

# Project Report

## AWS-hosted Virtual Classroom and Learning Platform

### Prepared For:

Smart-Internz aws-hosted virtual classroom and learning platform

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## 1. Abstract

This project demonstrates the development and deployment of a cloud-native virtual classroom using AWS services and the Flask framework. Designed for scalable digital learning, the platform allows users to register, authenticate, and access course resources hosted securely on the cloud. Key services include EC2 for hosting, S3 for storage, and RDS (MySQL) for backend data. This initiative aligns with modern educational demands for accessibility, reliability, and cost-effectiveness in e-learning platforms.

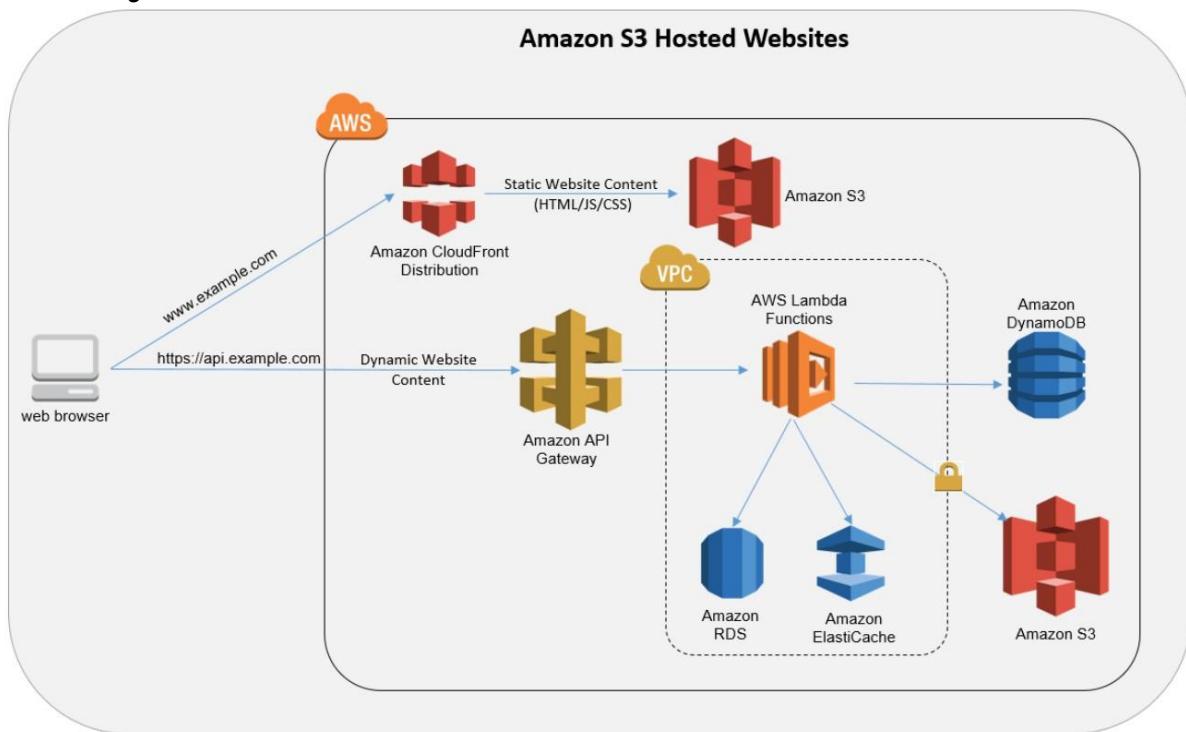
## 2. Project Overview

In an era driven by online education, this project presents a functional virtual classroom hosted entirely on the AWS cloud. It showcases the integration of Python-based Flask with key AWS services such as EC2, S3, and RDS, creating a robust educational environment. The system supports user registration, login authentication, and access to course content via a simple, intuitive interface. Its architecture ensures scalability, data security, and ease of deployment, fulfilling core requirements for remote learning applications.

## 3. Core Features

- Deployment on Amazon EC2 for scalable hosting
- Secure and reliable content storage using **Amazon S3**
- **MySQL-based User and Content Management** via Amazon RDS
- Clean and responsive frontend using **HTML, CSS, JavaScript, and Bootstrap**
- Integrated source control using **Git & GitHub** for version management

## 4. System Architecture:



## 5. Workflow Description

### 5.1 AWS Account Setup

- Create and verify an AWS account
- Familiarize with the AWS Console

### 5.2 Configure S3 for Content

- Create a bucket (e.g., aws-classroom-content)
- Upload study materials like PDFs and videos
- Set access permissions appropriately

