Online Course Management Platform

GitHub Repository

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Contents

1 Design Schema **3**

2 Table Schema **4**

3 Technology Stack Architecture **5**

I Technical Architecture and Stack Elaboration 5

4 Implementation Details **6**

I Authentication and Access Control 6

I.I Landing and Home Page 6

I.II Signup and Login 6

II Student Portal Implementation 7

II.I Student Home and Catalog 7

II.II My Courses and Profile 7

III Instructor Portal Implementation 8

III.I Teaching and Content Management 8

III.II Evaluation 8

IV Administrator Portal Implementation 8

IV.I Admin Dashboard and Quick Access 8

IV.II User and Resource Management 9

IV.III University and Oversight 9

V Data Analyst Portal Implementation 9

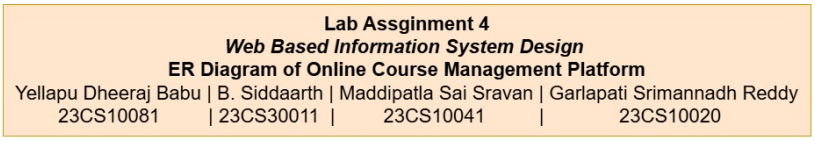
V.I Platform Analytics Dashboard 10

V.II Visual Data Breakdown 10

Chapter 1

Design Schema

The Entity–Relationship (ER) diagram represents the logical structure of the database used in the Online Course Management Platform. It illustrates the key entities, their attributes, and the relationships between them to manage courses, teachers, partner universities, and students.



