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Group: 3

Course: Software Design

Course Code: BSE 2210

Assignment: 1

Lecturer: Mr. Chikwanda J

Design & Architecture Report for the University Unified Student Experience Platform (USEP)

Member A — Design & Principles Lead:

1. Software Design in 2025 — Process and Artifact

Software design in 2025 is both a **process** and an **artifact**.

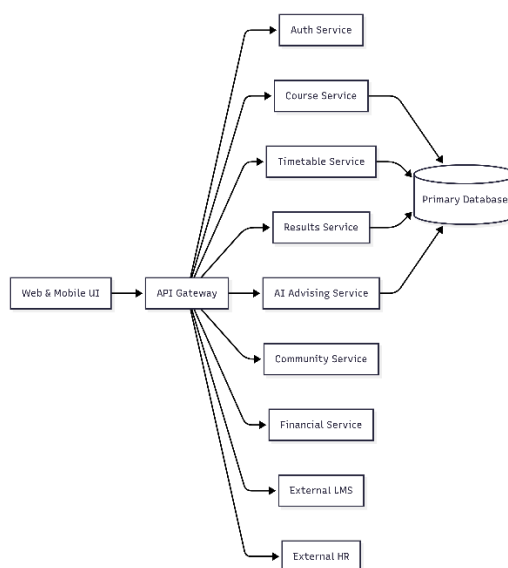
- **As a process**, it is collaborative and iterative, involving students, lecturers, and administrators. Prototypes are built, tested, and refined continuously, not just once at the beginning.
- **As an artifact**, it produces tangible outputs like diagrams, Architecture Decision Records (ADRs), and contracts. This helps record decisions, onboard new members, and keep the platform evolving smoothly.

This dual view ensures that design is both practical and durable for the University Unified Student Experience Platform (USEP).

2. System Overview of USEP

USEP integrates academic, financial, and community services into one unified platform. The high-level component diagram below shows how its parts interact.

System Overview / Component Diagram



Students access the system via web or mobile. All requests pass through an API Gateway, which routes them to services such as Course, Timetable, Results, Advising, Community, and Payments. Each service connects to a shared database or external systems such as LMS and HR. This setup makes the platform flexible and scalable.

3. Key Architecture Decision — ADR

One artifact we prepared is an **Architecture Decision Record (ADR)**. This document explains why we chose microservices over a monolith. The **ADR** can be found in the **docs** folder of our repository as **ADR.md**.

4. Trends in Modern Software Design

Three trends most relevant to USEP are:

- **Microservices** → independent services that scale on demand.
- **AI integration** → for personal advising, chatbots, and fraud detection.
- **Sustainable architecture** → cloud-native and serverless designs that reduce cost and energy.

These trends make USEP future-ready and student-focused.

5. Principles-First vs Application-First

Design can begin either with principles or with quick applications.

- **Principles-first** ensures values like privacy, accessibility, and modularity are built in from the start.
- **Application-first** moves faster initially but risks technical debt.

For USEP, a **principles-first** approach is the best because protecting student data and ensuring accessibility are non-negotiable.

Member B — Business Analyst:

Member C — Culture & Ops Lead: