
- List of search options to get data (like hospital, school, etc...)

Phone Gap

- Introduction Apache Cordova Phone Gap
- Advantages of Phone Gap

- Phone Gap Components
- How to setup Phone Gap Environment
- Sample projects on Phone Gap

Android Layout Design

- Linear Layout
- Relative Layout
- Grid Layout
- Frame Layout
- Table layout
- Fragment

Android Services

- Introduction
- Started Service
- Bind Service
- Assignment

Networking

- Connecting to an Internet Resource
- Parsing XML Using the XML Parser
- Downloading files
- Internet Services

Content Providers

- Registering Content Providers
- Publishing Your Content Provider's URI Address
- Creating the Content Provider's Database
- Implementing Content Provider Queries
- Content Provider Transactions
- Storing Files in a Content Provider

Animation

- Tweened View Animations
- Creating Tweened View Animations
- Applying Tweened Animations
- Using Animation Listeners
- Animating Layouts and View Groups
- Creating and Using Frame-by-Frame Animations
- Interpolated Property Animations
- Property Animations
- Property Animation Sets
- Animation Listeners



SYLLABUS

COVERAGE

- Introduction
- Basic Electronics Components
- Power supply Design
- Overview of Digital Electronics
- Semiconductor Memories
- Basics of Programming Language
- Programming in C
- Introduction to Microcontroller
- Memory Mapping
- Assembly language programming
- Software Development Tools
- LED Interfacing
- LCD Interfacing
- Development board testing
- SEVEN SEGEMENT DISPLAY interfacing
- Matrix keyboard interfacing
- FOURTEEN SEGMENT interfacing
- ROBOTICS basics
- ACTUATORS
- DC MOTOR interfacing
- New technologies and sensors

SYLLABUS IN DETAILS

Introduction

- Introduction to Embedded System
- Basics Of Embedded System
- Application of ES
- Examples of ES

Basic Electronics Components

- Resistor
- Capacitor
- Diode
- PNP transistor
- NPN transistor
- LED
- Step down Transformer
- Rectifier
- 7805 Voltage regulator IC
- Relay
- IR sensor
- PIR sensor
- LDR
- V-POT
- Ohm's and Watt's Law

Power supply Design

- Power Supply Circuit
- Practical design

Overview of Digital Electronics

- Binary, Octal, Decimal, Hexadecimal
- Gate :
AND, OR, NAND, NOR, XOR, INVERTER
- Gate IC's

Semiconductor Memories

- Address bus
- Data bus RAM
- ROM
- VONN NEUMANN architecture
- HARVARD architecture

Basics of Programming Language

- Compiler
- Interpreter
- Stages of compilation
- Data Types

- Modifiers
- Big-endian & Little-endian
- ASCII table
- Variables
- Operator

Programming in C

- Examples on different concepts
- Control structure
- Functions
- Storage classes
- Pointers
- Assembly language intro

Assembly language programming

- Instruction set and Programming
- Immediate Addressing
- Register Addressing
- Direct Addressing
- Indirect Addressing
- Indexed Addressing

Introduction to Microcontroller

- MP vs MC
- 8051 MC
- 8051 architecture
- 89s52 pin diagram
- Simulator vs Emulator

Memory Mapping

- Memory Addressing
- Program Memory – ROM
- Data Memory – RAM
- Internal RAM
- Registers
- Bit addressable memory
- Special Function Register

Software Development Tools

- KEIL
- Installation of KEIL
- PROTEUS
- Installation of PROTEUS
- USBasp driver
- Installation of USBasp driver
- USB to Serial Driver
- Installation of USB to Serial Driver

DC MOTOR interfacing

- Motor driver
- Manual robot making

New technologies and sensors

- RFID
- GSM
- GPS
- BLUETOOTH
- DTMF
- RF
- ULTRASONIC SENSOR

ACTUATORS

- Different types
- Examples
- Electrical actuators
- Application of actuators

ROBOTICS basics

- What is robotics
- Different types of ROBOT
- Manual and Autonomous ROBOT
- Basic parts
- Application of ROBOTICS & ROBOT
- LED Interfacing
- LCD Interfacing
- Development board testing
- Burning into MC
- SEVEN SEGEMENT DISPLAY
- interfacing
- Matrix keyboard interfacing
- FOURTEEN SEGMENT interfacing
- CONCLUSION : EMBEDDED SYSTEM, ROBOTICS
- PROJECTS & APPLICATIONS

SYLLABUS

COVERAGE

- VLSI design flow and methodologies
- FPGA architecture
- Digital Logic Creation Techniques
- Real Life Event Logic Design(Traffic Light Control, Three Way Switch, Car Locking)
- Digital Electronics logic design
- Verilog coding
- Synthesis and Verification
- Advanced Digital electronics circuit design using FSM
- CMOS fundamentals
- CMOS circuit design
- Layout Design
- Industry Oriented Projects
- IP design methodologies
- Next generation Transistor(TFET study)

SYLLABUS IN DETAILS

Introduction

- What is VLSI?
- Introduction to CMOS technology
- Demanding area for company
- Application of VLSI
- Indian ESDM market-Analysis of Growth & Opportunity Plan
- VLSI design methodologies
- VLSI Design Flow