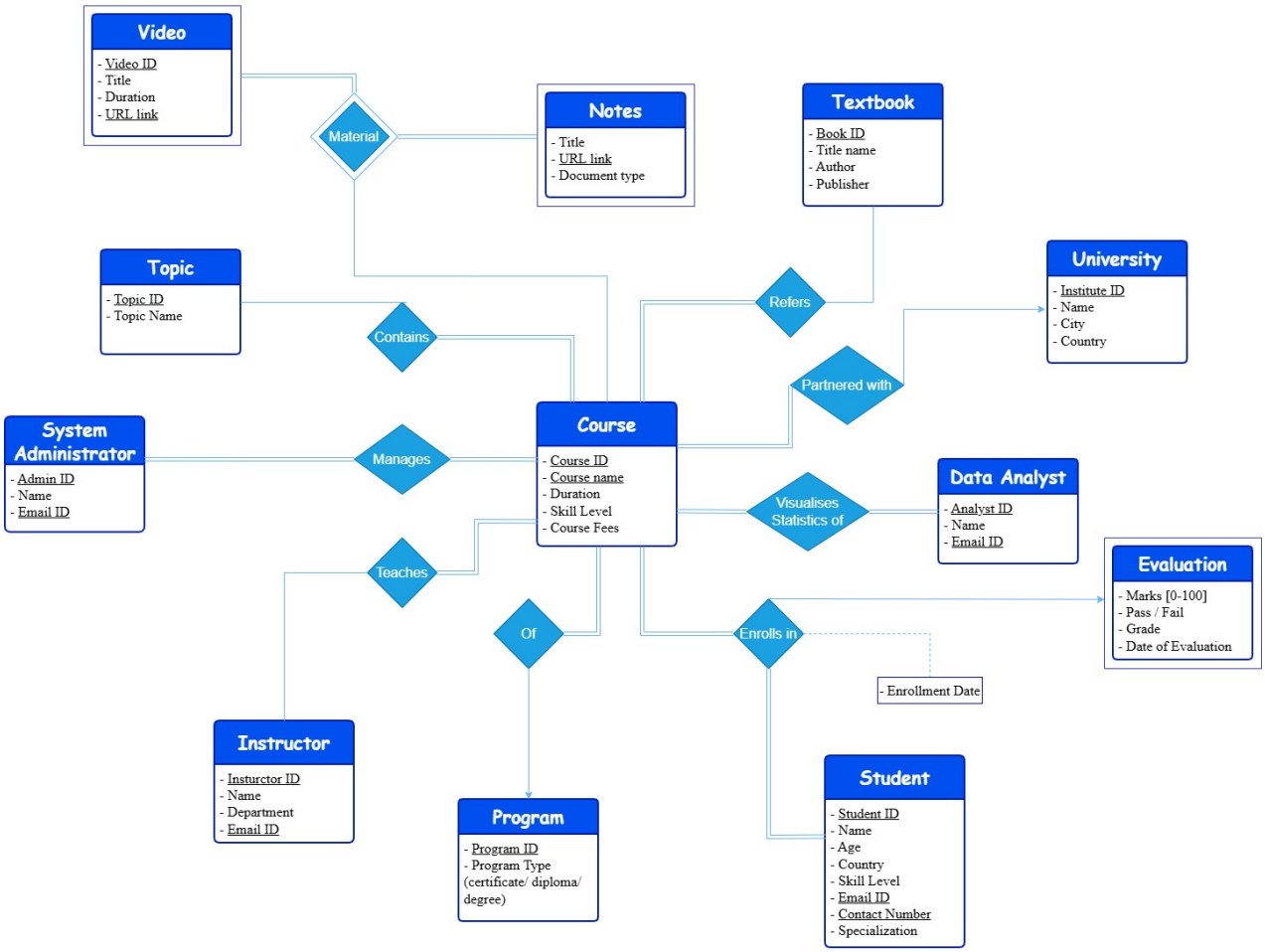


Figure 1.1: Entity-Relationship Diagram

Chapter 2

Table Schema

This chapter describes the relational table structure derived from the ER diagram and the SQLAlchemy models. It defines the tables, their attributes, primary keys (PK), and foreign key (FK) relationships used in the database implementation.

Table 2.1: Relational Table Schema of the Online Course Management Platform

Entity / Relation	**Attributes**
Users	id (PK), full_name, email, hashed_password, role
Course	course_id (PK), course_name, duration, skill_level, course_fees, program_id (FK), institute_id (FK)
Student	student_id (PK), name, dob, country, skill_level, email_id, contact_number, specialization
Instructor	instructor_id (PK), name, department, email_id
Topic	topic_id (PK), topic_name
Program	program_id (PK), program_type
University	institute_id (PK), name, city, country
Video	video_id (PK), title, duration, url_link, course_id (FK)
Notes	notes_id (PK), title, url_link, document_type, course_id (FK)
Textbook	textbook_id (PK), title, author, publisher, course_id (FK, Unique)
Assignment	assignment_id (PK), title, description, assignment_url_link, marks, due_date, course_id (FK)
StudentSubmission	submission_id (PK), assignment_id (FK), student_id (FK), submission_url, submitted_at, obtained_marks, status
Evaluation	evaluation_id (PK), marks, pass_fail, grade, date_of_evaluation, student_id (FK), course_id (FK)
SystemAdmin	admin_id (PK), name, email_id
DataAnalyst	analyst_id (PK), name, email_id
Association Tables (Many-to-Many)	
course_topic_link	course_id (FK), topic_id (FK)
course_student_link	course_id (FK), student_id (FK)
course_instructor_link	course_id (FK), instructor_id (FK)

Chapter 3

Technology Stack Architecture

This document presents the high-level system architecture illustrating the interaction between the frontend, backend server, and the database.

