
Course Title: Cloud Computing (with AWS)

Syllabus

1. Introduction to Cloud Computing

- Overview of cloud computing concepts.
- Key features: On-demand provisioning, elasticity, scalability, and pay-as-you-go.
- Benefits and challenges of cloud adoption.
- Cloud service models: IaaS, PaaS, SaaS.
- Deployment models: Public, Private, Hybrid, and Community clouds.

2. AWS Overview

- Introduction to Amazon Web Services (AWS).
- Global AWS infrastructure: Regions, Availability Zones, and Edge Locations.
- Overview of key AWS services and their categories (Compute, Storage, Networking, and Databases).

3. AWS Core Services

- **Compute:**
 - Amazon EC2 basics: Launching, configuring, and managing virtual servers.
 - Introduction to AWS Lambda (serverless computing).
- **Storage:**
 - Amazon S3: Object storage and its use cases.
 - Amazon EBS: Block storage for virtual machines.
 - Amazon Glacier: Long-term archival storage.
- **Databases:**
 - Amazon RDS: Managed relational databases.
 - Amazon DynamoDB: NoSQL database for scalable applications.

4. Networking and Content Delivery

- Basics of networking in the cloud.
- Introduction to Amazon VPC (Virtual Private Cloud).
- Elastic Load Balancer (ELB) and Auto Scaling.
- Overview of Amazon CloudFront for content delivery.

5. Security and Identity

- Shared responsibility model in AWS.
 - Basics of AWS Identity and Access Management (IAM).
 - Role-based access control and policies.
 - AWS Trusted Advisor for security best practices
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Recommended Books

1. **"AWS Certified Cloud Practitioner Study Guide"** by Ben Piper.
 2. **"Cloud Computing: Concepts, Technology & Architecture"** by Thomas Erl.
 3. **"Getting Started with AWS: Hosting Applications and Services on the Cloud"** by Jeffrey Barr.
 4. **"AWS in Action"** by Andreas Wittig and Michael Wittig.
 5. **AWS Whitepapers:**
 - **"Overview of Amazon Web Services"**
 - **"Architecting for the Cloud: AWS Best Practices"**
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Course Outcomes

By the end of this course, students will be able to:

1. Understand the foundational concepts of cloud computing and AWS architecture.
 2. Identify the core AWS services and their practical use cases.
 3. Launch and manage virtual servers using Amazon EC2.
 4. Utilize Amazon S3 for secure and scalable object storage.
 5. Understand and implement basic cloud networking with Amazon VPC and related services.
 6. Gain knowledge of AWS security practices, including IAM and data encryption.
 7. Monitor cloud resources and manage costs effectively using AWS tools.
 8. Develop and deploy basic applications using AWS services.
 9. Analyze real-world use cases to understand cloud solutions in various industries.
 10. Build a strong foundation to pursue advanced AWS certifications and roles in cloud computing.
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Lecture Plan : **"Cloud Computing with AWS":**

Week	Lecture	Topic
1	1	Introduction to Cloud Computing and AWS Overview
	2	AWS Global Infrastructure: Regions and Availability Zones
	3	AWS Core Services Overview
2	4	Identity and Access Management (IAM) Basics
	5	Setting Up Your AWS Account and Best Practices
	6	Introduction to AWS Management Console and CLI
3	7	Amazon EC2: Launching Virtual Machines
	8	EC2 Pricing Models: On-Demand, Reserved, Spot Instances
	9	Auto Scaling and Elastic Load Balancing (ELB)
4	10	Amazon S3: Object Storage Overview
	11	S3 Storage Classes and Lifecycle Management
	12	S3 Security: Bucket Policies, ACLs, and Encryption
5	13	Amazon RDS: Relational Database Services
	14	DynamoDB: NoSQL Database Services
	15	AWS Lambda: Introduction to Serverless Computing
6	16	Elastic Beanstalk: Simplified Application Deployment
	17	Amazon CloudFront: Content Delivery Network
	18	Route 53: Domain Name System and Traffic Routing
7	19	AWS Networking: VPC Fundamentals
	20	Security Groups, NACLs, and VPN in VPC
	21	Monitoring and Logging with CloudWatch
8	22	CloudTrail: Auditing and Compliance in AWS
	23	AWS Config: Resource Management and Compliance
	24	Cost Management: AWS Pricing Models and Cost Explorer
9	25	S3 Static Website Hosting
	26	Deploying Applications with AWS Elastic Beanstalk
	27	Introduction to AWS SDKs for Developers
10	28	Big Data Analytics on AWS: Introduction to EMR and Redshift
	29	Machine Learning with AWS SageMaker
	30	AI Services: AWS Rekognition, Polly, and Lex
11	31	Serverless Architectures with AWS Lambda and API Gateway
	32	Storage Gateway: Integrating On-Premises with AWS
	33	Disaster Recovery and Backup Strategies in AWS
12	34	Security in AWS: Shared Responsibility Model
	35	Advanced Security with AWS WAF and Shield
	36	Architecting for High Availability and Fault Tolerance
13	37	Future Trends in Cloud Computing and AWS Innovations
	38	Review of Core AWS Services and Best Practices
	39	Exam: AWS Knowledge Assessment
14	40	Final Project Presentation: End-to-End AWS Solution