**Cloud Solution Architect Course**

**Syllabus and Schedule**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S. No** | **Module No.** | **Lecture** | **Lab (Instructor Lead)** | **Assignment** | **Video Links** |
| 1 | 1 | * CourseOrientation * Why Cloud Computing? * Introduction to Cloud Computing * Private & Public Cloud * IaaS / PaaS / SaaS | * Bootstrap computer systems * IaaS / PaaS / SaaS practical examples * Introduction to Different Clouds and tools to be used in the course | * Setting up VirtualBox on workstations |  |
| 2 | 2 | * Introduction to Linux * Introduction to Virtualization (VirtualBox, VMware, QEMU/KVM) | * Creating a Virtual Machine on VirtualBox * Hands-on Ubuntu Installation * Overview of graphical user interface (GUI Gnome) | * Installation of Ubuntu on Virtual Machine * Internet Browsing (Social Media) |  |
| 3 | * Introduction to Command line interface (CLI) * Linux Structure (file and directory structure) * Basic Commands (cd, ls, mkdir, etc) | * Linux structure, etc, var, usr, root, home * Basic Commands: vi, nano, cd, ls, man, cat, grep, ps | * Command output screenshots |  |
| 4 | * Package Manager * Overview of public repositories * Software installation / update / upgrade / remove | * Installation of software using package manager (communication tools e.g Skype) | * Install a software using GUI and CLI |  |
| 5 | * Introduction to Bash * Introduction to Linux Kernel * User Management and system administration | * Using command line interface for different commands and operations * useradd, usermod, groupadd, groupmod * Detailed contents and uses of configuration and system files like passwd, hosts, hostname, etc. | * create three groups, marketing, technical, finance * add users to these groups |  |
| 6 | * Linux permissions * Partition types in linux, LVM * run-levels, systemd | * managing permissions and user rights * chown, chmod * create disk partitions * creating pv, vg, lv * mounting disk as /data * fdisk, format, ext2fsd, fsck, gparted | * same as lab tasks |  |
| 7 | * Advanced Commands (system administration commands, permissions, network, etc.) | * Advanced Commands and their options: htop, iftop, atop, ip, ifconfig, netstat, df, netplan, chattr, setfacl, sed, awk, | * same as lab tasks |  |
| 8 | * Administration of network services * ssh server * pki - public private key infrastructure * iptables / ufw * Apache / Nginx | * Setting up hosting server to host wordpress LEMP (Linux, Nginx, MySQL, PHP) | * setup wordpress blog |  |
| **MIDTERM EXAMS** | | | | | |
| 9 | 3 | * Introduction to Cloud Computing Infrastructure * Introduction to AWS, GCP, Azure * AWS Console and CLI overview | * Detailed interface overview of different clouds | * Explain difference between Public cloud vs private cloud |  |
| 10 | * Introduction to AWS / Azure * Identity and Access management * IAM roles * Creating Basic VMs (EC2 / VM instances) | * Hands-on AWS Identity management, IAM roles * Create an account on AWS * Hands-on Creation of VM on AWS * Detailed information about basic instances of AWS, like EC2 | * Invoke IAM roles * Create and delete EC2 instances * Create Snapshots |  |
| 11 | * Virtual Private Cloud * Load Balancer * Security Group | * Hands-on Creation of Virtual Private Cloud, its concepts and uses * Installation of Wordpress and mysql on different VMs within a VPC | * Create Virtual Private Cloud |  |
| 12 | * EBS * S3 / Blob Storage * EFS / SMB | * Detailed information about EBS, S3, EFS, RDS, cloudwatch etc. | * attach EBS with EC2 |  |
| 13 | 4 | * Basics of DevOps * Introduction to Git * Git Commands * + Project selection | * Hands-on experience of Git commands: add, commit, push, pull, merge, change branch, create branch | * Create github accounts * What is DevOps? Write history, cycle and tools of used at different stages of DevOps * Screenshots of complete process of git |  |
| 14 | * Introduction to cloud-native * Introduction to microservices * Containers vs Virtual Machines * Introduction to docker containers | * Examples of microservices * Hands-on installation of docker | * Container vs VM * Monolithic vs microservices |  |
| 15 | 5 | * Getting started with docker * Docker commands * Docker File | * Usage of hub.docker.com * How to access github docker file of a docker image * Image tags * Understanding of Docker file components * Docker commands, build, run, start, stop, pull, images, rm, rmi, exec, commit | * wordpress and mysql installation on docker * Anatomy of container image |  |
| 16 | * Docker compose * Docker Advanced networking concepts * Private container registry / Container registry | * Creating a docker file * Creating a docker compose file * Pushing the image to container registry | * Create custom image * Create a docker compose file for installation of wordpress and mysql |  |
| 17 | 6 | * Project Presentation | * Project Demonstration |  |  |
| **FINAL EXAMS** | | | | | |

**References**

1. <https://www.youtube.com/c/WBITT>
2. <https://www.youtube.com/c/babarzahoor>
3. <https://opensourceeducation.net/>
4. Cloud Native DevOps with Kubernetes: Building, Deploying, and Scaling Modern Applications in the Cloud: <https://www.amazon.com/Cloud-Native-DevOps-Kubernetes-Applications/dp/1492040762>
5. The Kubernetes Book: <https://www.amazon.com/Kubernetes-Book-Nigel-Poulton/dp/1521823634>
6. The DevOps Handbook: How to Create World-Class Agility, Reliability, and Security in Technology Organizations: <https://www.amazon.com/DevOps-Handbook-World-Class-Reliability-Organizations/dp/1942788002>
7. The Phoenix Project: A Novel About IT, DevOps, and Helping Your Business Win: <https://www.amazon.com/Phoenix-Project-DevOps-Helping-Business/dp/0988262592>
8. Linux Pocket Guide: <https://www.amazon.com/_/dp/0596006284?tag=oreilly20-20>
9. Cloud Computing: Concepts, Technology & Architecture: <https://www.amazon.com/Cloud-Computing-Concepts-Technology-Architecture/dp/0133387526>
10. Hands-on Azure DevOps Mitesh Soni: <https://www.amazon.com/Hands-Azure-DevOps-Implementation-Applications-ebook/dp/B08BLG5QM4>