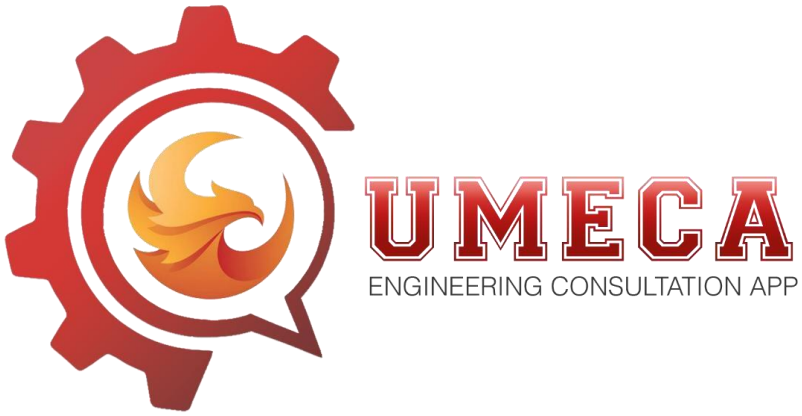
UNIVERSITY OF MINDANAO ENGINEERING CONSULTATION APP(UMECA)



College of Engineering Education

Bachelor of Science in Computer Engineering

University of Mindanao-Main, Davao City

By:

Students of CPE223L (7599)

October 10, 2025

DESCRIPTION OF THE PROJECT

The College of Engineering at the University of Mindanao struggled with manual and inconsistent consultation processes. To resolve this, the University of Mindanao Engineering Consultation App (UMECA) was developed to simplify scheduling, enhance communication, and ensure efficient, student-centered service.

Purpose and Background

The University of Mindanao Engineering Consultation App (UMECA) was developed to modernize and simplify the academic consultation process within the College of Engineering. Traditionally, students had to wait in long queues outside faculty offices, often resulting in scheduling conflicts, miscommunication, and unnecessary stress for both students and faculty members. UMECA addresses these challenges by introducing a digital platform that enables students to request consultations anytime and allows faculty to efficiently manage appointments through an organized system. With features such as automated scheduling, real-time notifications, and secure data management, the system promotes accessibility, transparency, and convenience. Ultimately, UMECA reflects the university's commitment to innovation and service excellence by creating a more efficient, student-centered, and technology-driven academic environment.

Technological Inspiration

The development of the University of Mindanao Engineering Consultation

App (UMECA) was inspired by the growing adoption of digital and cloud-based academic management systems in modern education. Drawing from technological trends such as mobile-first development, cloud integration, and data-driven automation (Microsoft, 2023; EDUCAUSE, 2022), UMECA was designed to streamline the consultation process through secure authentication, real-time scheduling, and automated notifications. It offers responsive access for both students and faculty while providing administrative tools for monitoring and record management. The system also incorporates activity logging and a structured relational database to ensure transparency, accountability, and data reliability. Guided by these innovations, UMECA stands as a scalable and futureready solution aligned with global advancements in educational technology.

Team Roles

The development of the University of Mindanao Engineering Consultation App (UMECA) was conducted through a collaborative effort among four main teams. The Documentation Team prepared the User and Programmer's Manuals to provide clear technical guidance and complete documentation. The Mobile Team developed a responsive application interface for students and faculty, while the Desktop Team created the desktop version of the project to ensure accessibility through computers. Meanwhile, the Database Team designed and maintained the system's database using Entity Framework Core and MySQL, guaranteeing data accuracy, security, and smooth backend integration. Together, these teams successfully developed and implemented a reliable, efficient, and well-integrated consultation management system for the College of Engineering.

RATIONALE

The University of Mindanao Engineering Consultation App (UMECA) was developed in response to the growing need for an efficient and organized consultation system within the College of Engineering. With the college's large student population and busy faculty schedules, manual appointment handling often led to long queues, overlapping schedules, and lost records. UMECA addresses these issues by providing a centralized digital platform where students can easily request consultations and faculty can manage schedules in real time, improving accessibility, accuracy, and convenience for both parties.

Comparable to digital academic management systems adopted by universities worldwide, such as those in China and the United States, UMECA embodies the same principles of innovation and efficiency found in global educational technologies. In countries like China, universities have implemented smart campus systems that integrate cloud computing, big data, and mobile platforms to manage academic services efficiently (Wang & Li, 2023). Similarly, many universities in the United States use advanced learning management and scheduling systems to streamline faculty-student interactions, automate consultations, and maintain centralized academic records (Díaz-García et al., 2023). Compared to these global practices, UMECA provides a localized yet equally innovative approach, offering the same level of accessibility, automation, and transparency suited to the needs and context of the University of Mindanao.

