



Electronics & ICT Academy
(Under MeitY, Ministry of Communications & IT, Govt. of India)

Indian Institute of Technology Guwahati, Guwahati, Assam, Pin 781039

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DETAILED POINT-WISE COURSE SYLLABUS

DAY 1

1. Introduction to Cloud Computing

In this session, we would be exploring what Cloud Computing is all about, characteristics of the Cloud and the pros/cons of the same.

Theory:

- What is Cloud Computing?
- Essential Characteristics of Cloud Computing
- Why Cloud Computing?
- Advantages of Cloud Computing

2. Cloud Computing Models

There are different types/dimensions of Cloud, the same would be explored here along with the use cases. Given a particular requirement, we should be able to choose what type of Cloud to use.

Theory:

- Service Models (SAAS, PAAS, IAAS)
- Differences between the Service Models
- Deployment Models (Public, Private, Hybrid and Community Cloud)
- Overview of Community Cloud

3. Cloud Computing Risks and Concerns

As with any new technology there is a friction moving towards the Cloud. Here we would be exploring what the hindrances are moving towards the Cloud and how they can be addressed.

Theory:

- Cloud Security and Privacy
- Service Quality (SLA)
- Cloud Computing Portability and Interoperability
- Transition to the cloud
- Legal and compliance



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4. Introduction to AWS

Amazon AWS, Google GCP and Microsoft Azure are the prominent vendors in the Cloud space. We would be looking at the basics of AWS and the free tier which it offers.

Theory:

- AWS Global Infrastructure (Regions, Availability Zones, and Edge Locations)
- AWS Free Tier

Practical:

- Signing up for AWS

5. Amazon Elastic Compute Cloud (EC2)

Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides secure, resizable compute capacity in the cloud. It is designed to make web-scale cloud computing easier for developers.

Theory:

- Introduction to EC2

Practical:

- Creating Key Pairs
- Launching your first AWS instance
- Setting up security groups
- Provisioning Linux Instance with required security

6. Amazon EC2 Pricing

Depending on the usage and payment there are different pricing models in AWS. Understanding the pricing models helps to lower the overall bill while using the AWS Cloud.

Theory:

- On-demand Instance pricing
- Reserved Instance pricing
- Spot Instance pricing



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DAY 2

1. Elastic Load Balancer (ELB)

Elastic Load Balancing automatically distributes incoming application traffic across multiple Amazon EC2 instances. It enables you to achieve fault tolerance in your applications, seamlessly providing the required amount of load balancing capacity needed to route application traffic.

Theory:

- Introduction to Load Balancing

Practical:

- Creating an Elastic Load Balancer
- Create an ELB with web servers across Availability Zones

2. EBS (Elastic Block Storage)

Amazon Elastic Block Store (Amazon EBS) provides persistent block storage volumes for use with Amazon EC2 instances in the AWS Cloud. Each Amazon EBS volume is automatically replicated within its Availability Zone to protect you from component failure, offering high availability and durability. Amazon EBS volumes offer the consistent and low-latency performance needed to run your workloads.

Theory:

- Introduction to Elastic Block Storage
- EBS Volume Types
- Introduction to Snapshots

Practical:

- Provisioning and Terminating EBS volumes
- Creating and deleting snapshots
- Creating volumes from snapshots
- Attach and Detach EBS volume to Linux Instances

3. IP Addressing Scheme

An addressing scheme is clearly a requirement for communications in a computer network. With an addressing scheme, packets are forwarded from one location to another. In this section, we will explore the IP Addressing Scheme just enough to get started with the AWS.

Theory:



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- IPv4 and IPv6 Addressing
- IP Address Classification
- Public and Private IP Addresses
- Elastic IPs
- Network and Host Portions
- Introduction to NAT

DAY 3

1. Amazon Virtual Private Cloud (VPC)

Amazon Virtual Private Cloud (Amazon VPC) lets you provision a logically isolated section of the Amazon Web Services (AWS) cloud where you can launch AWS resources in a virtual network that you define. You have complete control over your virtual networking environment, including selection of your own IP address range, creation of subnets, and configuration of route tables and network gateways.

Theory:

- Introduction to VPC
- VPC Components
- VPC security and Inbound and outbound ACL's

Practical:

- Creating using VPC wizard

2. Relational Database Service (RDS)

Amazon Relational Database Service (Amazon RDS) makes it easy to set up, operate, and scale a relational database in the cloud. It provides cost-efficient and resizable capacity while managing time-consuming database administration tasks, freeing you up to focus on your applications and business.

Theory:

- Introduction to RDS
- RDS Database types

Practical:

- Creating databases
- Configuring backups
- Connecting to the database



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3. Route53

Amazon Route 53 is a highly available and scalable cloud Domain Name System (DNS) web service. It is designed to give developers and businesses an extremely reliable and cost-effective way to route end users to Internet applications by translating names like `www.example.com` into the numeric IP addresses like `192.0.2.1` that computers use to connect to each other.

Theory:

- Introduction to Route53
- Various Route53 Record types

Practical:

- Creating zones
- Creating Health Checks

DAY 4

1. CloudWatch

Amazon CloudWatch is a monitoring service for AWS cloud resources and the applications you run on AWS. You can use Amazon CloudWatch to collect and track metrics, collect and monitor log files, set alarms, and automatically react to changes in your AWS resources.

Theory:

- Introduction to CloudWatch

Practical:

- Creating a CloudWatch dashboard
- Creating a CloudWatch alarms
- Monitoring other AWS services
- Configuring notifications
- Integrating CloudWatch with Auto-scaling

2. Auto scaling

Auto Scaling helps you maintain application availability and allows you to scale your Amazon EC2 capacity up or down automatically according to conditions you define. You can use Auto Scaling to help ensure that you are running your desired number of Amazon EC2 instances. Auto Scaling can also automatically increase the number



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of Amazon EC2 instances during demand spikes to maintain performance and decrease capacity during lulls to reduce costs.

Theory:

- Introduction to Bootstrapping
- What is launch configuration?
- What is Auto-Scaling group?

Practical:

- Setting up an auto-scaled, load-balanced Amazon EC2 application

3. S3 (Simple Storage Service)

Amazon Simple Storage Service (Amazon S3) is object storage with a simple web service interface to store and retrieve any amount of data from anywhere on the web. It is designed to deliver 99.99999999% durability, and scale past trillions of objects worldwide. Customers use S3 as primary storage for cloud-native applications; as a bulk repository, or "data lake," for analytics; as a target for backup & recovery and disaster recovery; and with server less computing.

Theory:

- Introduction to S3
- S3 durability and redundancy
- Buckets and Objects
- RRS (Reduced Redundancy storage)
- S3 Object Versioning and Lifecycle Policies

Practical:

- S3 static website hosting
- S3 Permissions and Bucket Policies
- Host a sample website on S3 Bucket

DAY 5

1. CloudFront

Amazon CloudFront is a global content delivery network (CDN) service that accelerates delivery of your websites, APIs, video content or other web assets through CDN caching. It integrates with other Amazon Web Services products to give developers and businesses an easy way to accelerate content to end users with no minimum usage commitments.

Theory:



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- **Introduction to CDN Network and CloudFront**

Practical:

- **Creating a CloudFront distribution**
- **Hosting a website of CloudFront distribution**
- **Implementing restrictions**
- **Configuring origins and behaviors**

2. Dynamo DB

Amazon DynamoDB is a fast and flexible NoSQL database service for all applications that need consistent, single-digit millisecond latency at any scale. It is a fully managed cloud database and supports both document and key-value store models. Its flexible data model and reliable performance make it a great fit for mobile, web, gaming, ad tech, IoT, and many other applications.

Theory:

- **Introduction to NoSQL Databases**

Practical:

- **Creating Dynamo DB tables**
- **Adding data manually**
- **Configuring alarms**
- **RCU and WCU**

DAY 6

1. Project and AWS Case study

All the different services have been explored individually till now. In the project, we would be combining the different AWS services to build a two-tier web application.

Practical:

- **Architecting two-tier applications on AWS**

2. AWS certification

Certification from AWS will increase the probability of getting a job in the IT. In this section, we will explore the trips and tricks around the AWS certification.

Theory:

- **Overview of AWS certifications**



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- How to book a slot for AWS certification?
- Certification examination question patterns

Practical

- MCQ Exam