Advanced JavaScript Frameworks (Angular) Mini Project

Student Course Management System

- **Submitted By**:

  - *2462309 Agna Maria Joseph*

    agna.mariya@btech.christuniversity.in
  - 2462324 Deon Biju

    deon.biju@btech.christuniversity.in
  - *2462326 G Sidhartha*

    g.sidhartha@btech.christuniversity.in
  - 2462371 Vidhika Singh

    vidhika.singh@btech.christuniversity.in

- **Course**: *Advanced JavaScript Frameworks (Angular)*
- **Instructor Name**: *M Nath*
- **Institution**: *Christ University*
- **Date of Submission**: 23/01/2026

2. Abstract

The Student Course Management System is a modern, interactive web application developed using Angular and TypeScript to efficiently manage students, courses, and enrollments. The primary goal of this system is to provide a centralized platform where administrators can manage student records and course details, while ensuring seamless enrollment and real-time updates.

The application features a clean and responsive user interface built with Angular Material, offering smooth navigation, intuitive layouts, and fast performance across devices. A mock backend using JSON Server simulates real-time data operations such as adding students, managing courses, and tracking enrollments. The final outcome is a scalable, user-friendly system that simplifies academic course management while demonstrating best practices in modern front-end development.

3. Objectives

- To design a user-friendly interface for managing students, courses, and enrollments.
- To implement a modular Angular architecture using components and services.
- To enable real-time student enrollment and course availability tracking.
- To apply Angular routing for smooth navigation between pages.
- To ensure responsive design using Angular Material components.
- To maintain clean, readable, and well-documented TypeScript code.

4. Scope of the Project

- The project focuses on the front-end development of a student course management system.
- It includes student management, course management, and enrollment functionalities.
- A mock backend (JSON Server) is used instead of a real database.
- The system supports desktop and mobile viewports through responsive UI design.
- Backend authentication, payment systems, and real database integration are outside the scope.
- The project emphasizes documentation, readability, and maintainability.

5. Tools & Technologies Used

Tool/Technology	Purpose
Tool / Technology Purpose Angular (v17)	Front-end framework
TypeScript	Strongly typed programming
Angular Material	UI components and theming
Angular CLI	project scaffolding and build tool
RxJS	Asynchronous data handling
Node.js	Runtime environment
Visual Studio Code	Code editor

6. Application Structure Overview

- The application follows a component-based Angular architecture.
- Feature components include Student, Course, and Enrollment modules.
- Services are used to manage shared data and business logic.
- Angular Routing enables smooth navigation between pages.
- TypeScript models and interfaces ensure structured and maintainable code.

7. Styling and UI Design Strategy

- The user interface is built using **Angular Material components**.
- Styles are applied using **component-level CSS**.
- Responsive design is achieved through **Material layout components**.
- Consistent colors, spacing, and typography improve usability.
- Hover effects and transitions enhance user interaction.

8. Key Features

Feature	Description
Responsive Design	Adapts seamlessly to all screen sizes
Smooth Navigation	Fixed top nav with anchor links
Project Cards	Flex-based layout with hover effects
Contact Form (non-functional)	Placeholder layout for inputs and button
Accessible Fonts & Colors	High contrast and readable typography

9. Challenges Faced & Solutions

One of the major challenges was managing shared data across multiple components. This was resolved by using Angular services with dependency injection.

Ensuring UI responsiveness across devices was addressed using Angular Material layout components. Duplicate enrollments were prevented through validation logic before submitting enrollment data.