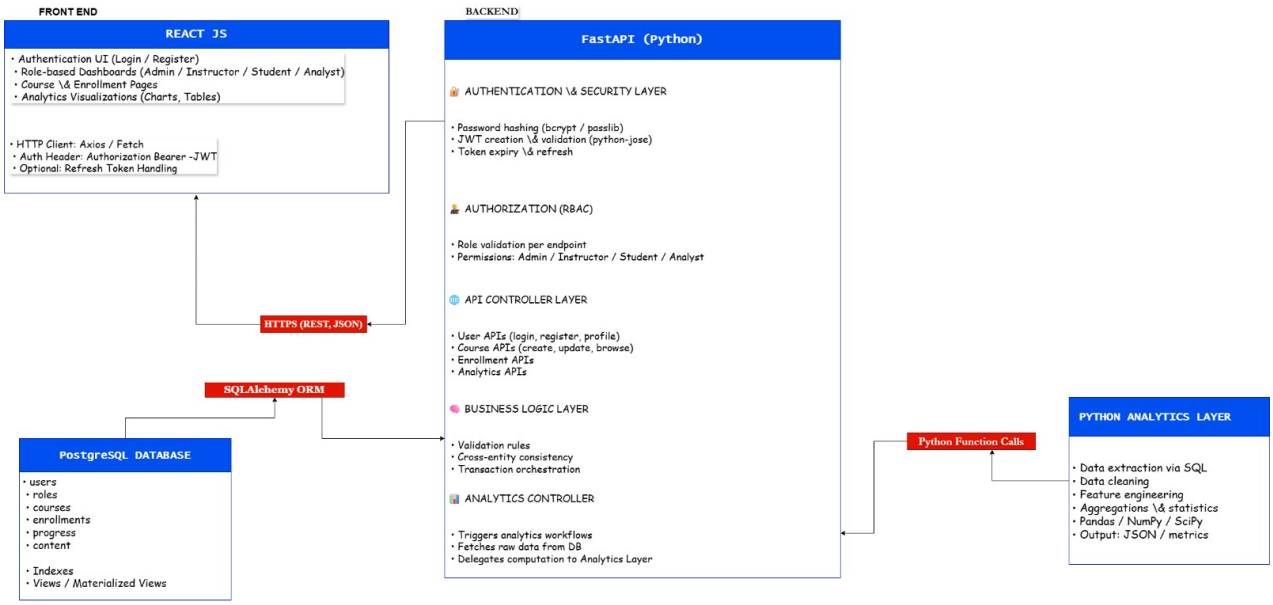


Figure 3.1: TechStack for Online Course Management Platform

I Technical Architecture and Stack Elaboration

The project is built as a complete web-based information system utilizing a modern decoupled full-stack architecture:

- **Front-end Interface**: Developed using **React.js**, providing a dynamic role-adaptive UI.
- **Connectivity Server**: Powered by **FastAPI**, handling JWT-based authentication and API routing.
- **Database Management**: **SQLAlchemy** ORM manages the database lifecycle and many-to-many transactions.
- **Security**: Implements **JWT** for sessions and **Bcrypt** for secure hashing.

Chapter 4

Implementation Details

I Authentication and Access Control

I.I Landing and Home Page

The landing page features core benefits such as diverse courses, expert instructors, and progress tracking.

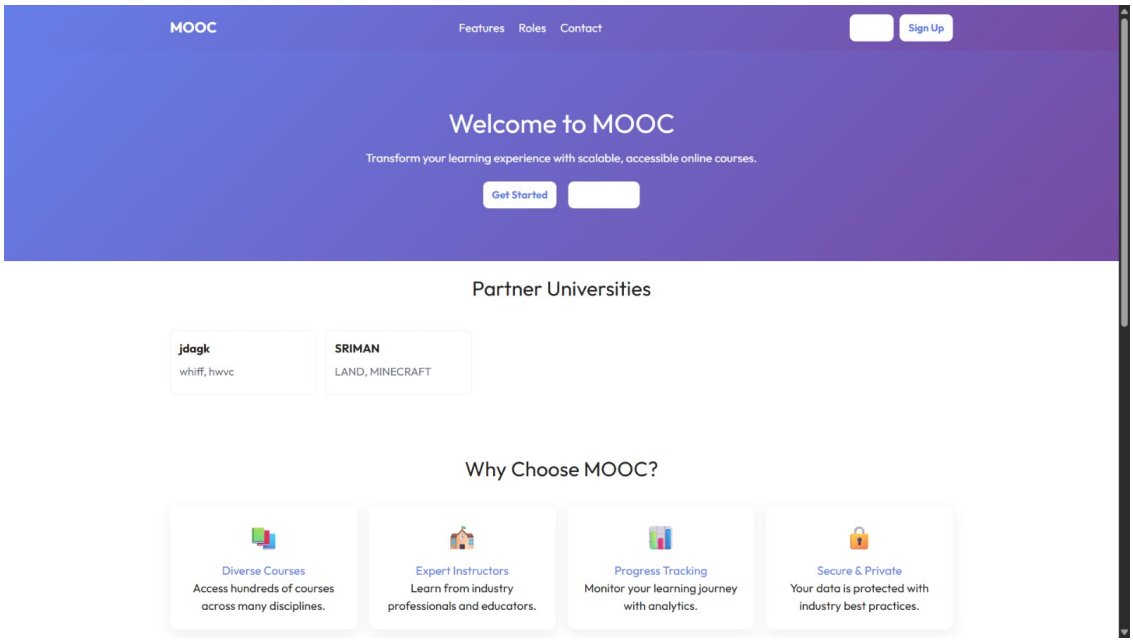


Figure 4.1: MOOC Landing Page

I.II Signup and Login

Users register via a form requiring name, email, and password. Instructors, Analysts, and Admins must provide an **Enrollment Key** for verification.