### 5.3 Set Up RDS (MySQL)

- Launch a MySQL-based RDS instance
- Configure database and connect using MySQL Workbench
- Create user and course material tables

### 5.4 EC2 Deployment

- Launch an EC2 instance with Amazon Linux/Ubuntu
- Configure security groups and connect via SSH
- Install Flask, Python, MySQL Client

## 5.5 Build Flask Application

- Develop endpoints for user registration, login, content access
- Create HTML templates using Bootstrap
- Integrate with S3 and RDS via boto3 and MySQL

## 5.6 Deploy on EC2

- SSH into instance
- Clone the GitHub repo
- Install dependencies (pip install -r requirements.txt)
- Run app using Flask/Gunicorn and optionally Nginx

## 5.7 Push Code to GitHub

- Create a GitHub repo
- Upload and document all project files

# 6. User Scenarios

## Scenario 1 – Student Registration & Login

**User:** Alice Johnson

**Process:** Registers on the platform → Logs in → Accesses course files from S3

## Scenario 2 – Admin Upload

**User:** System Administrator

**Process:** Uploads course materials (PDFs/videos) to S3 → Updates RDS metadata

## Scenario 3 – Download Course Content

**User:** Bob Patel

**Process:** Logs in → Navigates to content page → Downloads files from S3

## 7. Challenges Encountered

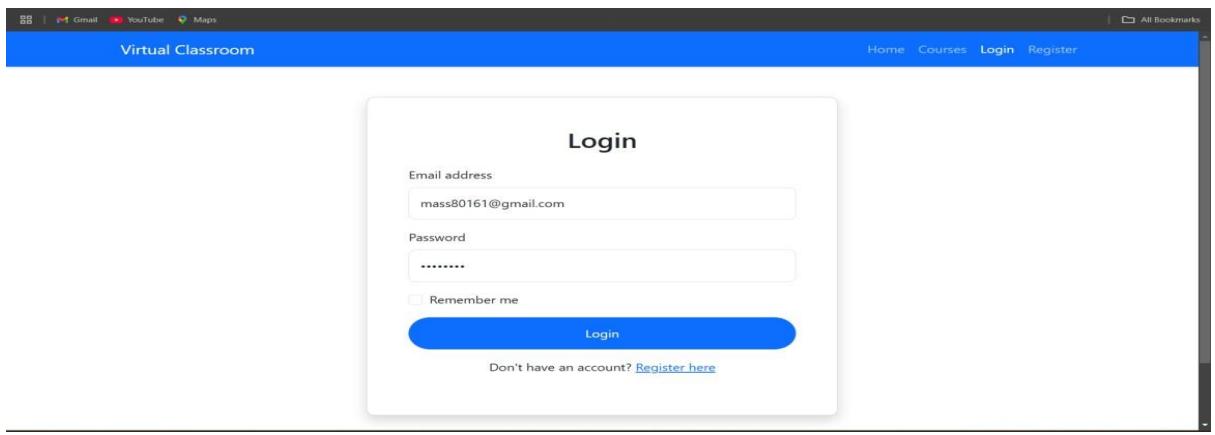
- Understanding IAM roles and policies
- Managing AWS credentials securely
- Setting up proper integration between Flask and AWS via boto3
- Troubleshooting RDS connection errors and MySQL setup
- Debugging issues related to EC2 and deployment steps

## 8. Web Interface Snapshots:

- home.html – Main navigation page



- register.html – Student registration form

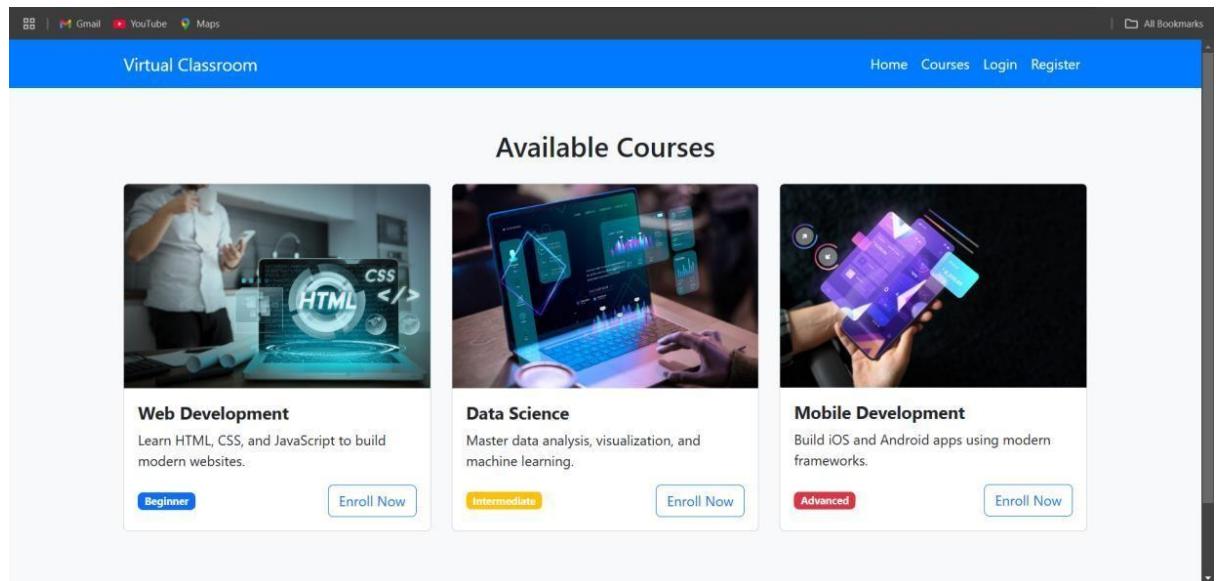

 A screenshot of a web browser showing the 'Virtual Classroom' login page. The title 'Virtual Classroom' is at the top left, and a navigation bar with 'Home', 'Courses', 'Login', and 'Register' links is at the top right. The main content area features a large central 'Login' form. It includes fields for 'Email address' (containing 'massb0161@gmail.com'), 'Password' (containing '\*\*\*\*\*'), and a 'Remember me' checkbox. A large blue 'Login' button is at the bottom of the form. Below the button, a link says 'Don't have an account? [Register here](#)'.

- login.html – Login form



The screenshot shows a web browser window for 'Virtual Classroom'. At the top, there are icons for signal strength, battery, time, and notifications. The top right has links for 'Home', 'Courses', 'Login', and 'Register'. The main content area is titled 'Create Account' and contains fields for First Name (MASANA), Last Name (DURAI), Email address (mass80161@gmail.com), Password, and Confirm Password. There is also a checkbox for 'I agree to the Terms and Conditions'.

- content.html – Course access page with download links



The screenshot shows a web browser window for 'Virtual Classroom'. At the top, there are icons for signal strength, battery, time, and notifications. The top right has links for 'Home', 'Courses', 'Login', and 'Register'. The main content area is titled 'Available Courses' and displays three course cards:

- Web Development**: Learn HTML, CSS, and JavaScript to build modern websites. Includes 'Beginner' and 'Enroll Now' buttons.
- Data Science**: Master data analysis, visualization, and machine learning. Includes 'Intermediate' and 'Enroll Now' buttons.
- Mobile Development**: Build iOS and Android apps using modern frameworks. Includes 'Advanced' and 'Enroll Now' buttons.

## Video Demo Link:

[<https://drive.google.com/file/d/1C3fbCxOtkl7vIrWHuxYWTF7D-G0WpROP/view?usp=drivesdk> ]

## 9. Conclusion

This project serves as a practical implementation of cloud-powered education solutions. Leveraging AWS infrastructure and open-source web technologies, it achieves scalability, security, and reliability. It validates the feasibility of hosting virtual classrooms with minimal infrastructure overhead while providing a smooth and professional user experience for both educators and students.

## 10. References

### 1. AWS Account Setup:

[https://youtu.be/CjKhQoYeR4Q?si=ui8Bvk\\_M4FfVM-Dh](https://youtu.be/CjKhQoYeR4Q?si=ui8Bvk_M4FfVM-Dh)

### 2. Web Application Stack:

Flask || MySQL Connector using flask || HTML/JS/CSS

### 3. AWS EC2 Instance:

[https://www.youtube.com/results?search\\_query=aws+ec2+oneshot](https://www.youtube.com/results?search_query=aws+ec2+oneshot)

### 4. RDS Database:

[https://www.youtube.com/results?search\\_query=rds+oneshot](https://www.youtube.com/results?search_query=rds+oneshot)

### 5. MySQL:

[https://www.youtube.com/results?search\\_query=mysql+tutorial](https://www.youtube.com/results?search_query=mysql+tutorial)

### 6. RDS connects MySQL:

[https://www.youtube.com/results?search\\_query=mysql+connector+for+rds](https://www.youtube.com/results?search_query=mysql+connector+for+rds)

### 7. Clone Git repo:

[https://www.youtube.com/results?search\\_query=clone+github+repository](https://www.youtube.com/results?search_query=clone+github+repository)

### 8. AWS Cost Management:

<https://youtu.be/OKYJCHHSWb4?si=aY3DQl1v26CfZxA>