10. Outcome

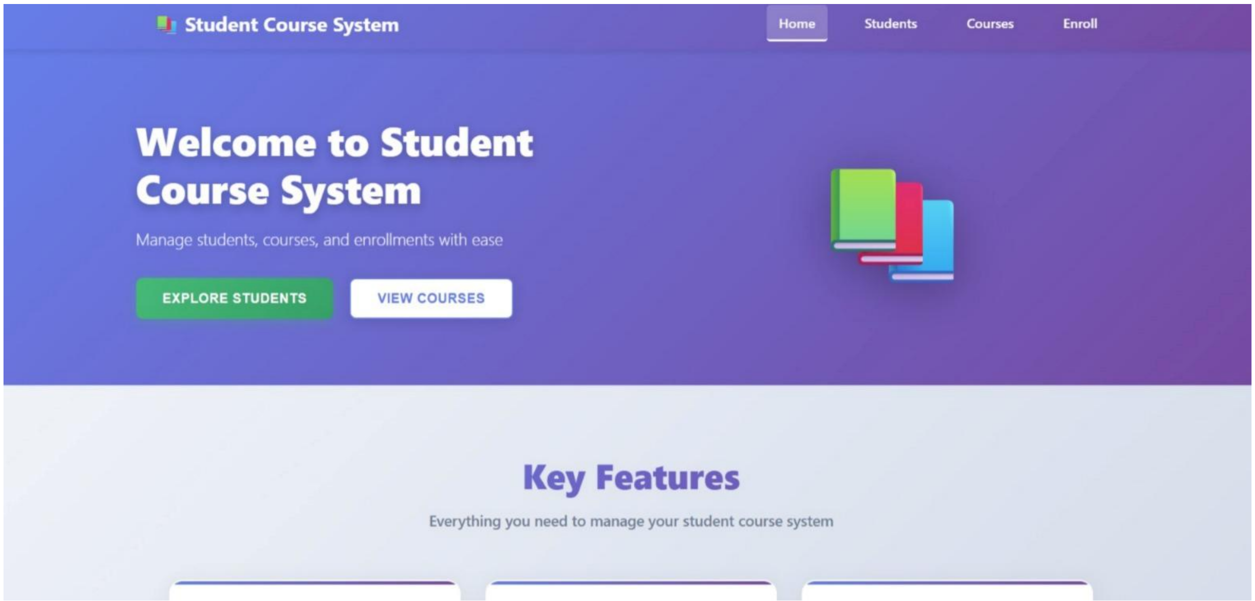
The project successfully delivers a fully functional Student Course Management System with a clean user interface and modular code structure. The implementation enhanced understanding of Angular concepts such as components, services, routing, and observables.

11. Future Enhancements

- Integration with a real backend and database
- - User authentication and role-based access control
- - Course completion tracking and certificates

- - Analytics dashboard for enrollment statistics
- - Exporting reports in PDF or Excel formats

