

AWS-hosted Virtual Classroom and Learning Platform

Prepared For

Smart-Internz

Cloud Practitioner

By

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Project Title:

AWS-hosted Virtual Classroom and Learning Platform

Category:

Cloud Deployment | Web Application | AWS Cloud Practitioner

Skills Utilized:

- Core Python
- Flask Framework
- AWS EC2, S3, RDS
- MySQL
- HTML, CSS, JavaScript
- Git & GitHub

1. Project Overview:

In the modern era of digital learning, building a secure, scalable, and flexible virtual classroom is crucial. This project demonstrates the integration of Flask and multiple AWS services to develop a cloud-native educational platform.

Deployed on AWS EC2, the application leverages Amazon S3 for content storage and Amazon RDS (MySQL) for user and application data. Users can register, log in, and access course materials hosted on the cloud — making the platform both effective and expandable for future needs.

2. Key Features:

- Scalable Infrastructure using EC2
- Secure File Storage using S3
- User Management via RDS (MySQL)
- Responsive Web UI for students and instructors
- Seamless Cloud Integration with GitHub

3. Architecture:

```
project/
├── app.py
├── templates/
│   ├── home.html
│   ├── register.html
│   ├── login.html
│   └── content.html
└── static/ # If needed for CSS, JS, or images
```

4. Final Project Flow:

4.1 Create an AWS Account:

- Sign up and verify your account.
- Explore the AWS Management Console.

4.2 Create an S3 Bucket and Upload Data:

- Create a bucket (e.g., aws-classroom-content).
- Upload files (PDFs, videos).
- Set proper permissions (public or signed URLs).

4.3 Create an RDS Instance (MySQL):

- Launch RDS with MySQL engine.
- Configure DB instance and create a database.
- Connect using MySQL Workbench to create tables.

4.4 Launch and Configure EC2 Instance:

- Launch instance with Amazon Linux 2 or Ubuntu.
- Set security groups and SSH key pair.
- Install Python, Flask, MySQL client.

4.5 Develop Flask App:

- Build routes for register, login, content.
- Create templates: home.html, register.html, login.html, content.html.
- Use Bootstrap for styling.
- Connect app to AWS S3 (using boto3) and RDS.

4.6 Deploy Flask App on EC2:

- SSH into EC2.
- Clone GitHub repository.
- Install dependencies: pip install -r requirements.txt.
- Run app using Gunicorn + Nginx (optional).

4.7 Upload Code to GitHub:

- Create repository.
- Push project files with commits and documentation.

4.8 Test Scenarios:

- **Scenario 1: Student Registration and Login**
- **Scenario 2: Admin Upload of Course Materials**

- **Scenario 3: Downloading Course Content**

5. User Scenarios:

Scenario 1: Student Registration and Course Access

- **User:** Alice Johnson
- **Process:** Registers via form, logs in, and accesses course content from S3.

Scenario 2: Admin Uploads Course Materials

- **User:** System Admin
- **Process:** Uploads PDFs; content is stored in S3 and metadata is updated in RDS.

Scenario 3: Student Downloading Course Content

- **User:** Bob Patel
- **Process:** Selects a file, clicks a link, and downloads directly from S3.

6. Challenges Faced:

- Learning AWS services and IAM policies
- Managing AWS credentials securely
- Flask and AWS integration (using `boto3`)
- RDS connection issues and MySQL Workbench setup
- Debugging EC2 deployment issues

7. Output Pages:

- Landing page with navigation

The screenshot shows the homepage of the Virtual Classroom platform. At the top, there's a green header bar with the text "Virtual Classroom" on the left and "Home Courses Login Register" on the right. Below the header, the main content area has a light blue background. In the center, the text "Welcome to Virtual Classroom" is displayed in a large, bold font, followed by a smaller subtext: "Transform your learning experience with our interactive platform". A prominent green "Get Started" button is centered below this text. Further down, there are three white rectangular boxes with rounded corners, each containing a title and a brief description. The first box is titled "Live Classes" and says "Join interactive live sessions with expert instructors.". The second box is titled "Rich Content" and says "Access high-quality learning materials and resources.". The third box is titled "Community" and says "Connect with peers and collaborate on projects.". At the very bottom of the page, a dark grey footer bar contains the copyright notice: "© 2025 Virtual Classroom. All rights reserved."

- Registration form

The screenshot shows the "Create Your Account" registration form. It features a white card-like background with a thin black border. At the top of the card, the text "Create Your Account" is centered. Below this, there are four input fields arranged in two rows: "First Name" (with "jhon" entered), "Last Name" (with "doe" entered), "Email Address" (with "name@qwe.com" entered), and "Password" (with "*****" shown). Underneath the password field is a "Confirm Password" field with "*****" shown. Below these fields is a small checkbox labeled "I agree to the Terms and Conditions" which is checked. At the bottom of the card is a large green "Register" button. Below the button, a link says "Already have an account? [Login here](#)". The top of the page has a green header bar with "Virtual Classroom" on the left and "Home Courses Login Register" on the right.

- Login page

The screenshot shows the "Login to Your Account" page. It has a similar white card design with a thin black border. At the top, it says "Login to Your Account". Below this are two input fields: "Email Address" (with "jhon@2003.com" entered) and "Password" (with "*****" shown). There is also a "Remember me" checkbox which is checked. At the bottom of the card is a large green "Login" button. Below the button, a link says "Don't have an account? [Register here](#)". The top of the page has a green header bar with "Virtual Classroom" on the left and "Home Courses Login Register" on the right. At the very bottom of the page, a dark grey footer bar contains the copyright notice: "© 2025 Virtual Classroom. All rights reserved."

- Course materials page with download links from S3

The screenshot shows a web browser window with a blue header bar containing icons for Gmail, YouTube, and Maps, along with a 'Virtual Classroom' tab and a 'All Bookmarks' link. The main content area is titled 'Available Courses' and displays three cards:

- Web Development**: A man in a white shirt is shown working at a desk with a laptop displaying a 'HTML' and 'CSS' interface. Below the image:
 - Learn HTML, CSS, and JavaScript to build modern websites.
 - [Beginner](#)
 - [Enroll Now](#)
- Data Science**: A laptop screen displaying various data visualizations like charts and graphs. Below the image:
 - Master data analysis, visualization, and machine learning.
 - [Intermediate](#)
 - [Enroll Now](#)
- Mobile Development**: A person holding a smartphone with a complex user interface. Below the image:
 - Build iOS and Android apps using modern frameworks.
 - [Advanced](#)
 - [Enroll Now](#)

8. Conclusion:

This project highlights the integration of cloud computing with web development to build a fully operational virtual classroom. Leveraging AWS's scalability and Flask's simplicity, the platform achieves reliable user access, secure data handling, and an overall smooth educational experience.

9. GitHub And Demo Link:

Demo Link :

```
[  
https://drive.google.com/file/d/1SKSIBe1ydjG1anNSPYwPDEzxtx-LTWpP/view?usp=drivesdk  
]
```

GitHub Link:

```
[  
https://github.com/marvel008/AWS-hosted-Virtual-Classroom-and-Learning-Platform-  
main.git  
]
```