Software Engineering
Capstone Topic Approval Form

The guidelines for the Software Engineering Capstone course require a student to demonstrate the application of academic and professional abilities developed as an undergraduate student. The software engineering capstone challenges students to integrate skills and knowledge from several program domains into one project. As a result, it is highly recommended that your topic should resolve a current or perceived business problem. As stated, you want to exemplify what you have learned in your Software Engineering program to showcase your skills. Remember, your research topic exemplifies scholarship and research at the highest level and is significant and helpful to potential employers in identifying your abilities. Your research will always be something you can look back on with pride. Finally, it is recommended for students to use publicly available datasets for transparency and external validity.

The purpose of this document is to help you clearly state the research question you will be exploring in your Software Engineering capstone project, your project's scope, your project's tools, and your timeline in order to assure that these align with your degree emphasis. Without clearly defining each of these areas, you will not have a complete and realistic overview of your project, and it cannot be accurately assessed whether your project will be acceptable for the purposes of these courses. Of course, if this is a project you have already completed at work or elsewhere, this should be easy to complete! Many students do use a project they have already completed in the past several years. In that case, you will write the proposal as if the project has not been done yet. If you have not yet done your project, this document can help make sure the scope is within the acceptable range for this capstone. Whether you completed a project or not, you will develop your capstone software application using the tools provided throughout your program. An instructor will approve this form before submitting this task for evaluation. The task will not be evaluated without an instructor's signature. The instructor may ask for additional information before approving the form.

Before submitting this form for approval, please remove all italicized directions in the form.
Please only submit a Topic Approval Form that has been signed by an instructor for evaluation.

Software Engineering
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The purpose of this document is to help you clearly explain your capstone topic, project scope, proposed software product, and timeline. Identify each of these areas so that you will have a complete and realistic overview of your project. Your assigned instructor cannot approve your project topic without this information.

Note: you must fill out and submit this form. The space beneath each area requiring your response will expand as needed. Any cost associated with development of the capstone will be the responsibility of the student.

STUDENT NAME and ID:
Student name: Andrew Davis Maloch
Student ID:012613473

INFORM INSTRUCTOR:

Potential use of proprietary company information: (Y/N) N

ANALYSIS:

WESTERN GOVERNORS UNIVERSITY

Project topic AND description:
Cloud-Enabled Degree Plan Tracker with Multi-Device Synchronization. This capstone enhances an existing .NET MAUI mobile application by migrating from local SQLite storage to Google Firebase cloud services, implementing user authentication, real-time data synchronization across devices, and cloud-based features while maintaining all existing degree planning functionality.

Project purpose AND goals:
To transform a local-only mobile application into a professional, cloud-native platform that supports multiple users with secure authentication and real-time data synchronization. Primary goals: 1) Implement Firebase authentication system, 2) Migrate SQLite data layer to Firestore with real-time sync, 3) Maintain offline capability with cloud conflict resolution, 4) Enhance user experience with multi-device support.

Descriptive method:
Comparative analysis of application performance and user experience before (local SQLite) and after (cloud Firestore) migration. Will document data synchronization efficiency, authentication flow improvements, and offline/online state management.

Predictive/prescriptive method:
Predictive modeling of user growth scalability by analyzing cloud infrastructure capabilities versus local storage limitations. Prescriptive recommendations for optimal data structuring in NoSQL environments based on academic planning use cases.

DESIGN and DEVELOPMENT:

Explain why the problem and software product you have proposed are worthy of study:
This project addresses the critical evolution from academic prototype to production-ready software by solving real-world problems of data persistence across devices and multi-user access. The migration from local to cloud architecture demonstrates essential industry skills in cloud service integration, authentication systems, and scalable data design - all highly relevant to modern software engineering careers.

Projected outcomes and deliverables:

- Fully functional .NET MAUI application with Firebase integration
- Complete authentication system with user management capabilities
- Real-time synchronized data across multiple devices
- Comprehensive documentation of architecture decisions and migration process
- Deployed application package and cloud infrastructure

Estimated number of hours for the following

1) Planning and Design

a) Task 1 approval & initial planning: 8 hours
b) System architecture & Firebase design: 12 hours
→ Subtotal: 20 hours

2) Development
a) Firebase setup & authentication: 18 hours
b) Data layer migration to Firestore: 30 hours
c) Real-time sync & offline capability: 24 hours
d) Testing, polish & deployment: 16 hours
→ Subtotal: 88 hours

3) Documentation
a) Part 1: Software Requirements Spec: 10 hours
b) Part 2: Design & Development docs: 10 hours
c) Part 3: QA & Deployment docs: 8 hours
d) Part 4: Retrospective & presentation: 8 hours
→ Subtotal: 36 hours

Total: 144 hours

Timeline

- Start: Monday, September 30, 2025
- End: Monday, October 20, 2025
- Schedule: 8 hours/day, 6 days/week

IMPLEMENTATION and EVALUATION:

Describe how you will approach the execution of your project:

I will employ an agile, phased development methodology focusing on incremental cloud integration. The approach begins with Firebase authentication setup, followed by systematic data layer migration from SQLite to Firestore with careful attention to real-time synchronization and offline capability. Each phase will include testing and validation before proceeding to the next. The final phase will focus on deployment preparation and comprehensive end-to-end testing of the cloud-integrated system.

INFORM INSTRUCTOR OF:

Potential use of human subjects (Y/N): N
Potential use of proprietary company information (Y/N): N

STUDENT NAME:

Andrew Davis Maloch

By submitting this form, you acknowledge all information provided is accurate and that any changes to the topic, proposal, or goals must be discussed with your assigned instructor prior to continuing.

INSTRUCTOR NAME:

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INSTRUCTOR SIGNATURE:

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INSTRUCTOR APPROVAL DATE: