İstanbul Beykent University Student Portal System Project

This project focuses on analyzing the existing web-based student information system by examining the current hardware and software infrastructure, and redesigning it accordingly. The study aims to identify system and user requirements, and to propose an improved and redesigned system structure within the framework of feasibility and sustainable development.

Today, the existing student information system is separated into many different websites, which makes it complicated and difficult to use. Students must visit several platforms in order to complete basic academic processes, which results in unnecessary time and energy loss.

For example, students check their exam grades, attendance and course registration through the OBS system, while instructors share materials and announcements on a different platform called PUSULA. In addition, exam schedules and exam locations are accessed from another website.

As a result, the current structure fails to follow modern technology requirements and cannot be considered sustainable in the long term. The system is fragmented, outdated, and far from user-friendly.

Problem Identification

- Too many independent platforms
- Low usability and user experience
- Extra time and energy consumption
- Fragmented data structure
- Lack of integration
- Outdated system design

Requirements

A modern student system should:

- Be accessible from one platform
- Have a clear and simple interface
- Support all academic and administrative processes
- Provide faster access to information
- Reduce unnecessary steps
- Be user-friendly for students and academic staff

Proposed Solution

Our project aims to gather all existing systems under a single, modern web platform. The system will include academic information, financial procedures, announcements, instructional materials, and general student services in one place. With this integration, we expect to offer a more efficient, modern, visually simple, and user-friendly structure that saves time, energy and resources for everyone in the university.

What Is the Classical Waterfall Model?

The Classical Waterfall Model is one of the earliest and most fundamental **Linear-Sequential Life Cycle** models in software engineering. In this approach, the software development process flows downward like a waterfall, consisting of distinct phases—Requirements Analysis, Design, Development, Testing, and Maintenance—that follow one another with minimal iteration. The core principle of the model is **"no phase begins until the previous one has been completed and verified."** The output of each phase (such as design documents) serves as the input for the next phase. This structure ensures that the development process progresses in a disciplined, planned, and predictable manner. The Waterfall model is particularly suitable for projects in which planning and documentation areessential, and the requirements can be clearly defined from the outset.

Why We Chose the Waterfall Model for Our Project?

For our **"Beykent University Integrated Campus System"** project, we chose the Classical Waterfall methodology instead of Agile approaches for several reasons:

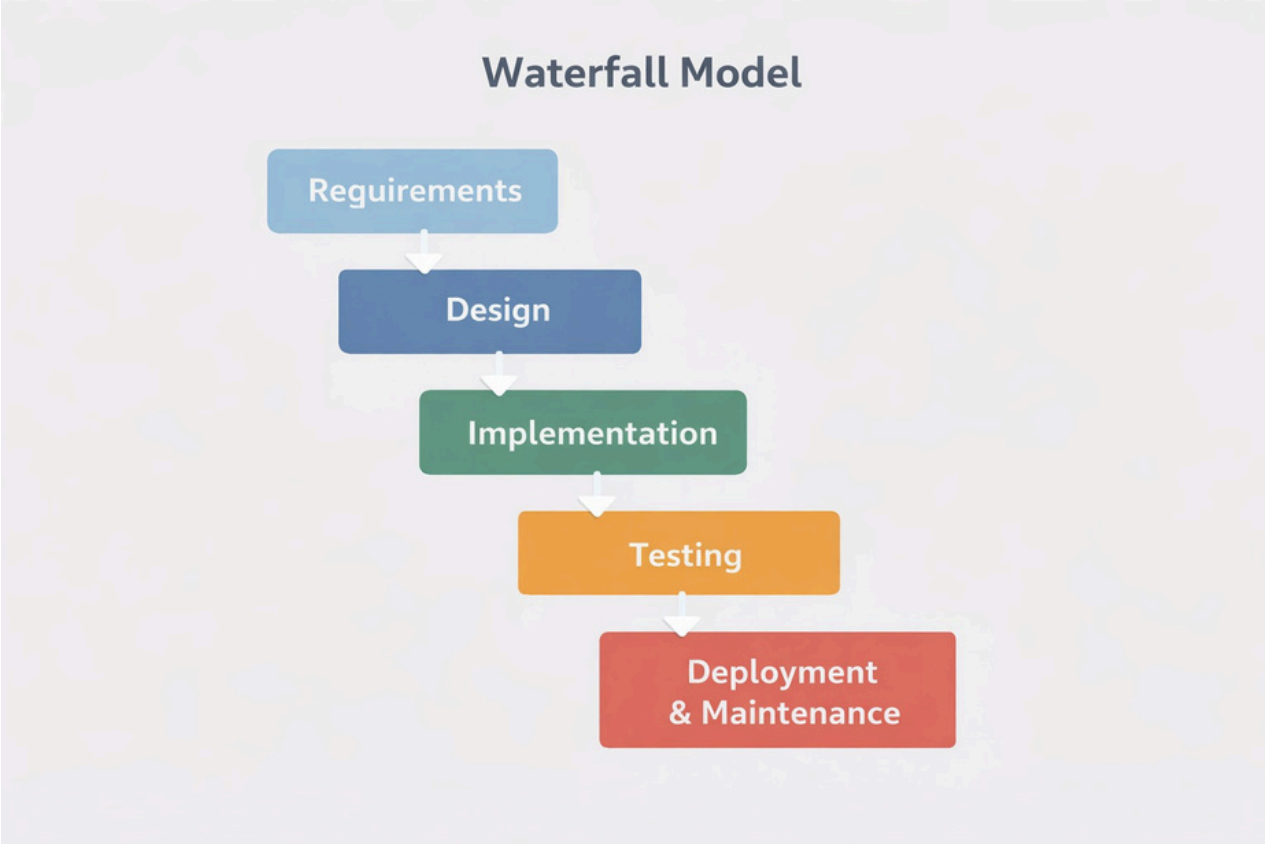
Clarity and Stability of Requirements: University regulations—such as passing criteria, attendance rules, and credit calculations—are predetermined and strictly enforced. Because these requirements are not expected to change frequently throughout the project, they align well with the Waterfall model's principle of fixed and stable requirements.