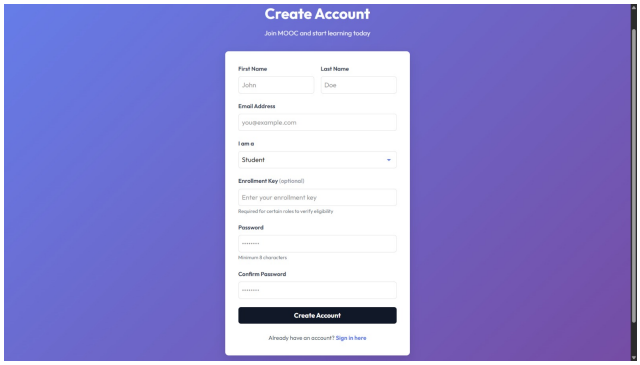


Figure 4.2: Signup Interface

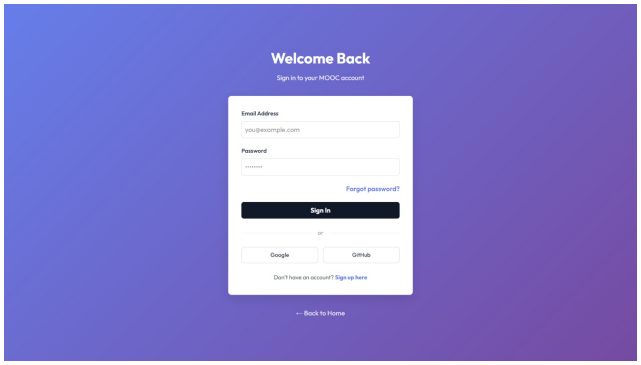


Figure 4.3: Login Interface

II Student Portal Implementation

II.I Student Home and Catalog

Students explore available courses via a card-based catalog. Cards display metadata such as duration, skill level, and fees.

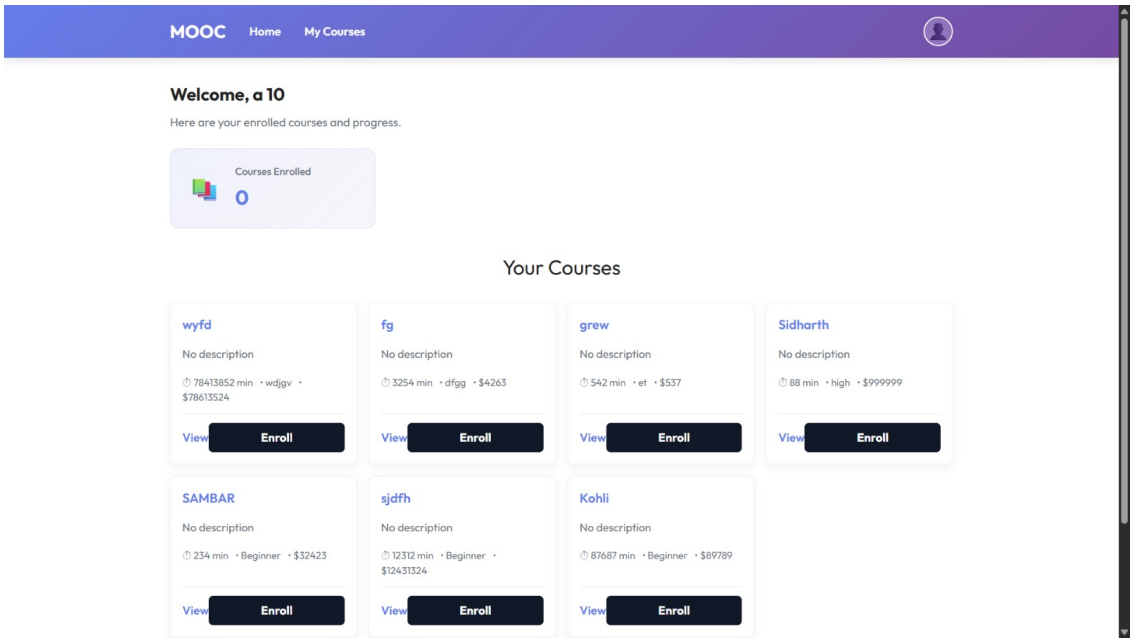


Figure 4.4: Student Home Dashboard and Course Catalog

II.II My Courses and Profile

Students can filter their enrolled courses using a search bar and manage their personal demographics, specialization, and learning progress through a comprehensive profile view.

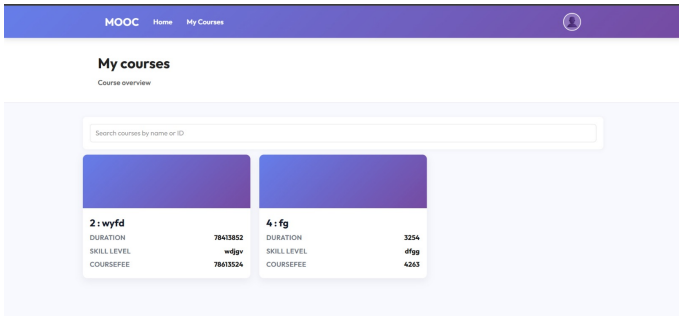


Figure 4.5: Student Enrollment Overview

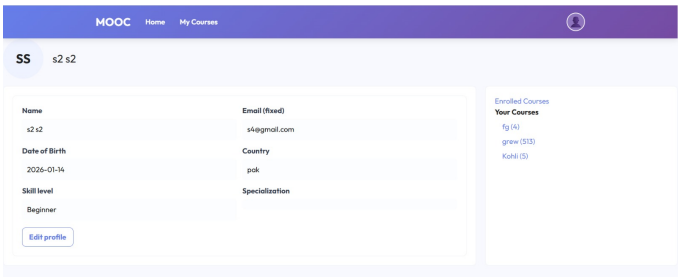


Figure 4.6: Student Personal Profile

III Instructor Portal Implementation

III.I Teaching and Content Management

Instructors monitor professional metrics like gross earnings and manage hierarchical curricula consisting of videos, notes, and assessments.

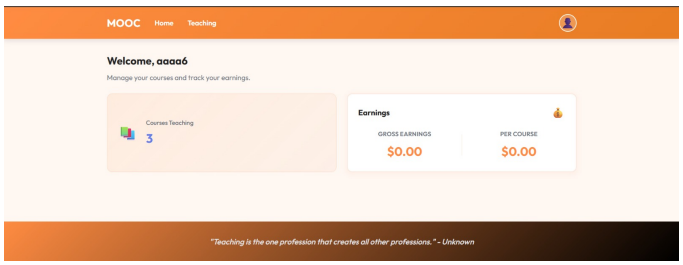


Figure 4.7: Instructor Dashboard

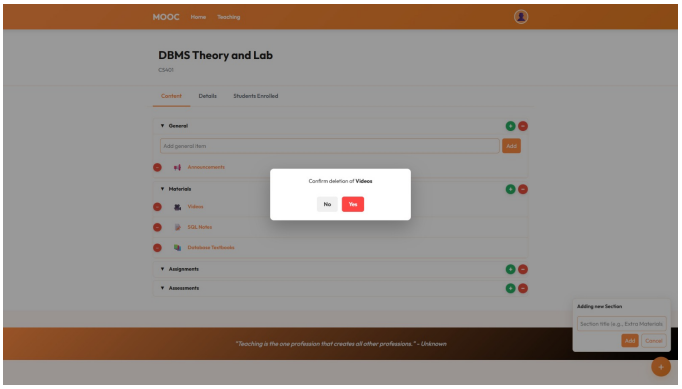


Figure 4.8: Curriculum Management

III.II Evaluation

The portal provides detailed modal interfaces for reviewing student submissions and assigning grades across all course assignments.

