**Syllabus**

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| Topics | Subtopics | Hours |
| **Cloud Computing**  **Fundamentals** | What is cloud computing?- Definition, Commodity Hardware,  Benefits of cloud computing, History, Current, Trends and  Challenges | 30 Minutes |
| Cloud Service Models- Types of Cloud, IaaS, PaaS, SaaS | 30 minutes |
| IaaS vs. PaaS vs. Saas - Working, Advantages, Drawbacks | 40 minutes |
| Quiz-1 | 20 minutes |
| Virtualization concepts - Key Properties, Types of Virtualization: Server, Desktop, Network, Storage, Data, Application, Data Centre, CPU, GPU, Linux and Cloud Virtualization, Benefits of virtualization | 2 Hours |
| Understanding of containerization & virtualization technologies- Containerization, Docker Container-Architecture, Kubernetes- Importance of cluster computing, kubernetes architecture  VMware- Introduction, Uses of VMware workstation, Hyper-VUses, Features & Working | 3 Hours |
| **OS Based Virtualization**  **Lab-1** : Implementation of Virtualization using Oracle VirtualBox.  **Lab-2** : Ubuntu Instance Creation Using VirtualBox  **Internetworking concepts: Classful & Classless addressing scheme,**  **IP Addressing classes, subnetting;**  **Lab-3** : Networking between two OS instances | 3 Hours |
| **Assignment-1** |  |
| Cloud Deployment Models-Private, Public, Hybrid, HPC | 20 Minutes |
| **Amazon Web Services** | Amazon AWS-Primary Benefits of the Cloud/AWS  **Lab-4** : Creating a free account in AMAZON AWS and exploring  various services.  **Lab-5** : Familiarization of various services in AWS | 40 Minutes |
| AWS Service Categories | 1 Hour |
| **Launching an EC2 Instance**  **Lab-6** : Creating a Linux operating system instance in AWS.  **Lab-7** : Networking between two EC2 instances | 2 Hours |
| Basics of PuTTY  Lab-8 : Connecting to Your Linux Instance using PuTTY in Windows. | 1 Hour |
| Quiz-2 | 20 minutes |
| **How a Website Works - Working of DNS, How to register for a**  **domain name, FTP, How to install WordPress;**  **Lab-9** : Host a Static Website in Amazon AWS.  **Lab-10** : Deploying WordPress on AWS | 3 Hours |
| **Assignment-2** |  |
| **Big Data Analytics - Characteristics of Big Data, Current Trends,**  **Challenges, Importance of Cluster Computing, Hadoop Framework**  **- HDFS & MapReduce.**  **Lab-11:** Run a sample Hadoop operation in a single node (Pseudo  mode) in Virtual Box  **Lab-12:** Run a sample Hadoop operation in a single node (Pseudo  mode) in AWS  **Lab-13:** Deploy a multi-node Hadoop setup in AWS. | 5 Hours |
| **Assignment-3** |  |
| **Quiz-3** | 20 Minutes |
| **Configuring CloudWatch Logs** | 20 Minutes |
| **Deploying a relational database**  **Lab-14** : Creating A MySQL Database With RDS | 3 Hours |
| **Configuring IAM for Our Deployment** | 20 Minutes |
| **Quiz-4** | 20 Minutes |
| **Live Session** | 1 hour |
| **Existing Cloud**  **Computing**  **Providers and**  **Certifications** | **Cloud Providers and Certifications** | 20 Minutes |
| **AWS-Amazon Web Services** | 20 Minutes |
| **Azure 30** | 30 Minutes |
| **Google Cloud Platform** | 30 Minutes |
| **Quiz-5** | 20 Minutes |
| **Cloud Computing**  **Tools, Distributed**  **Systems and**  **Streaming**  **Mechanism** | **Cloud Encryption, Cloud Monitoring, Cloud Security** | 1 Hour |
| **The Gossip Protocol, Gossip Analysis, Gossip Implementations, Failure Detectors, Gossip-Style Membership, Dissemination and suspicion** | 2 Hours |
| **Grid Applications and Grid Infrastructure, P2P Systems, Napster, Gnutella, FastTrack and BitTorrent, Chord and Failures in Chord,**  **Pastry, Kelips, Cassandra, X-The Cap Theorem** | 2 Hours |
| **Quiz-6** | 20 Minutes |
| **Cristian's Algorithm, NTP, Lamport Timestamps, Vector Clocks, Global Snapshot Algorithm, Consistent Cuts, Safety and Liveness, Multicast Ordering and Implementation, Reliable Multicast, Virtual Synchrony, The Consensus Problem, Consensus In Synchronous Systems, Paxos, Simply, The FLP Proof** | 2 Hours |
| **Quiz-7** | 20 Minutes |
| **Real-time Streaming: Apache Spark- Deployment, RDD** | 40 Minutes |
| **Spark core architecture** | 2 Hours |
| **Quiz-8** | 20 Minutes |
| **Lab-15:** Deploy Spark sample applications | 1 Hour |
| **Live Session** | 1 Hour |
|  | **Final Assessment Quiz** | 1 Hour |