Documentation-Oriented Structure: Our project focuses on comprehensive system analysis and design rather than coding. The Waterfall model mandates detailed documentation (such as SRS and TDD) at the end of each phase, which supports academic reporting standards and provides a solid foundation for future development.

Critical Data Integrity and Security: Since the system handles sensitive information—including student grades, payment records, and graduation statuses—each stage of the project must be carefully analyzed and planned. By completing the analysis phase thoroughly before moving on to design, the Waterfall model reduces architectural risks and minimizes potential errors.

Time and Resource Management: The project must be completed within the constraints of the academic calendar. The Waterfall model allows us to create a clear timeline (such as a Gantt chart) at the beginning of the process, making it easier to track progress and meet deadlines.

For these reasons, the Waterfall model has been identified as the most appropriate development methodology for thestructure, academic expectations, and overall planning of our project.



Current System Analysis

In today's university environment, educational and administrative processes rely on various digital infrastructures designed for different purposes. In order to achieve the integration and modernization targeted in our project, it is first necessary to analyze the core functions of the existing subsystems that currently operate independently (stand-alone). Below are the functional descriptions of the main modules that constitute the campus ecosystem and will be unified under the scope of our project:

1. Student Information System (OBS / SIS)

The Student Information System is the primary platform where students carry out essential academic operations. Through this system, students complete course selection and registration, view their weekly course schedules, track their exam grades, monitor tuition and payment status, and check their attendance records. Additionally, administrative procedures such as transcript viewing, advisor approval, and graduation tracking are also conducted through this system. As the official source of academic records, it is one of the most critical systems within the university's academic infrastructure and functions as the main authoritative database.

2. Learning Management System (LMS / Moodle / ALMS)

The Learning Management System is the platform where academic communication between instructors and students is maintained. Instructors share course materials (PDFs, presentations, videos), assignments, announcements, and exam guidelines through this system. Students access course resources, upload assignments, and receive feedback from instructors. The LMS ensures organized management of course content in both face-to-face and online learning environments.

3. E-Library System

The e-library platform provides students with access to the university's digital academic resources. Through this system, users can search academic databases, e-books, scholarly articles, theses, and research reports. They can extend the loan period of borrowed books and place reservation requests. Students log in with their user accounts to access resources remotely, perform catalog searches, and obtain the scientific information needed for their research. The e-library system is especially critical for research projects, assignments, and academic studies.

4. Examination Management System

The Examination Management System allows students to access information regarding midterm, final, and resit exams—including dates, times, and exam rooms—from a single centralized location. In some universities, exam entry documents and exam results can also be viewed through this platform. Additionally, the supervision of exam regulations and the management of exam result appeal processes are handled through this system. Exam-related announcements and schedule changes are likewise published within this platform.

5. Preparatory School Tracking System

This system is specifically designed for students receiving foreign-language education and operates on a level-based (course/track) structure. Students use this platform to monitor their term grades, quiz/midterm results, the stricter attendance requirements unique to preparatory programs, and annual proficiency conditions. Exam schedules, inter-department announcements, and instructional materials are also shared through this system. It serves as a centralized tool that enables preparatory students to track their academic progress throughout the year.

At present, students are required to access five different systems—each with separate interfaces and login credentials—to perform these five distinct functions. This fragmented structure complicates the user experience and significantly reduces data integrity and integration capability**.**

Our New System

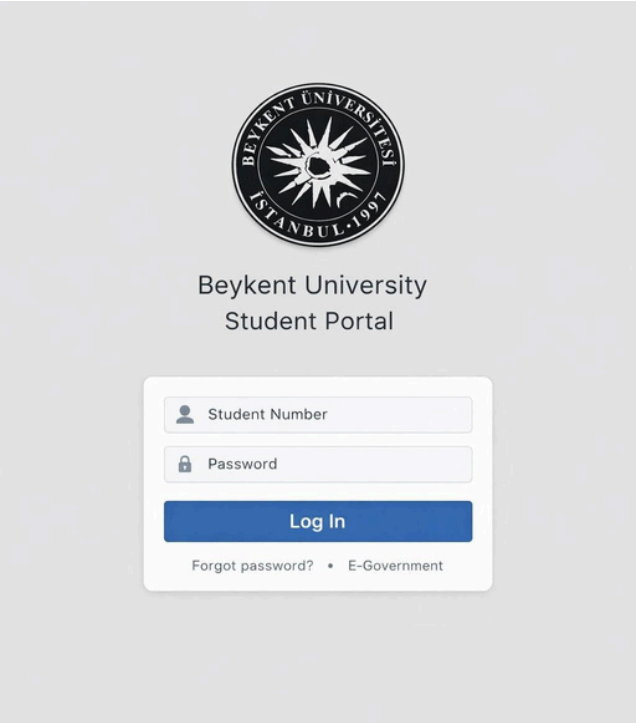
The system we are designing will combine all these separated websites and portals under a single interface with a simple and user-friendly design approach. Users will log in through a standard and clear login page, enter their credentials, and access the system after authentication.

When students enter the system, they will see two different announcement areas. One of them will show general university announcements and important reminders, and the other part will show messages, updates or schedule reminders from the instructors of the courses the student is currently taking.

