SYLLABUS FOR THE POST OF ASSOCIATES (IT) - PROGRAMMER

Primary Knowledge Area (70%)

Hypertext Preprocessor (PHP):

1. Introduction to PHP: Evaluation of Php, Basic Syntax, Defining variable and constant, Php Data type, Operator and Expression.

2. Decisions and loop: Making Decisions, Doing Repetitive task with looping, Mixing Decisions and looping with Html.

3. Function: What is a function, define a function, call by value and Call by reference, Recursive function, String Creating and accessing, String Searching & Replacing String, Formatting String, String Related Library function

4. Array: Anatomy of an Array, creating index based and Associative array Accessing array, Element Looping with Index based array, looping with associative array using each () and foreach (), Some useful Library function.

5. Handling Html Form with Php: Capturing Form, Data Dealing with Multi-value filed, and Generating File uploaded form, redirecting a form after submission.

6. Working with file and Directories Understanding file& directory, Opening and closing, a file, Coping, renaming and deleting a file, working with directories, Creating and deleting folder, File Uploading & Downloading.

7. Session and Cookie: Introduction to Session Control, Session Functionality What is a Cookie, Setting Cookies with PHP. Using Cookies with Sessions, Deleting Cookies, Registering Session variables, Destroying the variables and Session.

8. Database Connectivity with MySQL: Introduction to RDBMS, Connection with MySQL Database, performing basic database operation (DML) (Insert, Delete, Update, Select), Setting query parameter, Executing query Join (Cross joins, Inner joins, Outer Joins, Self joins.)

9. Exception Handling: Understanding Exception and error, Try, catch, throw. Error tracking and debugging.

10. PHP Frameworks (Laravel, CodeIgniter, Symphony): covering concepts of Classes, Functions, Inheritance, PDO, Curl, Sorting, Arrays, Linked List, Stack & Queue.

JavaScript Libraries and Framework:

1. Fundamentals of Web Design: Webpage and Website, Web application, Client server architecture, JavaScript, HTML, CSS, ES5 Grammar and types, Control flow and error handling, Loops, Function, Objects, Arrays, Promises, ES6 Let and const, Template literals, Arrow Function, Default parameter, Async Await,

2. Node & Express Js: Node.js - basics and setup, Node.js console, Node.js command utilities, Node.js modules, Node.js concepts, Node.js events, Node.js database access, Node.js with Express.js, Express.js Request, Express.js Response, Express.js Get, Express.js Post, Express.js Routing, Express.js Cookies, Express.js File Upload, Express.js Middleware, Express.js Scaffolding, Express.js Template

3. ReactJS introduction and overview: ReactJS installation and environment setup, Introducing JSX, Rendering Elements, Components and Props, State and Lifecycle, Handling Events, Conditional Rendering, Lists and Keys, Forms, Lifting State Up, Composition vs Inheritance, Thinking In React, React Hook

Data Migration:

MySQL, Create, Read, Update, Delete Operation, SQL and NoSQL concepts, Create and manage MongoDB, Migration of data into MongoDB, MongoDB with NodeJS, Services offered by MongoDB

Addon Knowledge Area (30%)

Python: Introduction on python, Installation of python, How to use python, Python Basic Syntax, Python First program, Literals, Constants & variables, Keywords, Operators, Comments, Control flow statement, Data structure (List, Tuple & dictionary in python), Function, Module & Packages, Array NumPy, OOPS Concept, SQL and python, Concepts of Web Page, Introduction on Django, Django Project & server configuration, Django app, MVT Design Pattern, View, Template, URL Mapping, Static file Handling, Model Form, Django Form, Form Validation, File Upload, Database connectivity, Creating CURD application in Django, Django Middleware, Session & cookies, Introduction to Flask

Data Structure and Algorithms: Introduction to object-oriented programming through stacks, queues and linked lists, Dictionaries: skip-lists, hashing, analysis of collision resolution techniques Trees, traversals, binary search trees, optimal and average BST's trees and red-black trees, Tries and pattern matching. Priority queues and binary heaps, Sorting: merge, quick, radix, selection, heap, Introduction to Graphs, Breadth first search and connected components, Depth first search in directed and undirected graphs and strongly connected components, Spanning trees: Prim's and Kruskal's algorithm, union-find data structure, Dijkstra's algorithm for shortest path. shortest path tree. Shortest and longest paths in directed acyclic graphs

SYLLABUS FOR THE POST OF ASSOCIATES (IT) - DATABASE SPECIALIST

Databases

PostgreSQL, MySQL and MongoDB: The following points will be covered in above stated Database Management Systems.

SQL:

1. RDBMS concept, relational database model, normalization, introduction of MySQL
2. MySQL Queries Create tables, fields Alter table Insert, Update and where condition Delete, Select Limits, Distinct Joins, Order by Group by, Union Import and Export Database.
3. Store procedure and MySQL Functions
4. MySQL Overview and Architecture, MySQL memory structures, MySQL background processes.
5. Creating Users, changing password, Granting and revoking privileges.
6. Backup and Recovery Taking user backup, Backup requirement, Physical and logical backup, Cold and hot backup, Enabling and disabling binary logging, Understanding the binary log architecture, Different backup techniques in MySQL (MySQL dump, Full back up, Transactional backup, Percona Xtrabackup), Restoring MySQL backup, Purging old logs, MySQL Binlog utility and PITR.
7. Control and Redo Log Files Managing the control files, Maintaining and monitoring redo log files. Trouble shooting and Performance Tuning/Optimization for large dB's, General Problems and their resolution, Connection problems, and understanding the error log, Performance tuning – Index suggestions, Optimizing the MySQL database.
8. Object Oriented approach of database connectivity, using MySQL functions in Php. PhP-MySQL interaction.

NoSQL:

1. Introduction to MongoDB, MongoDB architecture, Data modelling in MongoDB, Advantages of MongoDB over RDBMS, Mongo Shell, Configuration file in MongoDB
2. JSON File format for storing documents, Introduction to Documents, Collections, Database Commands in Mongodb, Inserting and Saving Documents, Inserting multiple documents, Updating Documents, Removing Documents, Document Replacement.
3. Operator and Modifiers, Indexing in MongoDB, Single index, Finding index, Multikey index
4. Aggregation Framework, Pipeline Operations- $match, $sort , $group, Pipeline Operations-,$project,, $unwind ,$limit, $skip, MapReduce, Aggregation commands.
5. Replication, Advantages of replication, Implementation of replication, Managing Configuration File in MongoDB, Setting up replica set in MongoDB, Replication configuration, Change replication configuration, Replication status, Remove members, Adding new port in replica set, Terminologies used in replication, Adding arbitrator, Stepping down a member
6. Backup and restore, Export and import of data, Importing from JSON file, Choosing the right database , Taking decisions on database, Strengths and weakness of database, Free and open source database.

SYLLABUS FOR THE POST OF ASSOCIATES (IT) – IT SUPPORT
[Hardware Oriented]

Networking Fundamentals: Introduction to ISO & TCP/IP Stack, DNS/UDP/IP, TCP/HTTP/HTTPS, ICMP/DHCP, Cabling, Addressing, Managing Basic Switches, Managing Advanced Switches, Managing Basic Routers , Transmission Environment, Routing Algorithms, IP, UDP, TCP Protocols, Reliable Data Transferring Methods, Application Protocols, Network Security, Management Systems, Circuit and Patching Switching, Data Communication Terminologies, Transmission Media, Network Devices, Network Topologies and Protocols, OSI Model.

Operating System Administration: Installing Windows OS, Setting Active Directory, Managing Active Directory, Managing User & Group, Setting File, Web Server, Backup and Restore, Introduction to Linux Fundamentals & Commands, Process Control Block, Multi-programmed batch, Threads, CPU Scheduling, Process Synchronization, Deadlocks, Memory Management, File System Implementation, Secondary Storage Structure

Information Security Concepts: Introduction to Information Security, Configuring SSH, Configuring DNS Server, Practical on Discovery and scanning techniques (who is domain search query, ping, nslookup, traceroute, visual traceroute, DNS query), Configuring Web Server with Virtual Hosting, Practical on Packet Sniffing tool Ethereal, Practical on password cracking tools john crack, Lophtcrack, Practical on Denial of Service, IP spoofing, Practical on network vulnerabilities assessment tool NMAP, Practical on ftp and telnet hacking.

System Security: Practical on OS finger printing using NMAP, Installation and secure configuration of E-mail server like send mail, Practical on useful utility for Security Administrator like Netcat, TCPdump, LSOf, Ngrep, Configuring Web Server, Configuring File Servers, Installation and Secure configuration of Database Server Oracle /MYSQL/Postgres, Practical on Intrusion Detection System using Snort/Tripwire, Practical on Firewall Testing using NMAP, Configuring a Proxy Server using Squid, Configuring a content filter using Dansguardian.

Cyber Security: Cyber Laws, Cryptography, Malware analysis, Penetration Testing and Incident Handling, Securing Web Application Services and Servers, Applied Algebra, Threats and prevention from Viruses, Worms, Trojan horse, Spams, Use of Cookies, Protection using Firewall, https, India IT Act, IPR issues, Ethical hacking.