SUMMARY

This thesis addressed the scheduling and management issues in the Department of Mechanical and Industrial Engineering and aimed to provide a comprehensive solution, a platform that would lay the foundation for the overall organisation in the laboratory setting. The project aimed to enhance operational efficiency, user satisfaction, and resource management within the laboratory environment. The process of research and development was exhaustive - starting from identifying the fundamental needs of the users to the creation of a simple but powerful system.

The process began with an overview of the current manual system, from which significant inefficiencies and pain points were identified. Upon this observation, it was clear that an automated solution to manage the laboratory was needed. To expand on this discovery, extensive market research was conducted. Other universities faced this issue, and each had a unique solution, which was further explored during this step. This research provided valuable insights into best practices and innovative solutions implemented elsewhere, helping to shape the strategic approach for TalTech's platform.

The service design process started with conducting in-depth user research — a detailed interview on user behaviour, user needs, and user pain points. The subjects for the interview were selected from various places within the department, such as lecturers, researchers, engineers, and business specialists. These insights played a critical role in understanding the target audience and outlining realistic core needs and values of user personas. In the next stage of user research, based on the data gathered from the interviews, an intricate user journey map was created. It was meant to follow the steps the users took along the scheduling journey. The map mentioned key interaction points with the service, needs, pain points, and emotional responses. After enough data was gathered about the issue in the department, a very clear and straightforward problem statement was written to reference throughout the development process.

At this point, working on a solution began. In this brainstorming part, many ideas were brought to the table, but after a careful selection based on user data, core, additional, and future features were set. To begin building the platform itself, flowcharts and wireframes were created as an aim to lay the groundwork. This acted as a blueprint for the application, ensuring the flow was logical, cohesive, and intuitive. This is the core of the user-centric design that was heavily implemented in

this process. Borth flowchart and wireframes went through adjustments and improvements based on the data from A/B and user testing.

Finally, the first version of the platform was designed. The front end of the application was created in Figma, featuring a user-friendly interface with TalTech's brand guidelines to ensure smooth navigation and a familiar look. On the other hand, Python was the choice for the back-end infrastructure development, which ensured that all users accessing the system were authenticated securely through TalTech's Uni-ID database.
The system would have three main databases linked and working in tune: a machine database, a calendar database, and a comments database.

This version of the platform focuses mainly on scheduling problems with some features solving management and tracking issues. With this upgrade, a user is now able to check any machine's availability from a calendar view, check comments, track resource availability, and reserve time slots from one application. Looking ahead, this has room for future development, and this platform may become an all-in-one laboratory management system. Features like remote accessing the machines to view the camera or upload a piece to be printed straight in the system would enhance user experience and overall efficiency. Future features also include collecting machine usage and user data to further improve the experience, admin and student access, calendar integration, and more.

The project demonstrates a significant step forward toward the primary goals of efficient, automated, and smooth laboratory experience. The platform is able to handle scheduling and management effectively. With the user-centric approach that was confirmed through repeated tests with feedback loops, the incorporation of university systems, and compliance with brand guidelines, it was guaranteed that the platform lived up to what its users expected of it.

This thesis has laid a strong foundation for a scheduling and management platform that enhances operational efficiency and user satisfaction within the TalTech Mechanical and Industrial Engineering Department. The structured approach, from identifying user needs to developing and testing the platform, has resulted in a strong yet flexible solution that will likely be adaptive. Future enhancements will build on this foundation, ensuring the platform evolves to meet the dynamic needs of the university environment.