

# **Lab 1 – Product Description**

## **Section 2 Update**

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Version 1.0

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## **Introduction**

Students often face challenges when trying to create a class schedule that meets degree requirements while molding it around busy lives of work, family, community, and personal responsibilities. When a required course is unavailable or clashes with other commitments, students can be forced to delay their graduation which increases both tuition cost and unnecessary stress. Academic advisors are also affected, as they spend a lot of time manually reviewing degree audits, each student's personal lives in an attempt to resolve scheduling conflicts.

Institutions rely on tools like DegreeWorks to track degree process. And while these tools are useful for audits, they often lack real-time course availability, conflict detection, and support for personal scheduling constraints. This results in students needing to manually piece

together schedules across multiples systems like LeoOnline, DegreeWorks, and a flurry of note taking systems. This increases the likelihood of errors and missed requirements. Both students and advisors are held back by the limitations in the toolset and contribute to delayed graduation outcomes.

GradMap is proposed as as a solution to these challenges. GradMap is a web-based scheduling application designed to help students and advisors quickly generate conflict-free, degree-compliant schedules. By combining degree requirements, course availability, and personal scheduling constraints into a single location. GradMap hopes to reduce errors and keep students on the best track towards graduation.

## Product Description

GradMap is a web-based academic planning system designed to assist undergraduate and graduate students in developing degree-compliant, conflict-free class schedules that align with both institutional requirements and personal availability constraints. The primary purpose of GradMap is to modernize the academic scheduling process by integrating degree requirements, course availability data, and student-defined time constraints into a single platform. Unlike traditional audit tools that only display degree progress, GradMap actively generates optimized draft schedules and provides real-time feedback before registration occurs. The system also supports advisor collaboration by allowing generated schedules to be reviewed, modified, and approved within the same environment. By combining automated planning with structured advisor oversight, GradMap supports clearer decision-making and a more guided path toward graduation.

### 2.1 Key Product Features and Capabilities

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GradMap provides several core capabilities that distinguish it from existing academic planning tools. The system automatically generates personalized semester schedules based on a student's declared degree requirements, completed coursework, and available class offerings. Students can define constraint blocks that represent work, family, or other personal commitments during which courses cannot be scheduled. Real-time conflict detection evaluates overlapping class times, unmet prerequisites, credit limits, and degree compliance concerns as schedules are created.

In addition, GradMap includes a requirements validation engine that continuously checks proposed schedules against the student's academic program to ensure alignment with graduation criteria. When conflicts or constraints arise, the system suggests alternative

courses that allow the student to continue progressing through their program. Advisor review functionality enables faculty members to examine submitted schedules, provide feedback, and approve final plans. Together, these capabilities create a structured workflow that simplifies planning while keeping both students and advisors actively involved in the decision-making process.

## **2.2 Major Components (Hardware/Software)**

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GradMap is designed as a cross-platform web application accessible through modern web browsers on operating systems including Windows, macOS, and Linux. The system is hosted on a web server environment such as Apache, Nginx, or Microsoft IIS. Backend processing is implemented using a server-side language such as Java, which supports scheduling algorithms, conflict detection logic, requirements validation, and advisor workflow management. A relational database management system, such as MySQL, stores user accounts, course offerings, academic requirements, and scheduling data.

The application architecture separates frontend and backend responsibilities to maintain scalability and long-term maintainability. The frontend interface is developed using standard web technologies, including HTML, CSS, and JavaScript, allowing users to interact with scheduling tools through an intuitive interface. Backend services manage authentication, schedule generation logic, validation processes, and secure database communication. Version control is maintained through Git and GitHub, with optional support for continuous integration workflows. This modular design allows the system to evolve over time while maintaining stable performance and data reliability.

## **Identification of Case Study**

GradMap is primarily developed for undergraduate and grad students who are having trouble planning schedules that work within both degree requirements and personal constraints.

Academic advisors serve as a secondary user group since they review and approve of student schedules. The case study group consists of a small sample of students and advisors who will use the prototype and provide feedback on its ease of use and effectiveness. In the future, GradMap may also be used by program directors or university admins to analyze enrollment trends and support institutional graduation goals.

## Glossary

Conflict Free Scheduling – Creating a class schedule with no overlapping course times.

Constraint Blocks – Reserved time periods where classes cannot be scheduled due to personal commitments.

Degree Compliance – Ensuring that a student's schedule meets all degree requirements as well as prerequisite conditions.

Load Balancing Recommendation – A scheduling suggestion for distributing course difficulty or workload evenly across a semester

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