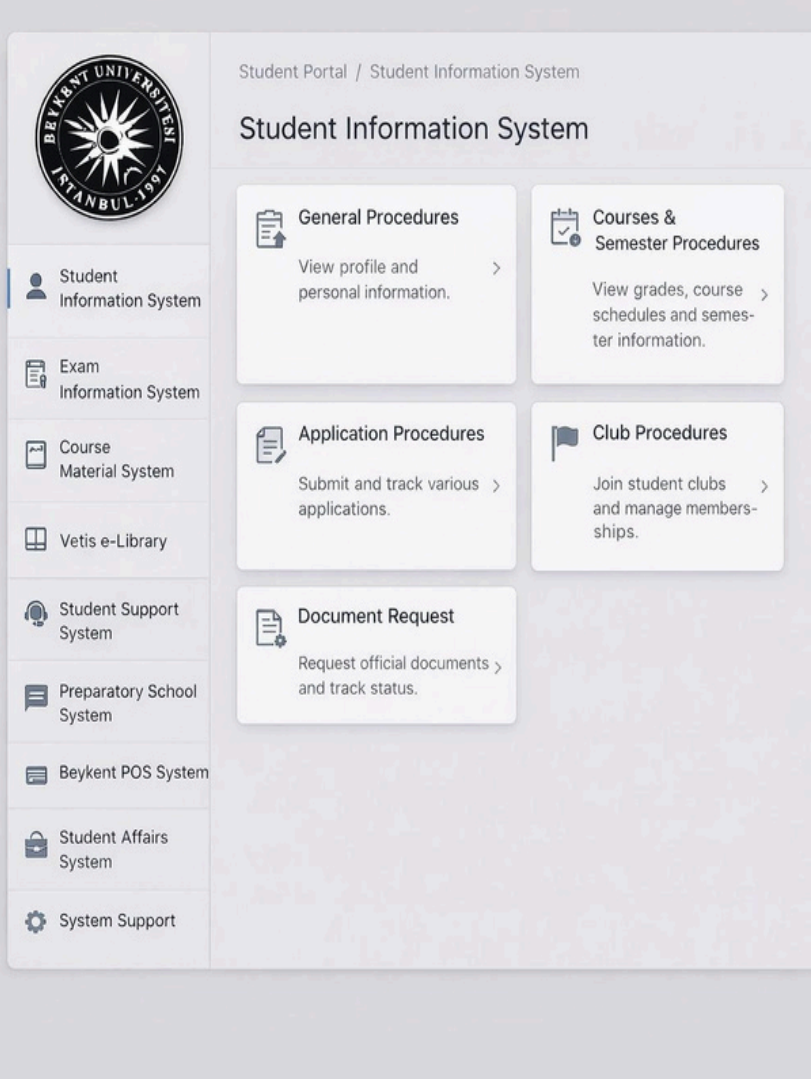
Inside the system, users will be able to reach all main functions through organized menu sections. Course materials will be located in a separate section, while grades, attendance and similar academic information will be displayed under another window. The library system will also be accessible through its own section. Basically, all the fragmented university systems will be gathered under one interface, and then divided into sub-sections inside the platform.

Our aim is to make all services easily reachable for new and current students without confusion, and to offer a clean and simple access structure by using a single interface. With this approach, students and staff will be able to use, follow, maintain or solve problems in the system more easily, and the overall process will become faster and more efficient for the university.

GUI (Graphical User Interface)



The Login Module, which serves as the initial welcome screen of the developed system, is the primary authentication interface that enables students to securely access the platform. In addition to the standard username/password verification, an **e-Government (e-Devlet)** integration has been implemented for Turkish citizens to enhance security and improve accessibility. The active 'Forgot Password' feature allows users to manage their account recovery processes independently (self-service), without requiring assistance from a system administrator. The interface is designed to be simple, clear, and aligned with the university's corporate identity. Following a successful login, users are granted access to all modules according to their designated roles.



Main menu screen, after the login process is completed, this screen welcomes the user and serves as a centralized control panel that provides access to all academic, administrative, and social modules required throughout the user's university life. The left-side menu remains fixed (sticky), allowing quick and seamless navigation between modules.

Student Information System: The main module where core academic processes such as course registration, grade viewing, and personal records are managed.

Exam Information System: The module used to view exam schedules, exam locations, and examination rules.

Course Material System: An educational content module that provides access to course materials such as PDFs, presentations, and videos.

Vetis e-Library: Aremoteaccess point to the university's digital library databases and publications.

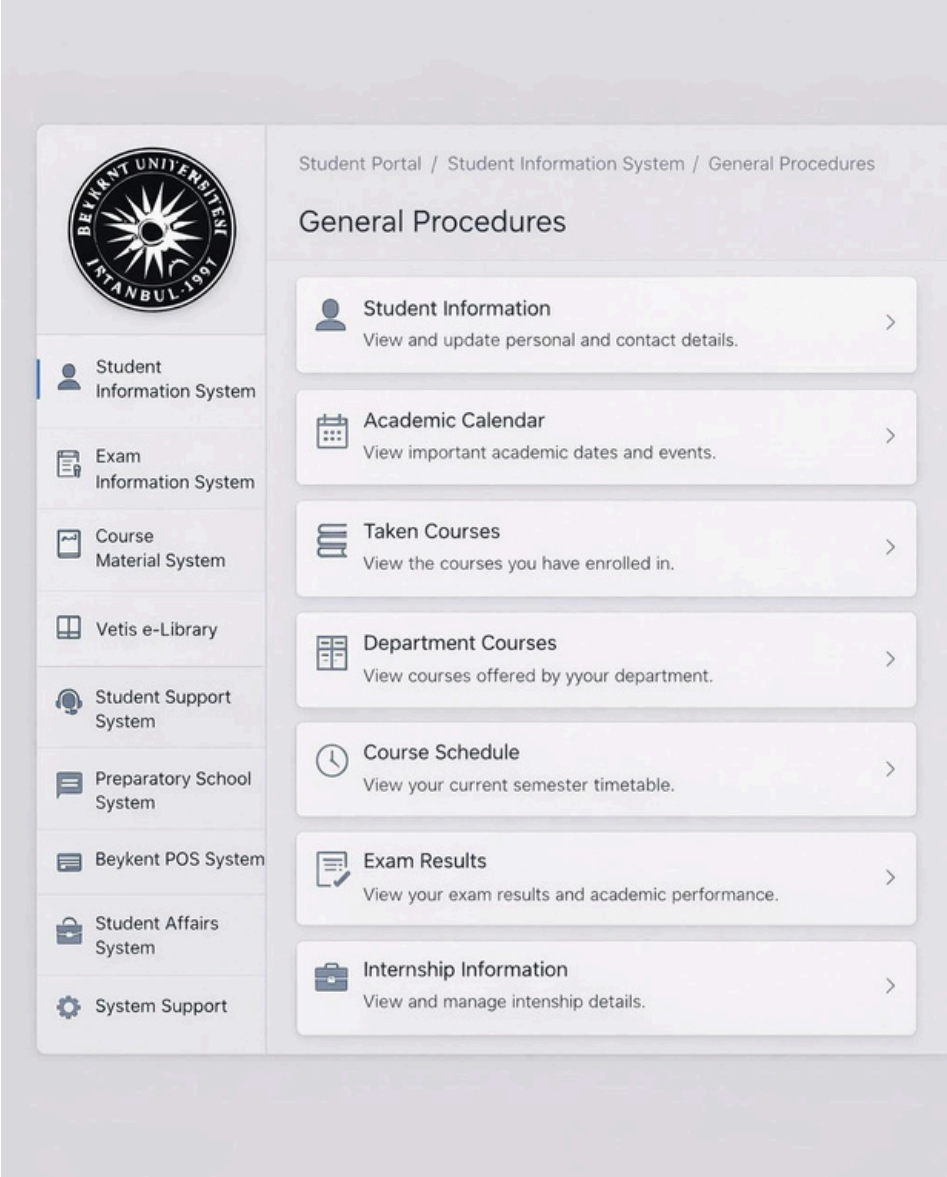
Student Support System: A communication module where students can submit feedback, complaints, and support requests.

Preparatory School System: A dedicated module for preparatory students to track grades, attendance, and exam information.

Beykent POS System: Provides access to information related to tuition fees and other payment transactions.

Student Affairs System: A module where document requests, student affairs applications, and administrative processes are managed.

System Support: A section where technical issues and user support requests are reported and tracked.



General Procedures is a submodule that allows students to access and manage their basic academic and personal information through a centralized interface. This section is designed to provide quick and organized access to general information related to the student's university life.

Student Information: Displays and allows updates to the student's personal and contact information.

Academic Calendar: Provides access to important academic dates, exam periods, and the official academic calendar.

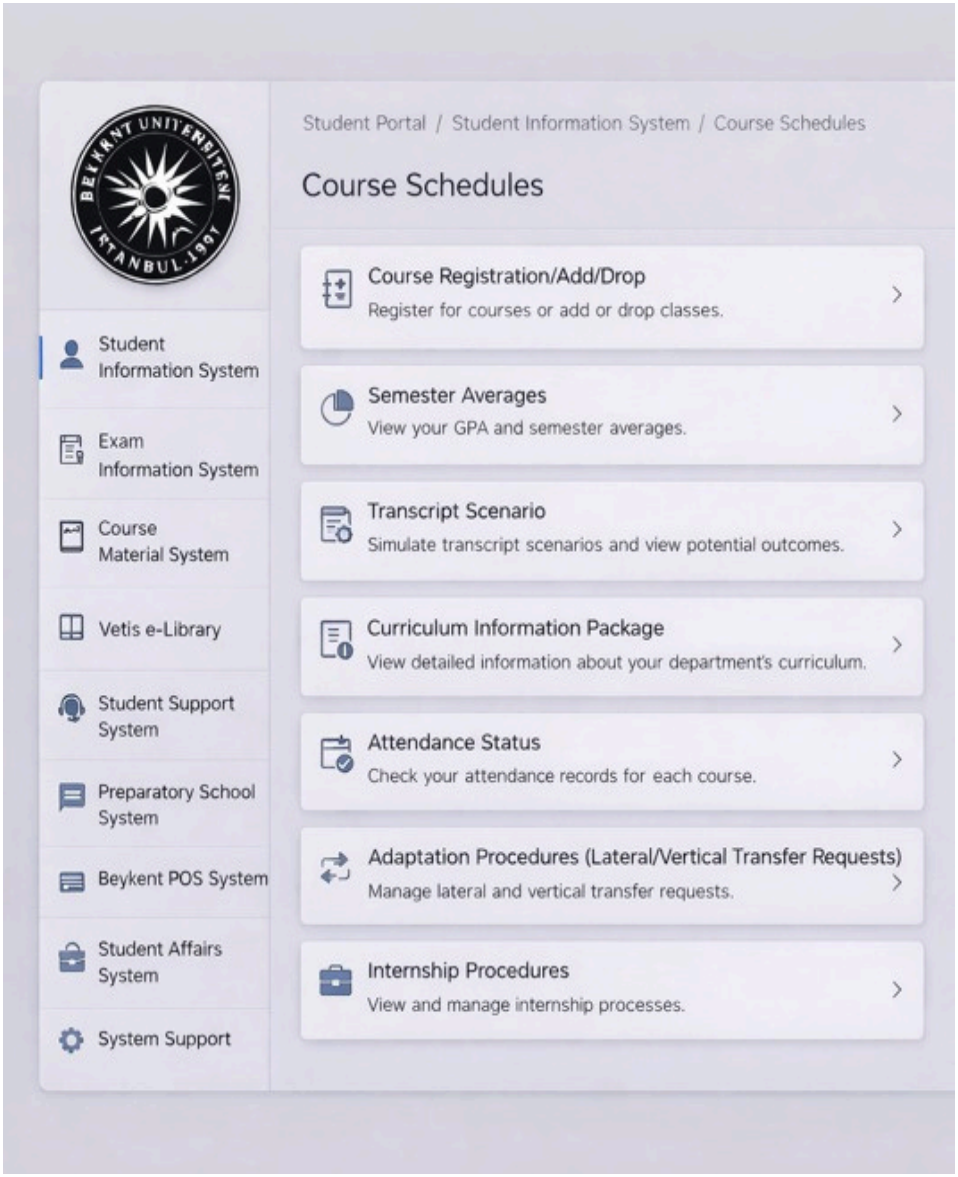
Taken Courses: Lists the courses in which the student is currently enrolled.