12. Screenshots of Final Output

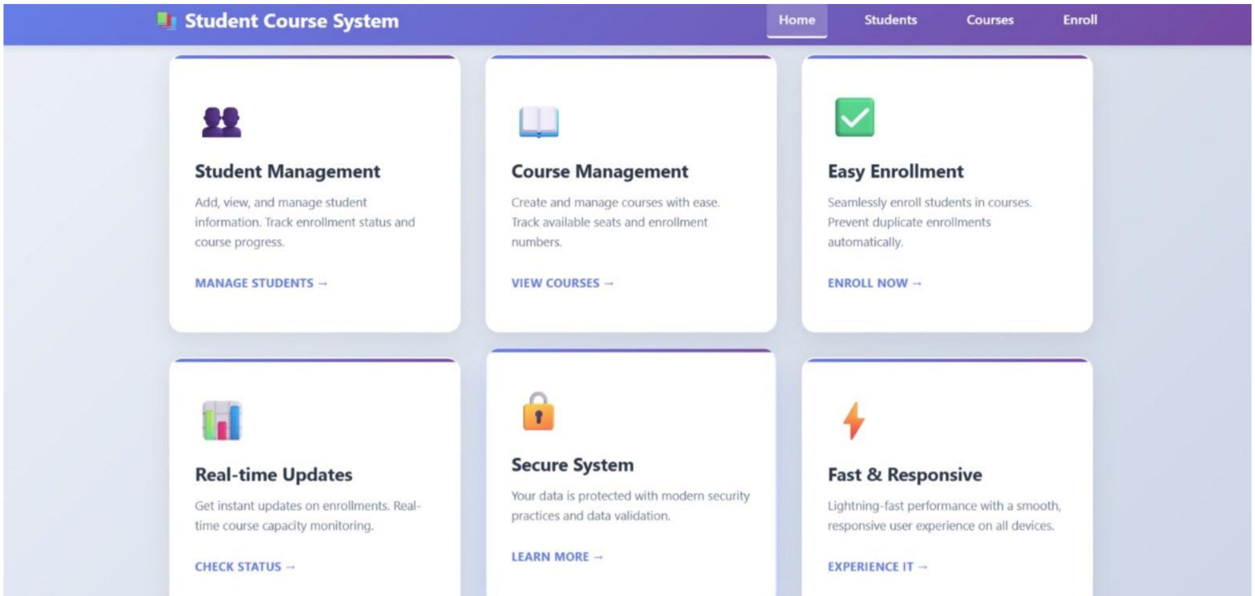


Welcome to Student Course System

Manage students, courses, and enrollments with ease

Key Features

Everything you need to manage your student course system



Student Course System

Home | Students | Courses | Enroll

👥 Student Management

Add, view, and manage student information. Track enrollment status and course progress.

MANAGE STUDENTS →

📖 Course Management

Create and manage courses with ease. Track available seats and enrollment numbers.

VIEW COURSES →

✓ Easy Enrollment

Seamlessly enroll students in courses. Prevent duplicate enrollments automatically.

ENROLL NOW →

📊 Real-time Updates

Get instant updates on enrollments. Real-time course capacity monitoring.

CHECK STATUS →

🔒 Secure System

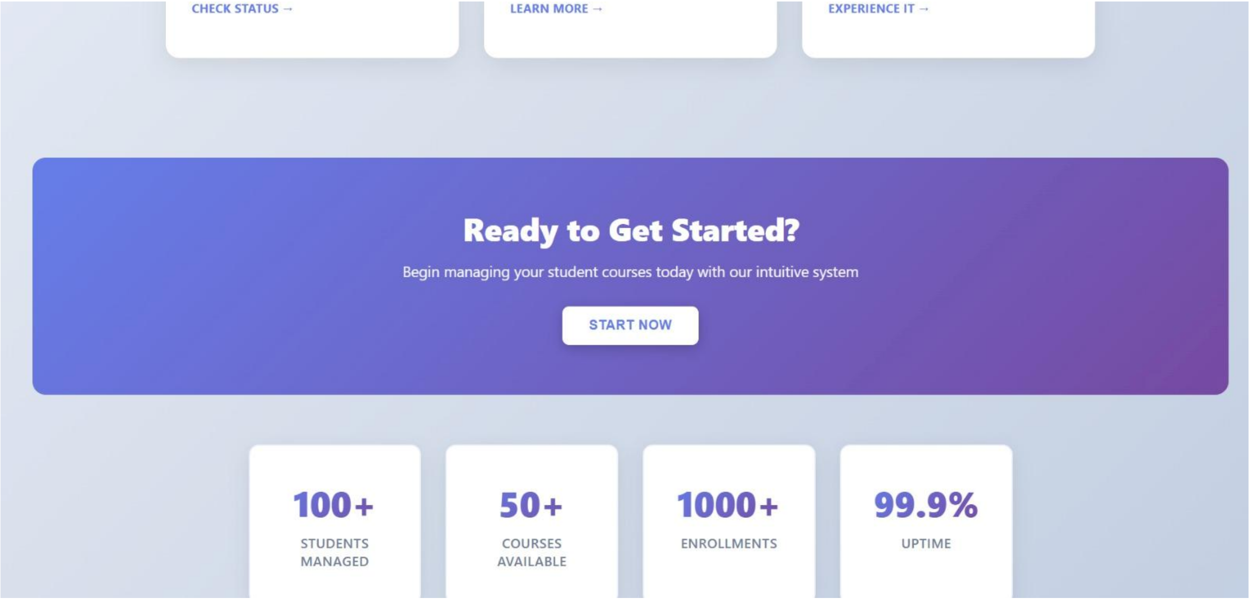
Your data is protected with modern security practices and data validation.

LEARN MORE →

⚡ Fast & Responsive

Lightning-fast performance with a smooth, responsive user experience on all devices.

EXPERIENCE IT →



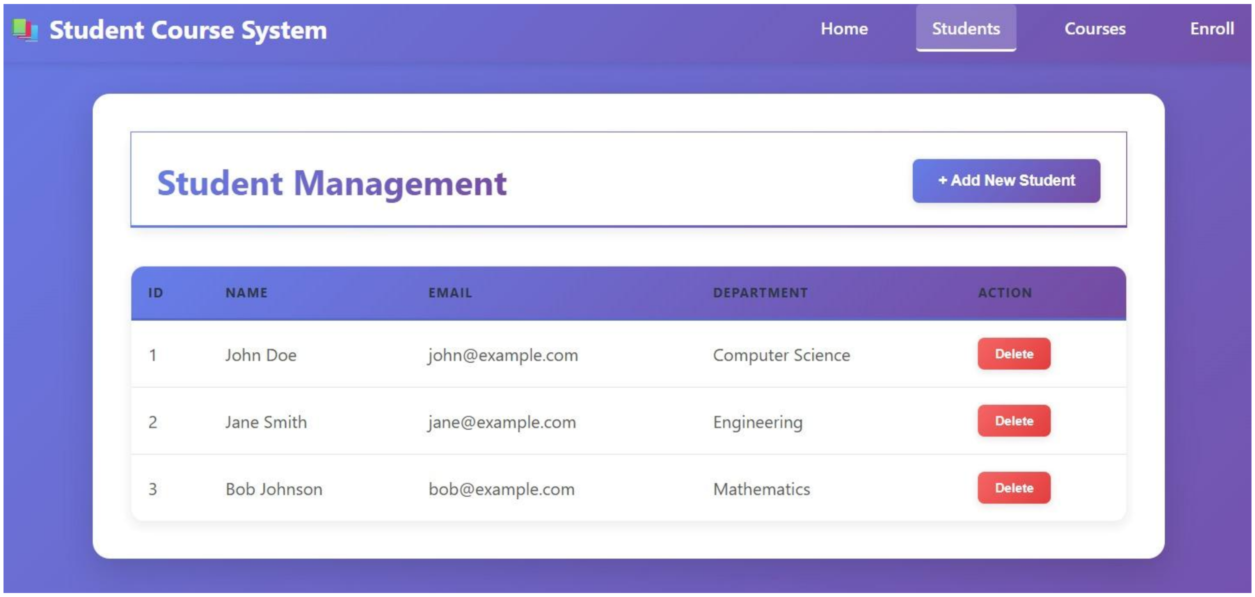
CHECK STATUS → | LEARN MORE → | EXPERIENCE IT →

Ready to Get Started?