Furthermore, UMECA supports environmental, economic, and operational sustainability by reducing the need for paper-based documentation and manual

coordination. The transition to digital processes helps minimize paper consumption and carbon emissions, aligning with global efforts to promote green and paperless campuses (UNESCO, 2023). Studies also show that digitizing academic workflows not only conserves resources but also improves

organizational efficiency and reduces administrative burdens in higher education institutions (EDUCAUSE, 2022). This shift enhances productivity, streamlines communication, and fosters a more sustainable and technology-driven learning environment, benefiting both students and faculty while supporting the university's sustainability goals. In line with the University of Mindanao's goals of sustainability, innovation, and service excellence, UMECA serves as a forwardlooking initiative that strengthens the institution's commitment to technological advancement and student-centered education.

OBJECTIVES OF THE STUDY

General Objective

The general objective of this study is to design and develop a digital academic consultation management system for the College of Engineering at the University of Mindanao. This system aims to enhance accessibility, efficiency, and transparency in managing academic consultations by providing a platform where students can conveniently request appointments and faculty can efficiently organize and monitor schedules. Through the integration of automated notifications, secure data handling, and real-time updates, the project seeks to streamline communication, reduce scheduling conflicts, and promote a more organized and student-centered academic environment.

Specific Objectives

The specific objectives of this study are to design and develop the core software components of the University of Mindanao Engineering Consultation App (UMECA). These include creating a relational database to manage user information and consultation records, developing API services for secure data exchange and real-time synchronization, designing user interfaces for both mobile and desktop platforms to ensure ease of use and accessibility, and implementing an action logging module to track user activities and maintain system transparency and accountability.

Implement a secure user authentication and registration system for students, faculty, and administrators. This objective focuses on establishing a reliable login and account management process that protects user information and

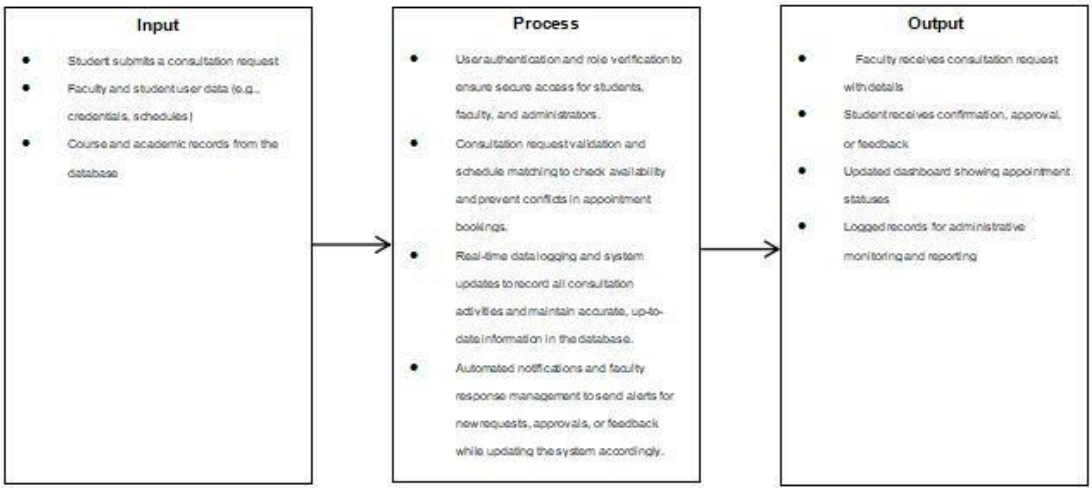
verifies identities. It ensures that only authorized users can access the system's features, maintaining confidentiality and data security throughout all transactions and communications within UMECA.

Enable real-time scheduling, tracking, and updating of academic consultation requests. This objective aims to allow students to request consultations and view status updates instantly while enabling faculty to manage their schedules efficiently. By integrating real-time processing, the system minimizes scheduling conflicts, promotes timely responses, and ensures a smooth and organized consultation workflow.

Develop a responsive system interface accessible via both mobile and desktop platforms. This objective ensures that the UMECA system provides a user-friendly experience that adapts seamlessly across different devices. It focuses on accessibility, intuitive navigation, and consistent functionality to accommodate the needs of students, faculty, and administrators regardless of their preferred platform.

Ensure automated notifications and logging of user actions for transparency and accountability. This objective involves integrating a notification system that alerts users of important updates, such as approved consultations or schedule changes, while maintaining a detailed activity log. These features promote system transparency, enhance communication, and uphold accountability across all user interactions.·

CONCEPTUAL FRAMEWORK



By digitizing the entire consultation workflow, UMECA promotes a more efficient, transparent, and accessible academic environment. This approach supports the university's goals of innovation and sustainability by minimizing paper use, reducing administrative workload, and fostering effective communication between students and faculty.

METHODOLOGY

This study employed applied research aimed at designing and developing a fully functional digital consultation management system tailored for the College of Engineering at the University of Mindanao. The approach focused on creating a practical, technology-driven solution that directly addresses existing challenges in academic consultation, such as inefficient scheduling, poor documentation, and limited accessibility. By integrating core software components, including the mobile and desktop applications, API services, and a relational database, the study

produced a unified platform that enhances communication, efficiency, and transparency between students and faculty.

The project adopted an iterative software development approach that emphasized continuous improvement and rigorous testing at every stage of implementation. Each phase of development involved careful evaluation of functionality, performance, and user experience to ensure system reliability and efficiency. Core features such as authentication, scheduling, and notification modules were thoroughly tested and refined to meet institutional standards for accuracy and responsiveness. This structured yet flexible approach allowed the development team to identify issues early, apply enhancements effectively, and deliver a robust, user-centered system that meets the demands of real-world academic use.

During the software development phase, the team thoroughly considered several real-world constraints that could affect the performance and usability of the University of Mindanao Engineering Consultation App (UMECA). Key factors such as user accessibility, network reliability, device compatibility, and system responsiveness were carefully analyzed to ensure that the software would function effectively across different platforms and usage environments. Since the application is intended for on-campus use, particular attention was given to optimizing performance under varying network conditions and ensuring smooth operation on commonly used mobile devices among students and faculty. Additionally, interface design decisions were guided by accessibility principles to support users with diverse technical abilities. Through continuous testing and

performance evaluation, these software-related constraints were addressed to develop a reliable, adaptive, and user-centered application that maintains stability and efficiency under realistic usage scenarios within the university setting.

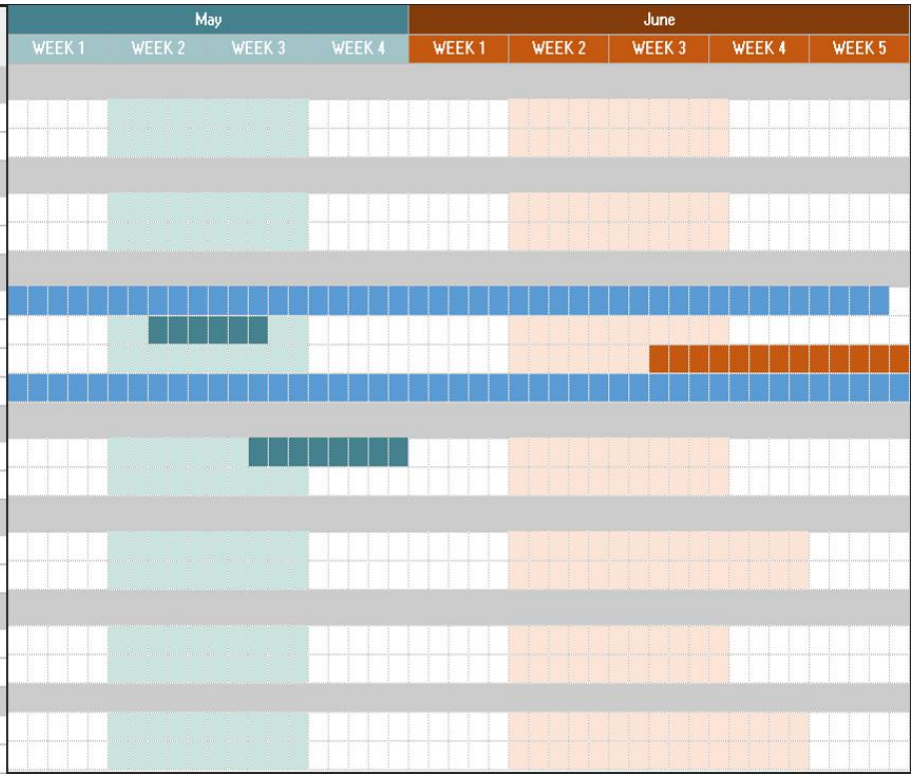
The project was developed through close collaboration among the mobile, desktop, documentation, and database teams. Each group contributed specialized expertise in software development, interface design, data management, and system documentation. Through coordinated efforts, iterative testing, and efficient version control, all components were seamlessly integrated into a unified, reliable, and high-performing academic consultation system.

TIMELINE(Gantt)

Database Mobile

WBS NUMBER	TASK TITLE	START DATE	DATE COMPLETED	DURATION	April		
					WEEK 3	WEEK 4	WEEK 5
1	**DESIGN PHASE**						
1.1	Project Delegation	4/12/25	4/14/25	2			
1.2	FlowChart	4/14/25	4/22/25	8			
2	**PROCUREMENT**						
2.1	Tools to use	4/16/25	4/20/25	4			
2.2	API to use	4/16/25	4/23/25	7			
3	**DEVELOPMENT**						
3.1	Backend Coding	4/25/25	6/27/25	63			
3.2	Connecting API	5/14/25	5/20/25	6			
3.2.1	Monitoring	6/20/25	7/1/25	11			
3.3	Debugging	4/30/25	7/1/25	62			
4	**TESTING**						
4.1	API Testing	5/20/25	5/31/25	11			
4.2	Quality Testing	7/1/25	7/10/25	9			
5	**LAUNCH**						
4.1	Sample Project launch						
4.2	Final Project launch						
6	**EVALUATION**						
6.1	Sir. Jay-al Evaluation	5/31/25	6/8/25	8			
6.2	Final Defense	10/10/25		1			
7	**Updates/Modification**						
7.1	Migrate Sql to MySql	8/1/25	10/10/25	70			
7.2	Change Seeder Information	8/1/25	8/31/25	30			

VBS NUMBER	TASK TITLE
1	**DESIGN PHASE**
1.1	Project Delegation
1.2	FlowChart
2	**PROCUREMENT**
2.1	Tools to use
2.2	API to use
3	**DEVELOPMENT**
3.1	Backend Coding
3.2	Connecting API
3.2.1	Monitoring
3.3	Debugging
4	**TESTING**
4.1	API Testing
4.2	Quality Testing
5	**LAUNCH**
4.1	Sample Project launch
4.2	Final Project launch
6	**EVALUATION**
6.1	Sir. Jay-al Evaluation
6.2	Final Defense
7	**Updates/Modification**
7.1	Migrate Sql to MySql
7.2	Change Seeder Information



VBS NUMBER	TASK TITLE
1	**DESIGN PHASE**
1.1	Project Delegation
1.2	FlowChart
2	**PROCUREMENT**
2.1	Tools to use
2.2	API to use
3	**DEVELOPMENT**
3.1	Backend Coding
3.2	Connecting API
3.2.1	Monitoring
3.3	Debugging
4	**TESTING**
4.1	API Testing
4.2	Quality Testing
5	**LAUNCH**
4.1	Sample Project launch
4.2	Final Project launch
6	**EVALUATION**
6.1	Sir. Jay-al Evaluation
6.2	Final Defense
7	**Updates/Modification**
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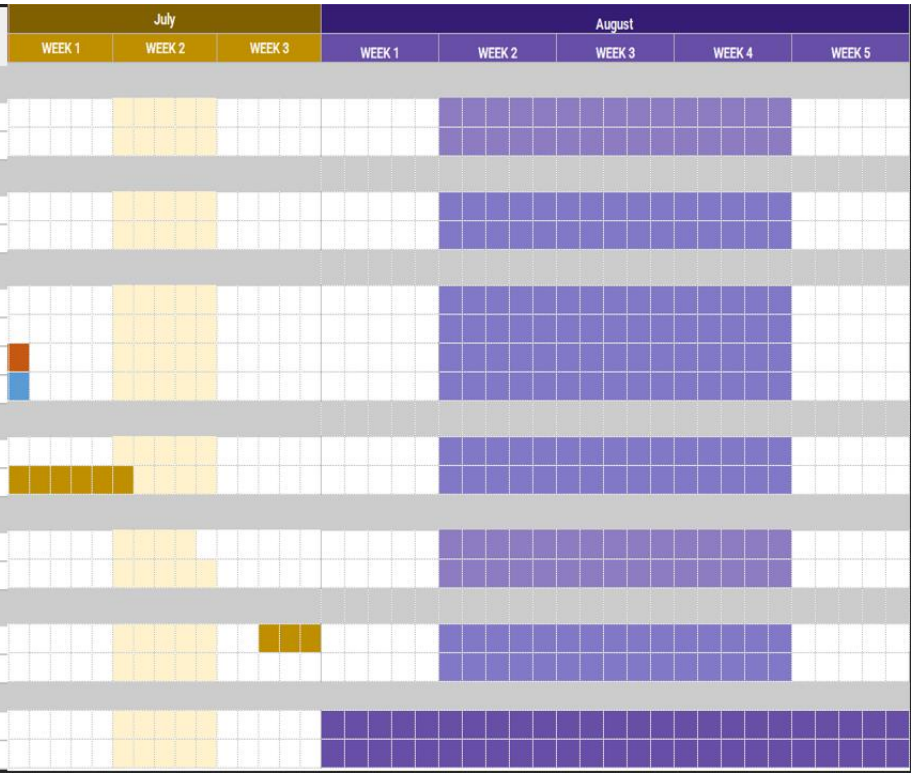
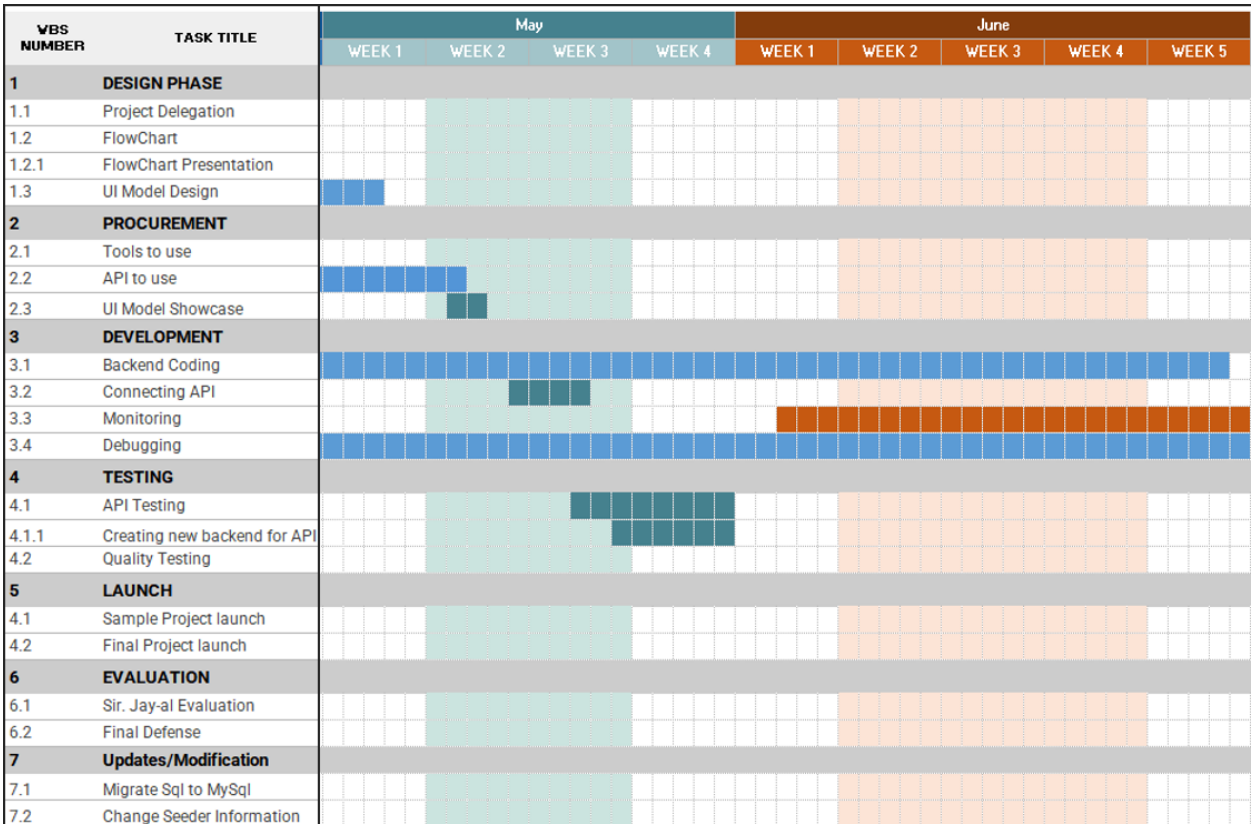


WBS NUMBER	TASK TITLE	September				October		
		WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 1	WEEK 2	WEEK 5
1	**DESIGN PHASE**							
1.1	Project Delegation							
1.2	FlowChart							
2	**PROCUREMENT**							
2.1	Tools to use							
2.2	API to use							
3	**DEVELOPMENT**							
3.1	Backend Coding							
3.2	Connecting API							
3.2.1	Monitoring							
3.3	Debugging							
4	**TESTING**							
4.1	API Testing							
4.2	Quality Testing							
5	**LAUNCH**							
4.1	Sample Project launch							
4.2	Final Project launch							
6	**EVALUATION**							
6.1	Sir. Jay-al Evaluation							
6.2	Final Defense							
7	**Updates/Modification**							
7.1	Migrate Sql to MySql							
7.2	Change Seeder Information							

Database Desktop

VBS NUMBER	TASK TITLE	START DATE	DATE COMPLETED	DURATION
1	**DESIGN PHASE**			
1.1	Project Delegation	4/12/25	4/14/25	2
1.2	FlowChart	4/14/25	4/18/25	4
1.2.1	FlowChart Presentation	4/21/25	4/21/25	0
1.3	UI Model Design	4/25/25	5/3/25	8
2	**PROCUREMENT**			
2.1	Tools to use	4/16/25	7/20/25	4
2.2	API to use	4/16/25	5/6/25	7
2.3	UI Model Showcase	5/6/25	5/9/25	3
3	**DEVELOPMENT**			
3.1	Backend Coding	4/25/25	6/27/25	63
3.2	Connecting API	5/14/25	5/20/25	6
3.3	Monitoring	6/20/25	7/1/25	11
3.4	Debugging	4/28/25	7/1/25	64
4	**TESTING**			
4.1	API Testing	5/20/25	5/31/25	11
4.1.1	Creating new backend for API	4/14/25	4/22/25	8
4.2	Quality Testing	7/1/25	7/10/25	9
5	**LAUNCH**			
4.1	Sample Project launch			
4.2	Final Project launch			
6	**EVALUATION**			
6.1	Sir. Jay-al Evaluation	5/31/25	6/8/25	8
6.2	Final Defense	10/10/25		1
7	**Updates/Modification**			
7.1	Migrate Sql to MySql	8/1/25	10/10/25	70
7.2	Change Seeder Information	8/1/25	8/31/25	30