Department Courses: Displays the courses offered by the student's academic department.

Course Schedule: Showsthe student's semester timetable in a day-and-time-based format.

Exam Results: Allowsstudents to view their exam results and overall academic performance.

Internship Information: Enables students to view and track information related to their internship processes.



Course Schedules is a submodule that enables students to manage course- and semester-based academic processes. This section presents all semester-related information—ranging from course registration to grade averages, attendance status, and internship procedures—within a unified structure.

Course Registration / Add / Drop: Allowsstudentstocomplete semester course registration and manage add–drop processes.

Semester Averages: Enables students to view their semester and cumulative grade point averages (GPA).

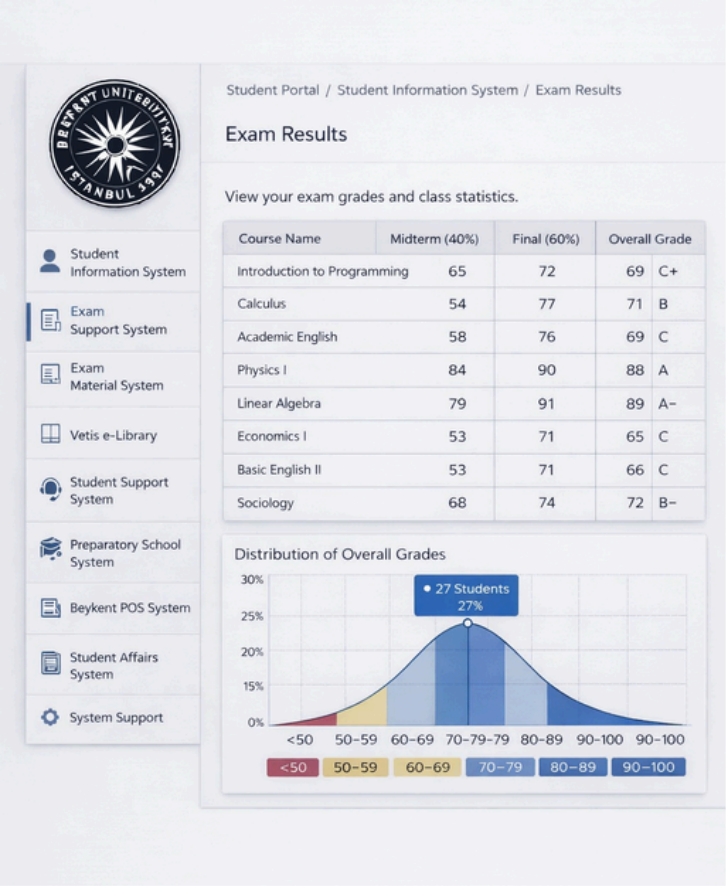
Transcript Scenario: Allows students to simulate transcript outcomes based on possible course and grade scenarios.

Curriculum Information Package: Provides detailed information about the department curriculum, course contents, and program structure.

Attendance Status: Displays course-based attendance records for the semester.

Adaptation Procedures (Lateral / Vertical Transfer): Manages adaptation processes related to lateral and vertical transfer requests.

Internship Procedures: Allows students to view and track internship-related processes.



The Exam Results page enables students to view their course-based exam grades and overall academic performance. In the existing system, grade distributions were presented using static and visually limited column charts. In this project, a more visually clear and interactive bell curve graph is used to present grade distributions. This improvement enhances visual quality and allows students to better evaluate their performance in relation to the overall class distribution.

The Exam Information System allows students to view upcoming exam dates, times, and room information through a single interface. Exams are displayed in a chronological order to support easier planning and time management. This structure provides quick access to exam details and helps reduce confusion caused by fragmented information

The Course Material System is the integrated version of the previously separate platform (Pusula Beykent) used for course materials and announcements. Within this project, the system has been unified under the main student portal, allowing instructors to share course materials and announcements directly, while enabling students to access all course-related content from a single platform.

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Preparatory School System

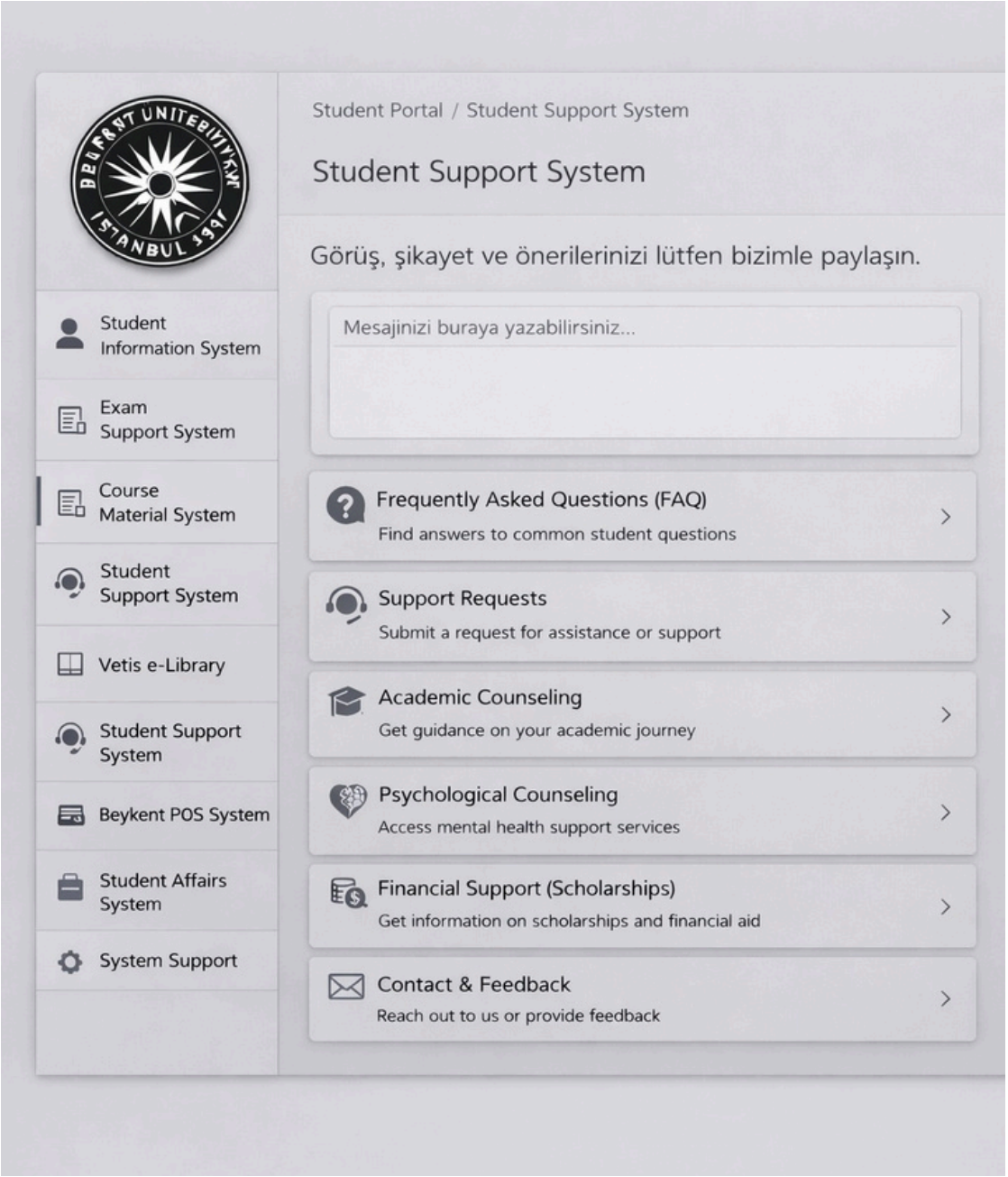
This module enables preparatory school students to monitor their academic progress, exam performance, and attendance status through a centralized platform. It consists of four core submodules that provide access to exam results, attendance records, exam schedules, and course materials.

Exam Results: Allows students to view their preparatory program exam grades, including quizzes, midterms, and proficiency exams.

Attendance Tracking: Displays attendance records specific to the preparatory program, enabling students to monitor daily participation and total absenteeism—an essential requirement in prep education.

Exam Schedule: Provides access to the official preparatory school exam calendar, including dates, times, and scope of upcoming assessments.

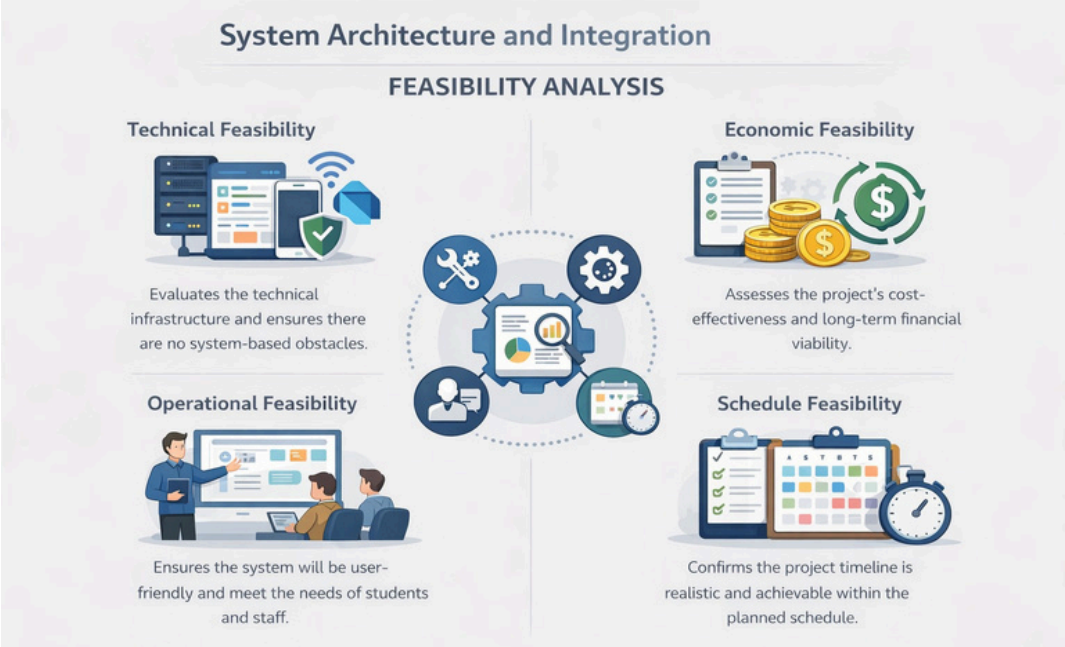
Course Materials: Offers access to preparatory school learning materials (PDFs, presentations, supplementary resources), supporting students throughout their language education process.



Student Support System, this screen is designed to provide students with centralized access to support services they may need throughout their university life. Students can submit feedback, complaints, and suggestions, access frequently asked questions, and track their support requests through the system. Academic counseling, psychological counseling, financial support, and communication channels are integrated into a single structure to ensure a more organized, accessible, and efficient interaction between students and the university.

System Architecture and Integration

Feasibility Analysis; before implementing the project, a feasibility study was conducted under four main categories.



- **Technical Feasibility**

The current IT infrastructure of the university was examined, and it was observed that the existing server capacity is sufficient to host the planned database and system services. Almost all students, who are the primary target users of the system, actively use smartphones and have continuous internet access. Therefore, there are no technical, hardware-related, or system-based obstacles that would.

- **Economic Feasibility**

The project budget was planned based on the principle of low cost and high efficiency. Since the selected programming languages and database management systems are open-source, there will be no licensing costs. In addition, reducing paper usage and decreasing administrative workload after the system is deployed indicate that the project will compensate for its costs in a short period of time.

- **Operational Feasibility**

The end users of the system, including students and academic staff, are already familiar with digital platforms. Since the interfaces are designed to be as simple and intuitive as commonly used daily applications, no additional training process will be required for effective use of the system.

- **Schedule Feasibility**

The project timeline is divided into clear phases such as analysis, design, development, and testing. At the current stage, database schemas and technical documentation have already been completed, which makes it possible to finalize the development process within the planned schedule.

TECHNOLOGIES USED AND DEVELOPMENT ENVIRONMENT

To ensure sustainability, security, and performance, the following technology stack was selected in accordance with industry standards.

- **Mobile Application (Client Side)**

Technology: Flutter Framework & Dart Programming Language
Purpose: Flutter is used to develop a single codebase that can run on both iOS and Android platforms while providing high-performance, native-like results.

- **Backend and API**

Technology: Node.js (Express.js) or Python
Purpose: A RESTful API architecture is implemented to handle requests from the mobile application, manage business logic, and ensure secure communication with the database.

- **Database**

Technology: PostgreSQL
Purpose: PostgreSQL is preferred to maintain relational data integrity and to securely store student, course, and grade information in a reliable and backup-friendly structure.

- **Design and Prototyping**

Tool: Figma
Purpose: Figma is used to design user interface screens and test user experience (UX) before the development phase begins.

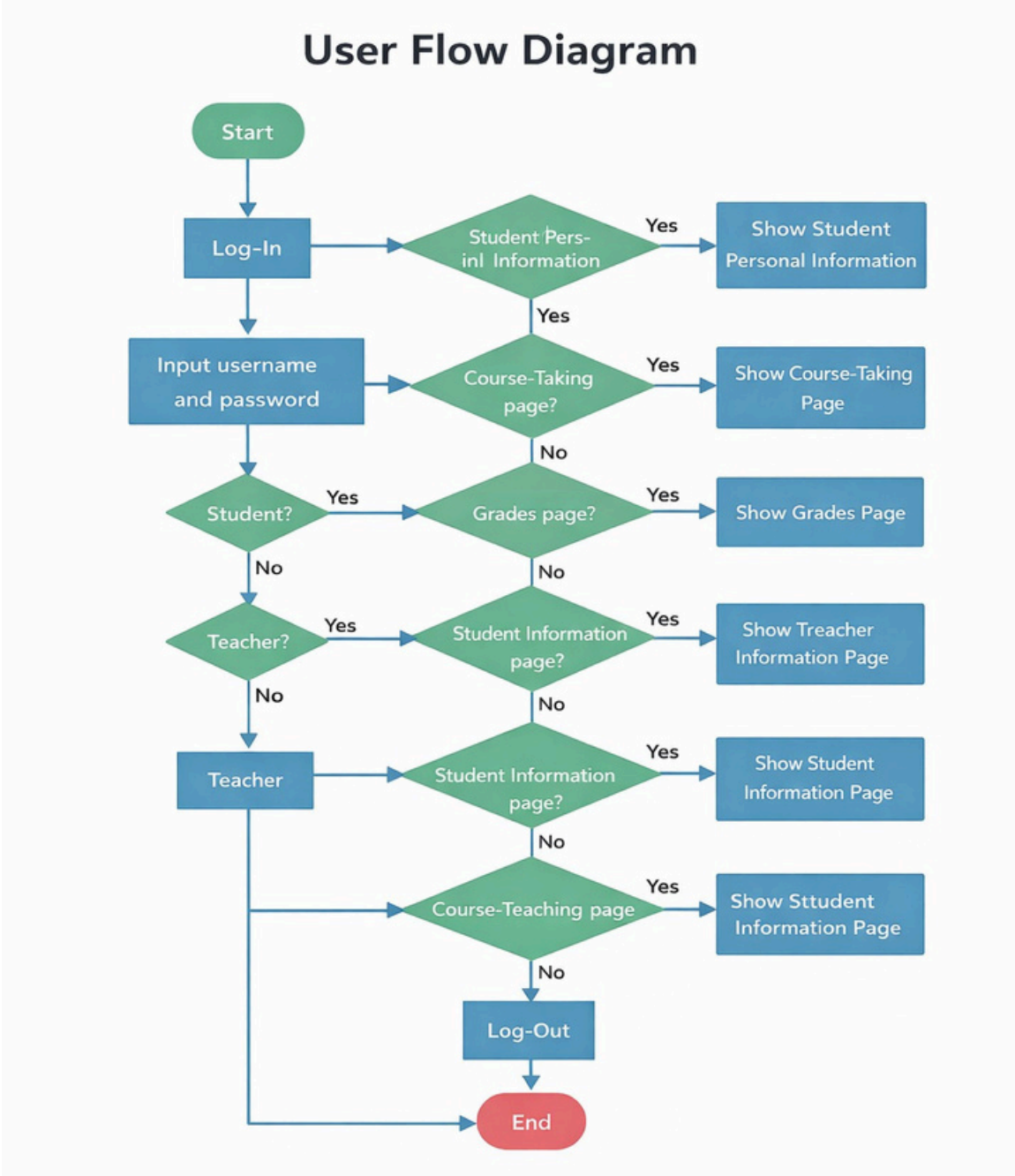
SYSTEM ARCHITECTURE AND DESIGN

A 3-Tier Architecture was adopted to ensure modularity and maintainability of the system.

Presentation Layer: The mobile application interface where users interact with the system.

Business Logic Layer: The server-side layer where data processing rules are applied. The mobile application does not directly access the database and communicates only through this layer.

Data Layer: The database server where all system data is securely stored.



DATABASE DESİGN

In order to maintain data consistency and cover all academic and administrative processes, a comprehensive relational database structure was designed. The main entities defined in the system are listed below:

Student: Stores student identity information, student number, department, and contact details.

Course: Contains course name, code, credit value, and instructor information.

Attendance: Records student attendance status for each course, including date and time details.

Course Material: Stores access information for digital course resources such as PDFs, presentation files, and video links.

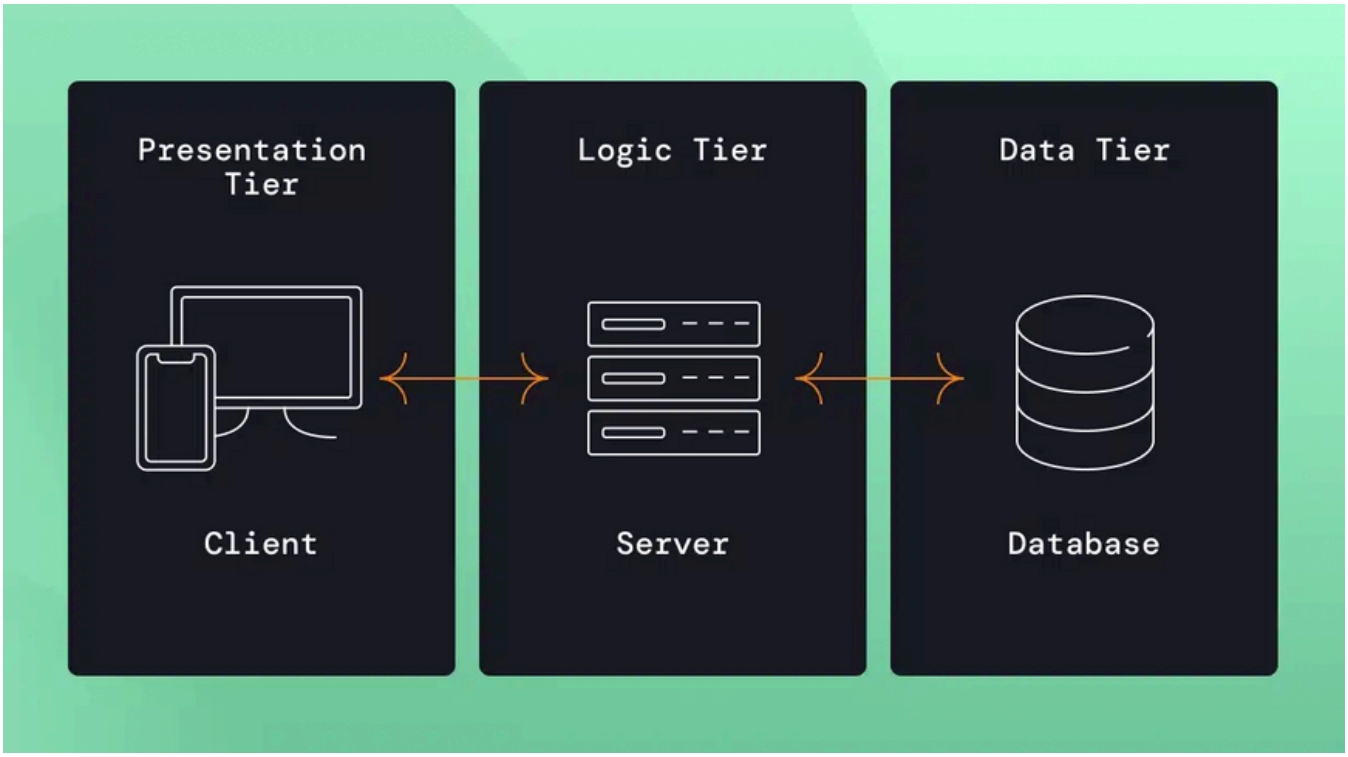
Exam: Defines exam types (Midterm, Final) and exam dates for courses, and contributes to generating individual exam schedules for students.

Grade: The main transaction table that records exam results for each student.

Academic Calendar: Includes university-wide important dates such as semester start, holidays, and course registration periods.

Payment: Stores tuition fee information, payment history, and outstanding balances in a secure financial structure.

Announcement: Contains administrative announcements with title, content, and publication date.



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