Begin managing your student courses today with our intuitive system

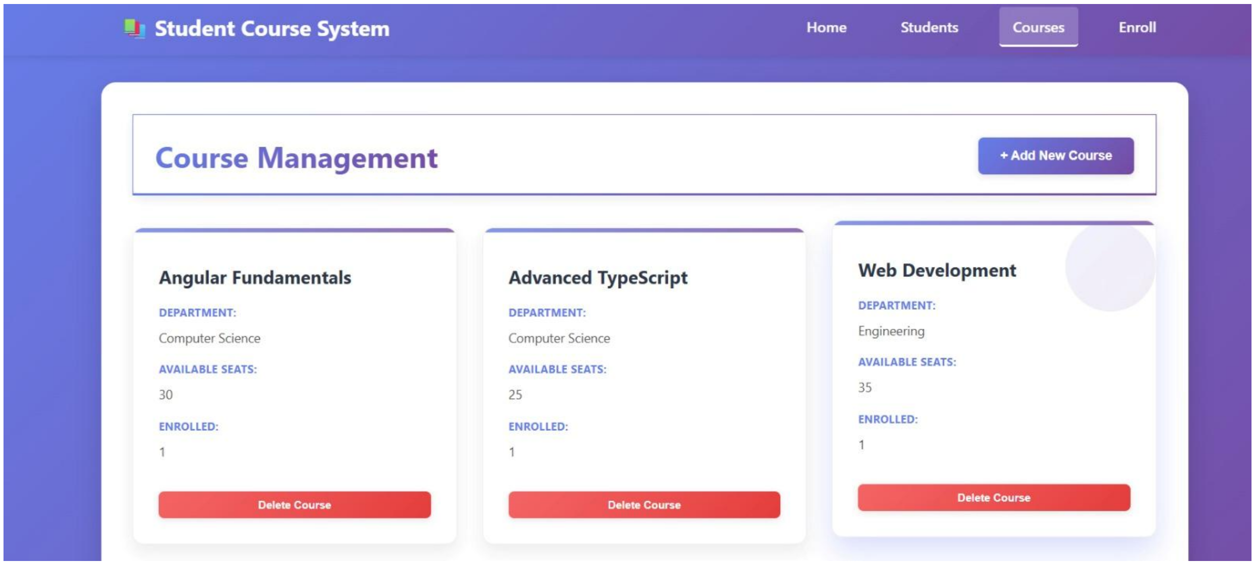
START NOW

100+	50+	1000+	99.9%
STUDENTS MANAGED	COURSES AVAILABLE	ENROLLMENTS	UPTIME



Student Management

ID	NAME	EMAIL	DEPARTMENT	ACTION
1	John Doe	john@example.com	Computer Science	Delete
2	Jane Smith	jane@example.com	Engineering	Delete
3	Bob Johnson	bob@example.com	Mathematics	Delete



Course Management

Angular Fundamentals

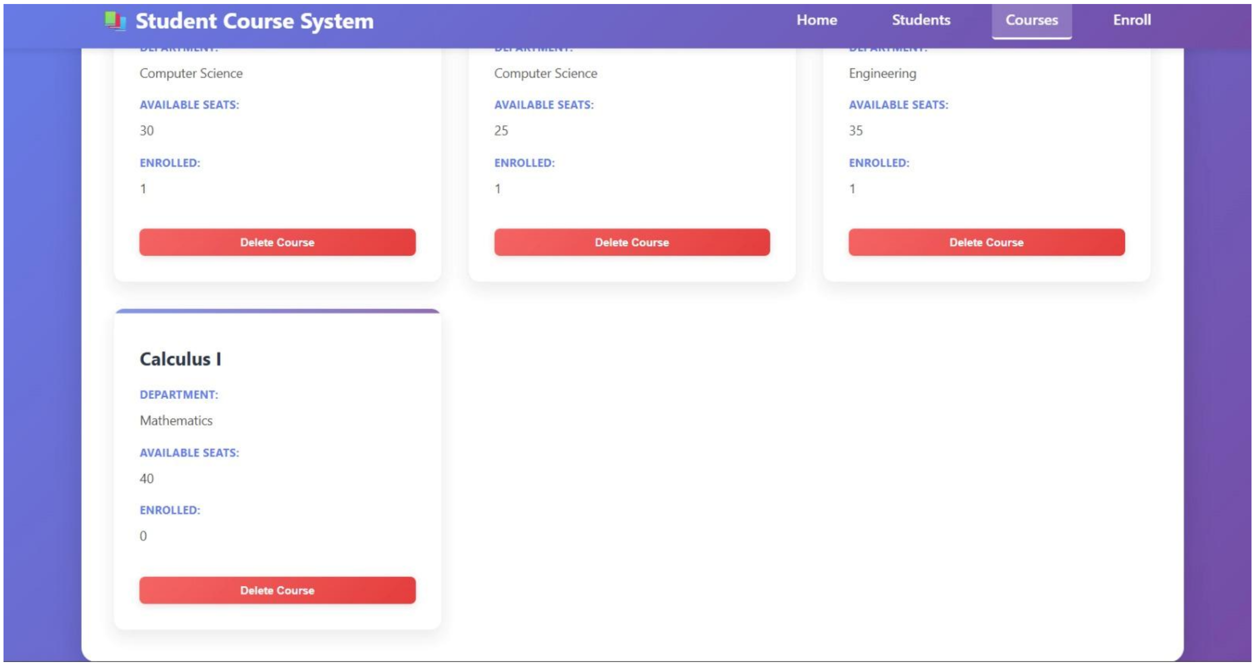
DEPARTMENT:
Computer Science
AVAILABLE SEATS:
30
ENROLLED:
1