Digital IC Design

- Overview of Digital Design with Verilog HDL(Day-2)
- Evolution of Computer Aided Digital Design
- VHDL vs Verilog
- Importance of Hardware Description Language(HDL)
- Popularity of Verilog HDL
- FPGA Architecture
- FPGA vs ASIC

Hierarchical Modeling concept

- Design of 4-bit ripple carry adderModules
- Instances
- Components of a simulation
- Example: Design Block, Stimulus Block

Gate-Level Modeling

- Gate types
- Gate Delays

Tasks and Functions

- Difference Between task and function
- Tasks
- Automatic(Re-entrant) task
- Functions
- Automatic(Recursive) function

Useful Modeling Techniques

- Procedural Continuous Assignments
- Use of force and release
- Overriding Parameters
- Conditional Compilation and execution
- Time Scale
- Useful system tasks

Dataflow Modeling

- Continuous Assignments
- Delays
- Expressions, operators and operands
- Operator type
- Design: 4:1 MUX, 4-bit full adder,

- Ripple Counter

Behavioral Modeling

- Structured Procedures
- Procedural Assignment
- Timing Control
- Conditional statements
- Multiway branching
- Loops
- Sequential and parallel blocks
- Generate Blocks
- Design: 4:1 MUX, 4-bit counter,
- Traffic signal controller

Logic Synthesis and Verification

- What is logic synthesis?
- Impact of logic synthesis
- Verilog HDL synthesis
- Synthesis Design Flow
- Verification of Gate-level netlist
- Modeling tips for logic synthesis
- Design Partitioning
- Sequential Circuit Synthesis

Switch Level Modeling

- Switch modeling Elements
- MOS switches
- CMOS switches
- Design: CMOS NOR gate, 2:1 MUX, Simple CMOS Latch

Analog IC Design

- Fabrication Process of MOSFETs
- Introduction
- Basic steps
- CMOS Technology
- Layout Design Rules
- Layout design using Microwind
- Design: Logic Gates
- MOS inverter static characteristics
- Resistive Load Inverter
- CMOS inverter
- Design: CMOS Inverter design using Dsch and Microwind
- Importance of Time Delay and Low power

Models/Logics to be designed:

- 1-bit Half Adder
- 1-bit Full Adder

- 4-bit Ripple carry Full adder
- 4:1 MUX using logic equation
- 4:1 MUX using Conditional Operators
- 4:1 MUX using Dataflow Operators
- 4-bit Full adder using Dataflow Operators
- Ripple Counter
- Unidirectional Shift Register
- Bidirectional Shift Register
- T Flip-flop
- Edge triggered D FF
- 8:1 MUX with Case statement
- ALU Design
- Generated Ripple Adder
- Traffic Signal Controller
- Three Way Switch logic
- Task definition using ANSI C style Argument Declaration
- D-FF with Procedural Continuous Assignment
- Instantiation of a CMOS switch
- Switch level logic gates
- Serial Adder Design using FSM(Finite State Machine)
- MOD-8 counter using FSM
- Arbiter ckt using FSM
- Different types of sequence detector using FSM
- Synthesizable FIFO model (Project-1)
- Behavioral DRAM model (Project-2)
- Projects
- Synthesizable FIFO Model(Day-29)
- Behavioral DRAM Model(Day-30&31)
- Tools Used:
- Xilinx ISE Design Suite(For Digital IC Design)
- Microwind(For Analog IC Layout Design)
- Dsch(For Circuit Design)

SYLLABUS

COVERAGE

- MATLAB Basics
- Research Activities using MATLAB
- Error Solving Techniques
- Coding techniques for fast execution
- Interfacing with different software languages
- 2D and 3D plotting
- Graphical User Interface design
- File export and import with MATLAB workspace
- Use of power system, control system &
- communication system tool box
- Use of signal processing & soft computing toolbox
- Use of MATLAB tools for fast computation
- Creating MATLAB libraries
- Simulation model design using MATLAB-Simulink
- Interactive session for VLSI domain students

SYLLABUS IN DETAILS

Introduction

- Why MATLAB?
- History
- Its strengths
- Weaknesses
- Competitors
- Starting MATLAB, Using MATLAB as a calculator, Quitting MATLAB

Basics

- Familiar with MATLAB windows
- Basic Operations
- MATLAB-Data types
- Rules about variable names
- Predefined variables

Programming-I

- Vector
- Matrix
- Array Addressing

- Built-in functions
- Mathematical Operations
- Dealing with strings(Array of characters)
- Array of array(cell) concept

Programming-II

- Script file
- Input commands
- Output commands
- Structure of function file
- Inline functions
- Feval command
- Comparison between script file and function file

Conditional statements and Loop

- Relational and Logical Operators
- If-else statements
- Switch-case statements
- For loop

- While loop
- Special commands(Break and continue)
- Import data from large database
- Export data to own file or database

2D Plotting

- In-built functions for plotting
- Multiple plotting with special graphics
- Curve fitting
- Interpolation
- Basic fitting interface

3D Plotting

- Use of meshgrid function
- Mesh plot
- Surface plot
- Plots with special graphics

GUI

- Creating menu window for providing input
- Creating graphical user interface table
- Modifying table content
- Creating a database

Simulink

- Model design
- Simulation
- Know your MATLAB tool (Branch specific)
- Interactive session for VLSI domain students
- Create application specific IC for Xilinx
- Project