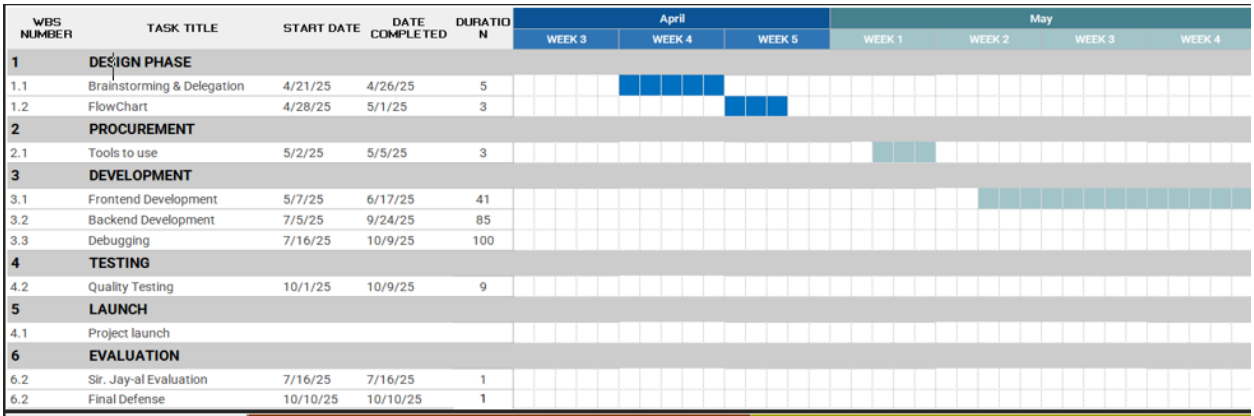


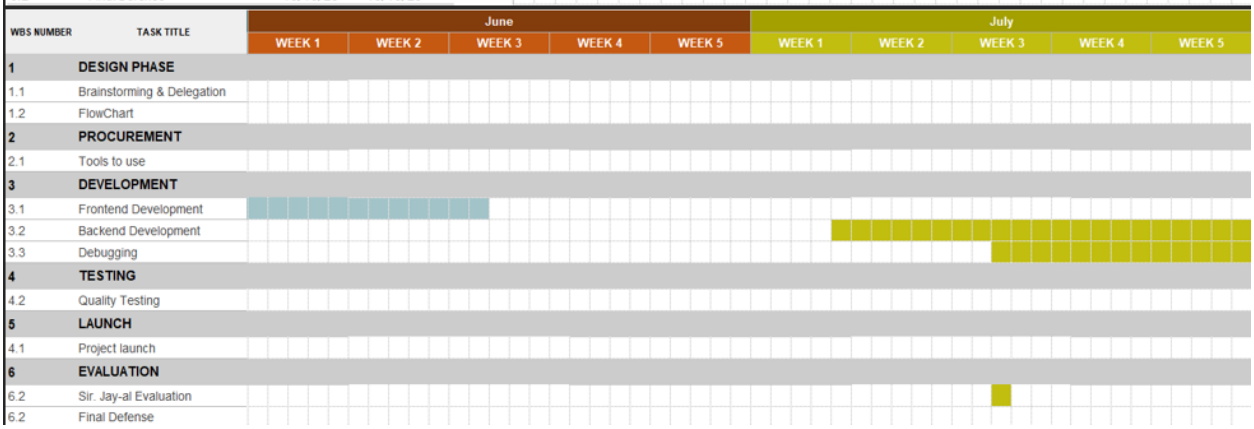
VBS NUMBER	TASK TITLE	July			August				
		WEEK 1	WEEK 2	WEEK 3	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5
1	**DESIGN PHASE**								
1.1	Project Delegation								
1.2	FlowChart								
1.2.1	FlowChart Presentation								
1.3	UI Model Design								
2	**PROCUREMENT**								
2.1	Tools to use								
2.2	API to use								
2.3	UI Model Showcase								
3	**DEVELOPMENT**								
3.1	Backend Coding								
3.2	Connecting API								
3.3	Monitoring								
3.4	Debugging								
4	**TESTING**								
4.1	API Testing								
4.1.1	Creating new backend for API								
4.2	Quality Testing								
5	**LAUNCH**								
4.1	Sample Project launch								
4.2	Final Project launch								
6	**EVALUATION**								
6.1	Sir. Jay-al Evaluation								
6.2	Final Defense								
7	**Updates/Modification**								
7.1	Migrate Sql to MySql								
7.2	Change Seeder Information								

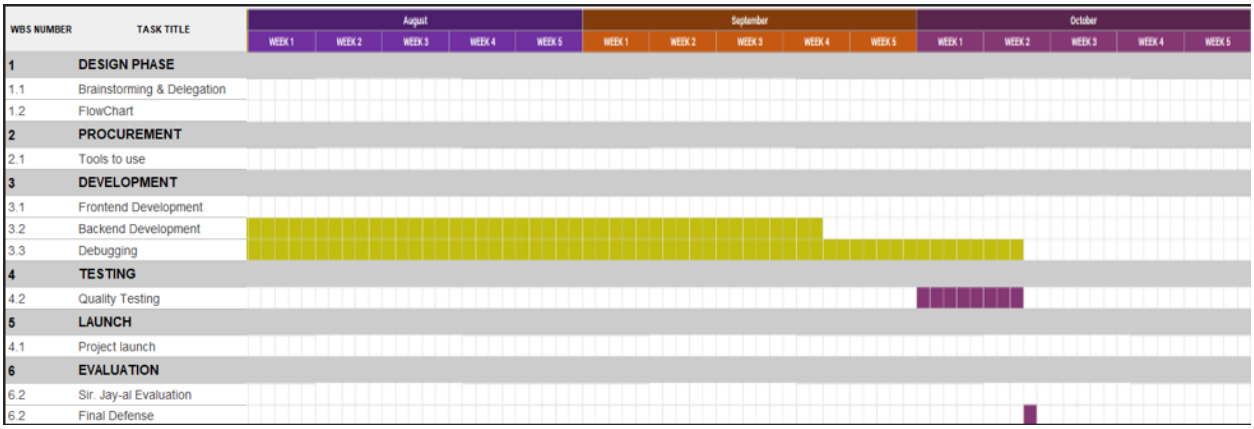
VBS NUMBER	TASK TITLE	September				October		
		WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 1	WEEK 2	WEEK 5
1	**DESIGN PHASE**							
1.1	Project Delegation							
1.2	FlowChart							
1.2.1	FlowChart Presentation							
1.3	UI Model Design							
2	**PROCUREMENT**							
2.1	Tools to use							
2.2	API to use							
2.3	UI Model Showcase							
3	**DEVELOPMENT**							
3.1	Backend Coding							
3.2	Connecting API							
3.3	Monitoring							
3.4	Debugging							
4	**TESTING**							
4.1	API Testing							
4.1.1	Creating new backend for API							
4.2	Quality Testing							
5	**LAUNCH**							
4.1	Sample Project launch							
4.2	Final Project launch							
6	**EVALUATION**							
6.1	Sir. Jay-al Evaluation							
6.2	Final Defense							
7	**Updates/Modification**							
7.1	Migrate Sql to MySql							
7.2	Change Seeder Information							

Mobile App Progression

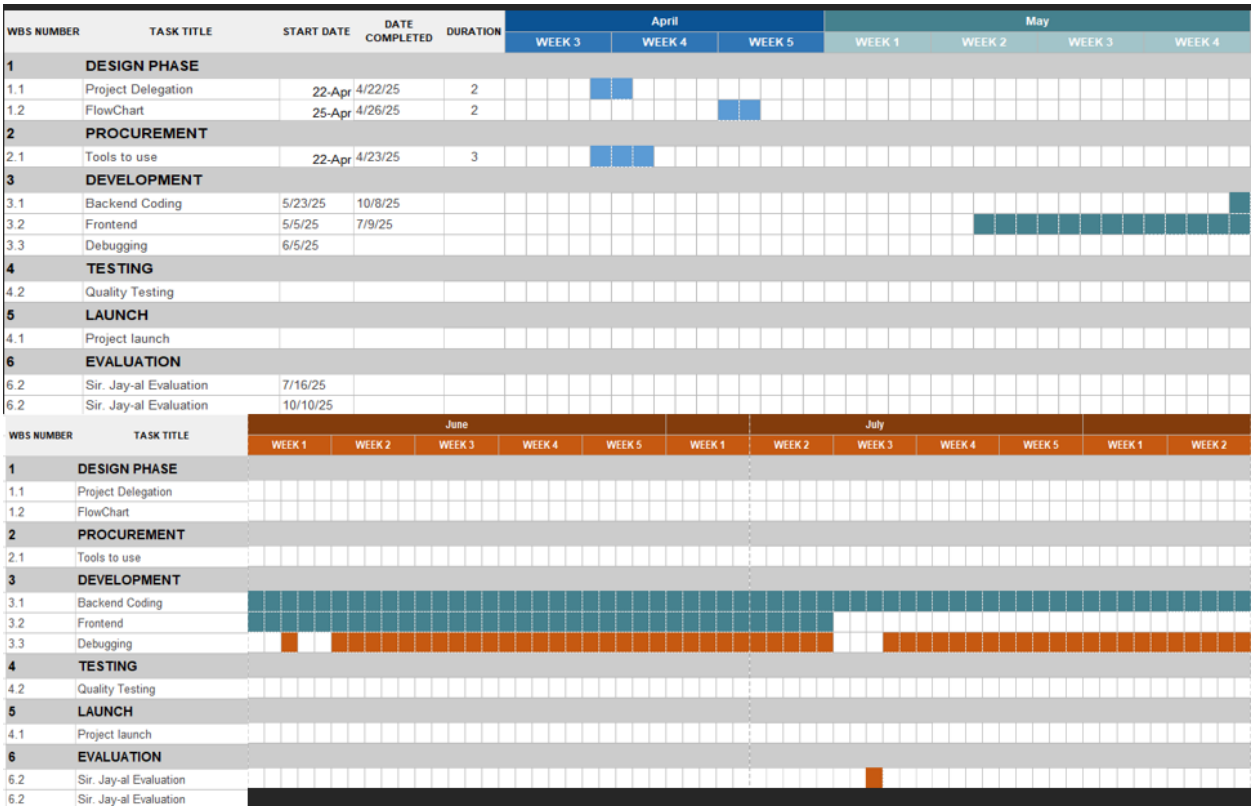
WBS NUMBER	TASK TITLE	START DATE	DATE COMPLETED	DURATION
1	**DESIGN PHASE**			
1.1	Brainstorming & Delegation	4/21/25	4/26/25	5
1.2	FlowChart	4/28/25	5/1/25	3
2	**PROCUREMENT**			
2.1	Tools to use	5/2/25	5/5/25	3
3	**DEVELOPMENT**			
3.1	Frontend Development	5/7/25	6/17/25	41
3.2	Backend Development	7/5/25	9/24/25	85
3.3	Debugging	7/16/25	10/9/25	100
4	**TESTING**			
4.2	Quality Testing	10/1/25	10/9/25	9
5	**LAUNCH**			
4.1	Project launch			
6	**EVALUATION**			
6.2	Sir. Jay-al Evaluation	7/16/25	7/16/25	1
6.2	Final Defense	10/10/25	10/10/25	1