Advanced TypeScript

DEPARTMENT:
Computer Science
AVAILABLE SEATS:
25
ENROLLED:
1

Web Development

DEPARTMENT:
Engineering
AVAILABLE SEATS:
35
ENROLLED:
1



Computer Science

AVAILABLE SEATS:

30

ENROLLED:

1

Computer Science

AVAILABLE SEATS:

25

ENROLLED:

1

Engineering

AVAILABLE SEATS:

35

ENROLLED:

1

Calculus I

DEPARTMENT:

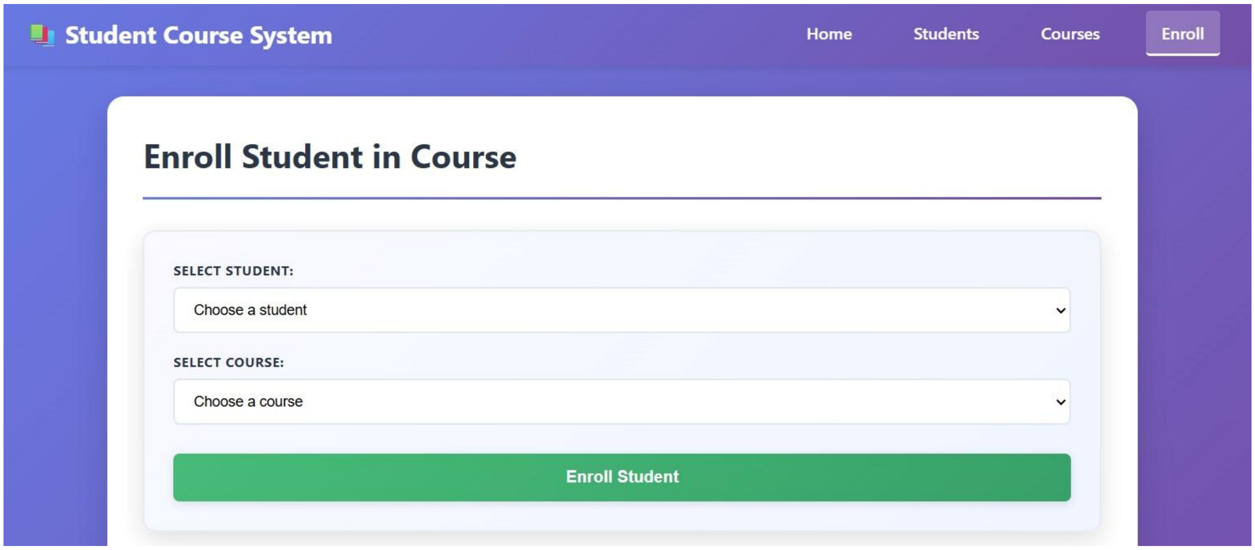
Mathematics

AVAILABLE SEATS:

40

ENROLLED:

0



Enroll Student in Course

SELECT STUDENT:

Choose a student

SELECT COURSE:

Choose a course

13. Conclusion

The Student Course Management System effectively demonstrates the use of Angular and TypeScript in developing a scalable and maintainable academic application. The project highlights the importance of clean documentation, readable code, and responsive UI design, making it suitable for academic evaluation and future expansion.

14. References

- L&T LMS : https://learn.lntedutech.com/Landing/MyCourse