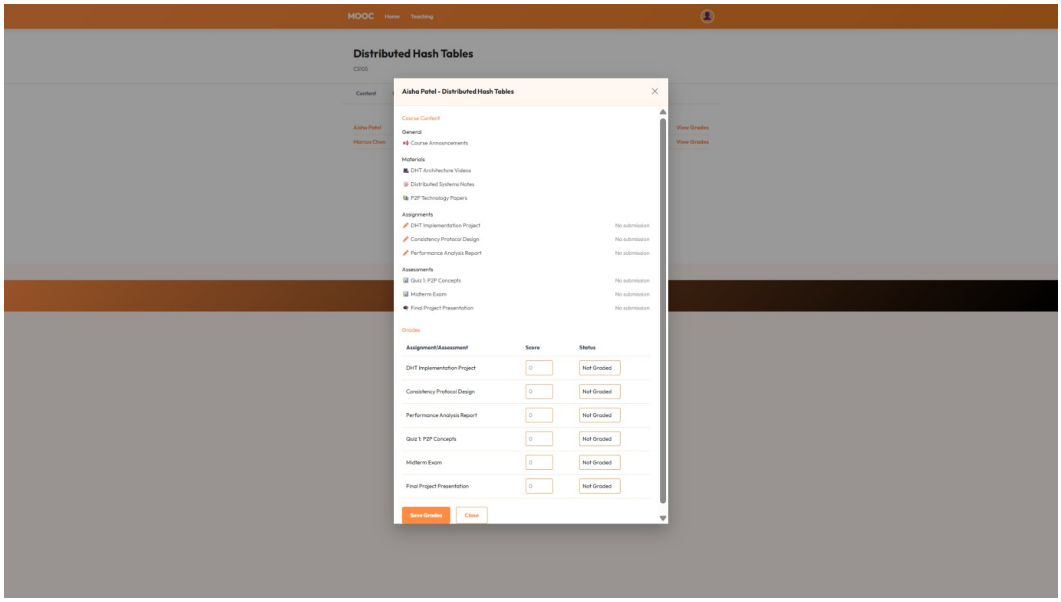


Figure 4.9: Student Evaluation Interface

IV Administrator Portal Implementation

The System Administrator manages the structural integrity and user lifecycle of the platform.

IV.I Admin Dashboard and Quick Access

The landing page for administrators provides a global overview of platform activity including counts for Courses, Students, Instructors, and partner Universities.

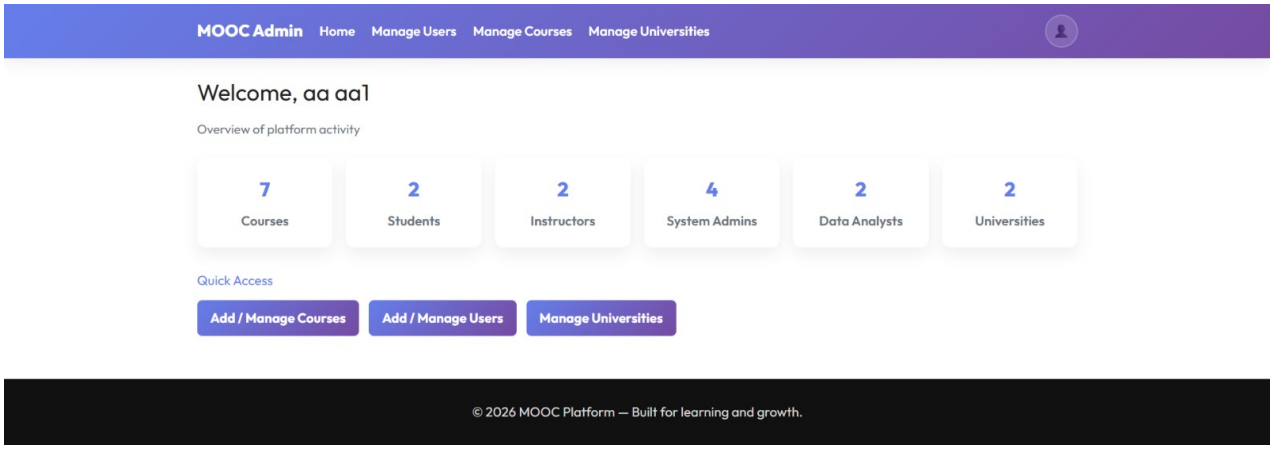


Figure 4.10: System Administrator Activity Dashboard

IV.II User and Resource Management

Admins have authority to manage user accounts, register partner universities, and oversee course staffing.

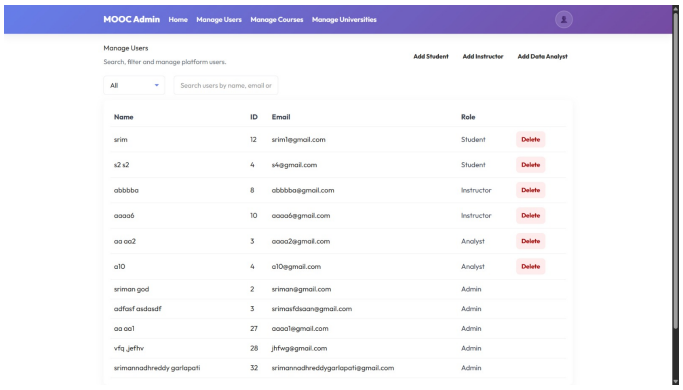


Figure 4.11: User Management Interface

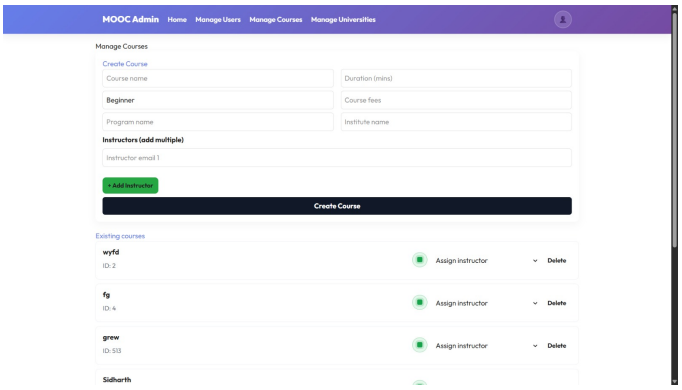


Figure 4.12: Academic Course Portal

IV.III University and Oversight

Admins manage a registry of partner institutions and can deregister students or deassign instructors from specific courses.

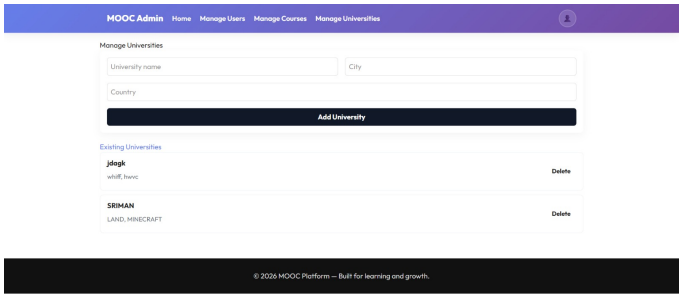


Figure 4.13: University Registry

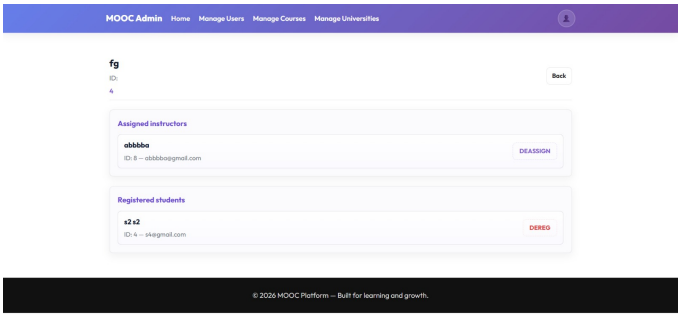


Figure 4.14: Course Oversight View

V Data Analyst Portal Implementation

The Data Analyst portal provides data-driven insights for platform-wide learning growth.

V.I Platform Analytics Dashboard

Upon entry, the analyst is presented with high-level financial and engagement metrics:

- **Key Performance Indicators**: Real-time tracking of Total Revenue, Total Enrollments, and Average Revenue per Course.
- **Top Performers**: Identification of the Top Revenue Course and the Top Enrollment Country (e.g., Pakistan, India) based on student density.

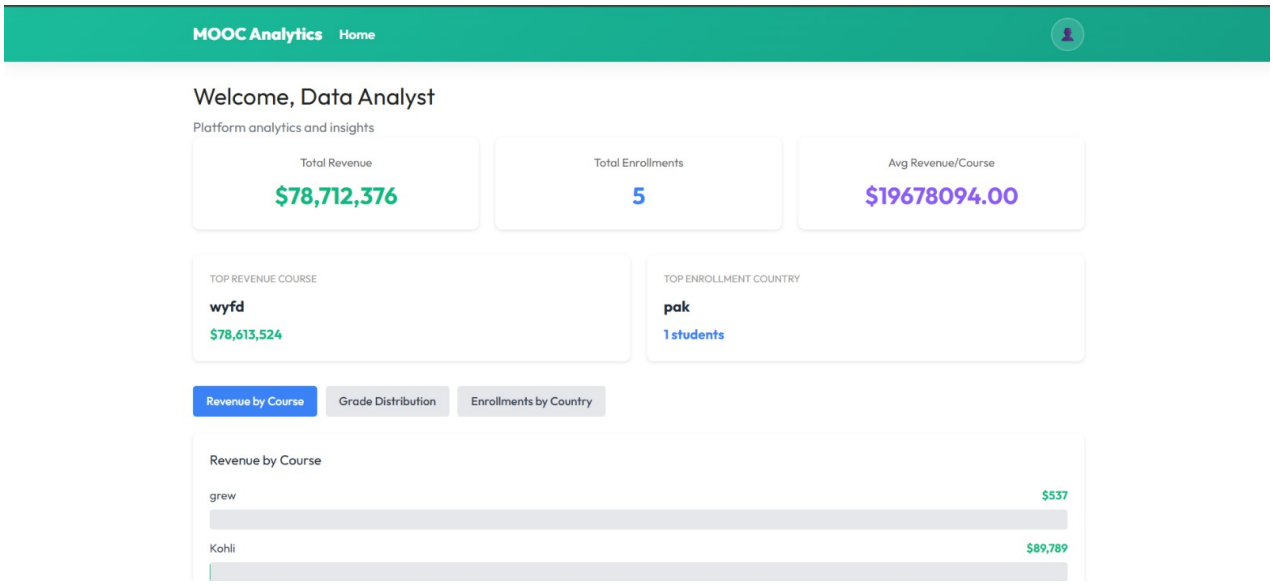


Figure 4.15: Platform Analytics and Performance Dashboard

V.II Visual Data Breakdown

The analyst can toggle between different visual reports to analyze platform health:

- **Revenue by Course**: A bar chart breakdown showing earnings generated by individual courses (e.g., grew, Kohli).
- **Enrollments by Country**: A geographical distribution report showing student counts per region (e.g., India, Pakistan).
- **Grade Distribution**: Analysis of student performance metrics to evaluate course effectiveness and quality assurance.

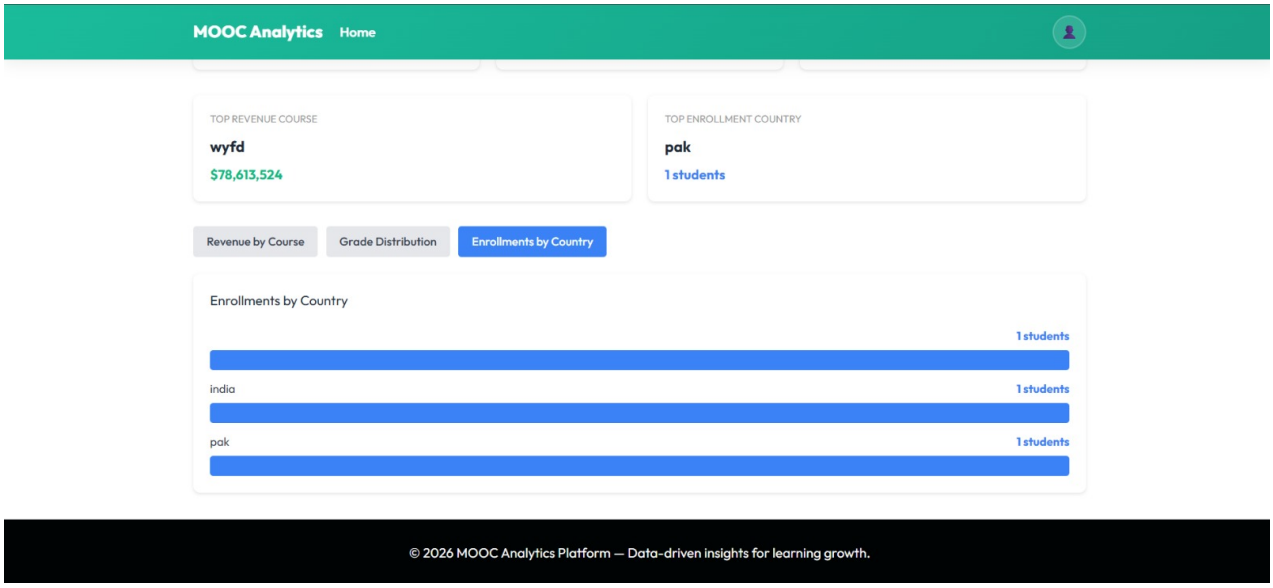


Figure 4.16: Student Demographic and Enrollment Analysis