Desktop Admin Progression



WBS NUMBER	TASK TITLE	START DATE	DATE COMPLETED	DURATION
1	DESIGN PHASE			
1.1	Project Delegation	22-Apr	4/22/25	2
1.2	FlowChart	25-Apr	4/26/25	2
2	PROCUREMENT			
2.1	Tools to use	22-Apr	4/23/25	3
3	DEVELOPMENT			
3.1	Backend Coding	5/23/25	10/8/25	
3.2	Frontend	5/5/25	7/9/25	
3.3	Debugging	6/5/25		
4	TESTING			
4.2	Quality Testing			
5	LAUNCH			
4.1	Project launch			
6	EVALUATION			
6.2	Sir. Jay-al Evaluation	7/16/25		
6.2	Sir. Jay-al Evaluation	10/10/25		

WBS NUMBER	TASK TITLE
1	DESIGN PHASE
1.1	Project Delegation
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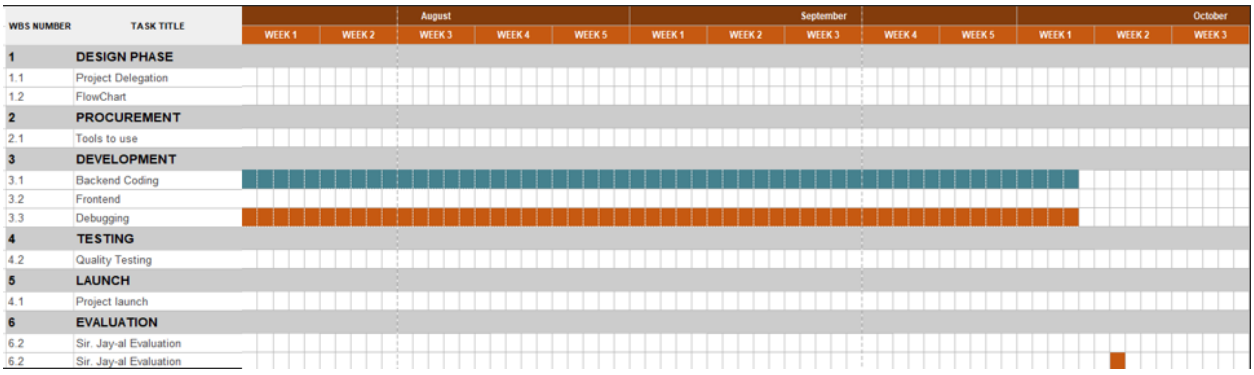

WBS NUMBER	TASK TITLE
1	DESIGN PHASE
1.1	Project Delegation
1.2	FlowChart
2	PROCUREMENT
2.1	Tools to use
3	DEVELOPMENT
3.1	Backend Coding
3.2	Frontend
3.3	Debugging
4	TESTING
4.2	Quality Testing
5	LAUNCH
4.1	Project launch
6	EVALUATION
6.2	Sir. Jay-al Evaluation
6.2	Sir. Jay-al Evaluation

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