

**Assignment 1: University Course Management System**

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1. Overview

The University Course Management System is a web-based application built with ASP.NET Core MVC that enables universities to manage students, professors, courses, and departments efficiently.

# The system allows users to:

* Accessible browsing of students with searching and sorting alphabetically, and by department.
* Assign professors to departments and courses.
* Perform CRUD (Create, Read, Update, Delete) operations on students, professors, courses, and departments.
* Ensure data integrity by preventing duplicate entries for department names and course names.
* Provide a smooth user experience with real-time validation and error handling.

2. Application Structure

# The project follows the Model-View-Controller (MVC) architecture:

* Controllers/ → Handles business logic and database operations.
* Models/ → Defines data structure and relationships.
* Views/ → Contains Razor pages for rendering UI.
* ViewModels/ → Used for form validation and UI-specific logic.
* Data/ → Contains the ApplicationDbContext for database operations.
* Migrations/ → Stores EF Core database migrations.

3. How to Run the Project

# Prerequisites:

* .NET SDK 9.0+ installed
* SQL Server / SQLite for database
* Visual Studio / VS Code
* EF Core CLI tools (dotnet tool install --global dotnet-ef)

# Steps:

1. Clone Repository
2. Cd into UniversityApp
3. Dotnet restore
4. Dotnet ef database update
5. Dotnet run
6. Go to URL: <http://localhost:5118/>
7. Navigate through pages using navbar at the top

4. Features (User Stories)

* **Student Management**
  + As an administrator, I want to add students so that they can enroll in courses.
  + As an administrator, I want to edit student details in case of mistakes.
  + As an administrator, I want to view all students in a searchable and sortable table.
  + As an administrator, I want to delete a student when they leave the university.
* **Course Management**
  + As an administrator, I want to add new courses and assign them to a department.
  + As an administrator, I want to prevent duplicate course names.
  + As an administrator, I want to edit course details like name, department, and professor.
* **Department Management**
  + As an administrator, I want to create departments so that students and professors can be assigned.
  + As an administrator, I want to prevent duplicate department names.
  + As an administrator, I want to assign professors to departments.
* **Professor Management**
  + As an administrator, I want to add professors so that they can be assigned courses.
  + As an administrator, I want to assign professors to a department.
  + As an administrator, I want to assign professors to teach specific courses.

5. Data Validation Rules

The system includes **robust validation** to prevent errors and ensure data consistency:

* **Student emails** must be unique and follow the format [name]@[domain].com.
* **Department names** must be unique.
* **Course names** must be unique.
* **Real-time validation** prevents invalid inputs before submission.

6. Search and Sorting

The system includes **dynamic search and sorting** features:

* **Search bar** to find students based on **name, email, or enrollment year**.
* **Sort students alphabetically** or by department.

This allows administrators to **quickly find and manage records**.

7. Error Handling (Friendly Messages)

To **prevent crashes** and ensure a **good user experience**, the system includes **robust error handling**:

1. **Duplicate handling messages** – If a user tries to add an existing course or department, they get a **friendly popup** instead of a raw error.
2. **Validation alerts** – If invalid data is entered (e.g., letters in a number field), users get **a nice alert message instead of a server crash**.

8. Additional Enhancements

* Responsive UI with Bootstrap – Looks great on all screen sizes.
* Dropdowns for selecting Departments and Professors – No need to manually enter IDs.

Conclusion

The **University Course Management System** is a robust and user-friendly web application designed to streamline the management of students, professors, courses, and departments. By leveraging the **ASP.NET Core MVC framework**, the system ensures **scalability, maintainability, and ease of use** while implementing essential academic operations.

Key features such as **CRUD operations, professor-course assignments, real-time validation, and duplicate prevention** contribute to a **seamless administrative experience**. Additionally, **search and sorting capabilities** enhance usability, allowing quick access to relevant data.

A major focus of the system is **data integrity and user experience**. Through **input validation, error handling, and interactive alerts**, the application prevents invalid data entry and ensures a **smooth workflow**. The **intuitive UI with Bootstrap styling and dropdown selections** further improves usability, making it accessible to all users.

With its **modular architecture**, this system is designed to be **easily extendable**. Future improvements could include **role-based authentication, course scheduling, and enhanced reporting features**. By incorporating these refinements, the application can evolve into a **fully-fledged university management platform**.