

AWS Foundations Capstone Course

A structured, beginner-friendly course designed for interns and new employees, aligned directly with the **AWS Foundation Capstone Project**. Each module includes **learning resources** (docs, videos, labs) that prepare learners to successfully complete the capstone.

Course Overview

Duration: 2 Days (12–14 hours total)

Outcome: Learners will build and deploy a full AWS-based web application using core AWS services.

Capstone Architecture:

- S3 (Static Website)
- API Gateway (REST API)
- Lambda (Backend Logic)
- DynamoDB (NoSQL Database)
- IAM & CloudWatch (Security & Monitoring)

DAY 1 – Foundations & Core Services

Module 1: Getting Started with AWS (30 mins)

What You'll Learn

- AWS account structure
- Root vs IAM users
- Navigating the AWS Console
- MFA and security basics

Topics

- AWS Global Infrastructure

- AWS Free Tier
- IAM fundamentals

Learning Resources

- AWS Docs: *What is AWS?*
- AWS Docs: *IAM Best Practices*
- AWS Video: *AWS Console Tour*
- Hands-on: Create IAM user + enable MFA

Capstone Connection

Secure access is required for **every service** used in the capstone.

Module 2: EC2 – Your First Server (90 mins)

What You'll Learn

- Virtual machines in AWS
- Security groups & key pairs
- Linux basics on EC2

Topics

- EC2 instances
- AMIs & instance types
- Security groups
- SSH access

Learning Resources

- AWS Docs: *Amazon EC2 Basics*
- AWS Docs: *Security Groups*
- Video: *Launch Your First EC2 Instance*
- Hands-on Lab: Launch EC2 + install Apache

Capstone Connection

EC2 is used to **connect to RDS** and understand compute fundamentals before Lambda.

Module 3: S3 – Cloud Storage & Static Websites (60 mins)

What You'll Learn

- Object storage concepts
- Bucket policies
- Static website hosting

Topics

- Buckets & objects
- Public access settings
- Static website endpoints

Learning Resources

- AWS Docs: *Amazon S3 Overview*
- AWS Docs: *Hosting a Static Website on S3*
- Video: *S3 in 15 Minutes*
- Hands-on Lab: Host HTML website on S3

Capstone Connection

S3 hosts the **frontend contact form** for the final project.

Module 4: IAM – Security & Permissions (45 mins)

What You'll Learn

- Permission management
- Least-privilege access
- IAM policies & roles

Topics

- Users, groups, roles
- Managed vs custom policies

- Service roles

Learning Resources

- AWS Docs: *IAM Policies Explained*
- Video: *IAM in Plain English*
- Hands-on Lab: Create read-only S3 user

Capstone Connection

IAM roles allow **Lambda to access DynamoDB and S3 securely**.

Module 5: RDS – Managed Databases (60 mins)

What You'll Learn

- Relational databases in AWS
- MySQL basics
- Connecting EC2 to RDS

Topics

- RDS instances
- Security & connectivity
- SQL basics

Learning Resources

- AWS Docs: *Amazon RDS for MySQL*
- Video: *RDS Explained*
- Hands-on Lab: Create MySQL DB + query data

Capstone Connection

Builds database confidence before using **DynamoDB**.

DAY 2 – Advanced & Serverless Services

Module 6: VPC – Networking Basics (45 mins)

What You'll Learn

- AWS networking model
- Public vs private resources

Topics

- VPCs & subnets
- Route tables
- Security Groups vs NACLs

Learning Resources

- AWS Docs: *VPC Basics*
- Video: *VPC for Beginners*
- Hands-on: Restrict EC2 SSH access

Capstone Connection

Explains **how services securely communicate**.

Module 7: Lambda – Serverless Computing (60 mins)

What You'll Learn

- Event-driven architecture
- Writing Lambda functions
- IAM roles for Lambda

Topics

- Lambda runtime
- Triggers & execution model
- boto3 basics

Learning Resources

- AWS Docs: *What is AWS Lambda?*
- Video: *Lambda in 10 Minutes*
- Hands-on Lab: HelloWorld + S3 reader Lambda

Capstone Connection

Lambda processes **API requests and saves data**.

Module 8: CloudWatch – Monitoring & Logs (45 mins)

What You'll Learn

- Metrics & alarms
- Logs for debugging

Topics

- EC2 metrics
- Lambda logs
- Alarms & dashboards

Learning Resources

- AWS Docs: *Amazon CloudWatch Overview*
- Video: *Monitoring AWS Resources*
- Hands-on: Create CPU alarm + view Lambda logs

Capstone Connection

Used to **monitor and debug** the final application.

Module 9: API Gateway – Build APIs (60 mins)

What You'll Learn

- REST APIs
- Lambda integrations

- CORS configuration

Topics

- Resources & methods
- Stages & deployments
- API security basics

Learning Resources

- AWS Docs: *API Gateway REST APIs*
- Video: *Build a Serverless API*
- Hands-on: Create /hello endpoint

Capstone Connection

API Gateway connects **frontend (S3)** to **backend (Lambda)**.

Module 10: Final Capstone Project (2–3 hours)

Goal

Build and deploy a **serverless contact form application**.

Services Used

- S3 (Frontend)
- API Gateway (REST API)
- Lambda (Processing)
- DynamoDB (Storage)
- CloudWatch (Logs)

Learning Resources

- AWS Docs: *DynamoDB Basics*
- Video: *Serverless Web App on AWS*
- Hands-on: End-to-end deployment

Success Criteria

- Form submits successfully
- Data stored in DynamoDB
- Logs visible in CloudWatch

Cleanup & Cost Management (Required)

What You'll Learn

- Avoiding unexpected charges

Resources

- AWS Docs: *Delete AWS Resources*
- Checklist-based cleanup exercise

Official AWS Documentation & Learning Links (By Module)

Module 1: Getting Started with AWS

- AWS Overview: <https://docs.aws.amazon.com/whitepapers/latest/aws-overview/introduction.html>
- IAM Best Practices: <https://docs.aws.amazon.com/IAM/latest/UserGuide/best-practices.html>
- AWS Global Infrastructure: <https://aws.amazon.com/about-aws/global-infrastructure/>
- AWS Free Tier: <https://aws.amazon.com/free/>

Module 2: EC2 – Your First Server

- EC2 User Guide: <https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/concepts.html>

- Launch EC2 Instance:
https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/EC2_GetStarted.html
- Security Groups:
<https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/ec2-security-groups.html>
- Amazon Linux 2:
<https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/amazon-linux-2-virtual-machine.html>

Module 3: S3 – Cloud Storage & Static Websites

- Amazon S3 Overview:
<https://docs.aws.amazon.com/AmazonS3/latest/userguide/Welcome.html>
- Static Website Hosting:
<https://docs.aws.amazon.com/AmazonS3/latest/userguide/WebsiteHosting.html>
- Bucket Policies:
<https://docs.aws.amazon.com/AmazonS3/latest/userguide/bucket-policies.html>
- Public Access Settings:
<https://docs.aws.amazon.com/AmazonS3/latest/userguide/access-control-block-public-access.html>

Module 4: IAM – Security & Permissions

- IAM User Guide:
<https://docs.aws.amazon.com/IAM/latest/UserGuide/introduction.html>
- IAM Policies Explained:
https://docs.aws.amazon.com/IAM/latest/UserGuide/access_policies.html
- IAM Roles: https://docs.aws.amazon.com/IAM/latest/UserGuide/id_roles.html

Module 5: RDS – Managed Databases

- Amazon RDS Overview:
<https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/Welcome.html>
- RDS MySQL Guide:
https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP_MySQL.html

- Connecting to RDS:
https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/USER_ConnectToInstance.html

Module 6: VPC – Networking Basics

- Amazon VPC Overview:
<https://docs.aws.amazon.com/vpc/latest/userguide/what-is-amazon-vpc.html>
- VPC Components:
https://docs.aws.amazon.com/vpc/latest/userguide/VPC_Introduction.html
- Security Groups vs NACLs:
https://docs.aws.amazon.com/vpc/latest/userguide/VPC_Security.html

Module 7: Lambda – Serverless Computing

- AWS Lambda Overview:
<https://docs.aws.amazon.com/lambda/latest/dg/welcome.html>
- Lambda Execution Model:
<https://docs.aws.amazon.com/lambda/latest/dg/lambda-concepts.html>
- Using boto3:
<https://boto3.amazonaws.com/v1/documentation/api/latest/index.html>

Module 8: CloudWatch – Monitoring & Logs

- CloudWatch Overview:
<https://docs.aws.amazon.com/AmazonCloudWatch/latest/monitoring/WhatIsCloudWatch.html>
- CloudWatch Logs:
<https://docs.aws.amazon.com/AmazonCloudWatch/latest/logs/WhatIsCloudWatchLogs.html>
- CloudWatch Alarms:
<https://docs.aws.amazon.com/AmazonCloudWatch/latest/monitoring/AlarmThatSendsEmail.html>

Module 9: API Gateway – Build APIs

- API Gateway Overview:
<https://docs.aws.amazon.com/apigateway/latest/developerguide/welcome.html>

- REST APIs:
<https://docs.aws.amazon.com/apigateway/latest/developerguide/apigateway-rest-api.html>
- Enable CORS:
<https://docs.aws.amazon.com/apigateway/latest/developerguide/how-to-cors.html>

Module 10: Final Capstone – DynamoDB & Serverless App

- DynamoDB Overview:
<https://docs.aws.amazon.com/amazondynamodb/latest/developerguide/Introduction.html>
- Lambda + DynamoDB:
<https://docs.aws.amazon.com/lambda/latest/dg/services-dynamodb.html>
- Serverless Web App Tutorial:
<https://docs.aws.amazon.com/apigateway/latest/developerguide/http-api-dynamo-db.html>

Cleanup & Cost Management

- Delete AWS Resources: <https://docs.aws.amazon.com/general/latest/gr/aws-decommission.html>
- AWS Billing Dashboard:
<https://docs.aws.amazon.com/awsaccountbilling/latest/aboutv2/billing-what-is.html>