

Imam Abdulrahman Bin Faisal University College of Computer Science & Information Technology Department of Computer Science

> CS 411 – Software Engineering Term 1 – 2024/2025

# Software Project Management Plans

# For

# **Automated Attendance System**

Version 1.0

CS 2024, G1

Dr. Nehad Mohammed Ibrahim

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This Software Project Management Plans (SPMP) was prepared and provided as a deliverable for Software Engineering, CS 411, 1st term, and it will be used by Imam Abdulrahman University.

This document is based in part on the IEEE Recommended Practice for SPMP Descriptions.

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# **Revision History**

Name	Date	Reason For Changes	Version
Hassan Alzourei	Oct. 08, 2024	Prepared initial version	0.1
All members	Oct. 09, 2024	Updated section 3	0.2
Ali Albaqqal	Oct. 10, 2024	Complete review - Final version	1.0

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# 1. Project Overview

This section of the SPMP document provides an overview of the purpose, scope and objectives of Automated Attendance System for which the plan has been written. In addition to the assumptions of the project's progress and constraints on the software, a list of project deliverables, a summary of the project schedule and a budget for Automated Attendance System.

## 1.1 Purpose, Scope, and Objectives

#### • Purpose:

The Automated Attendance System uses Face ID and geolocation technology to automate and streamline the attendance process. The system will improve university attendance tracking's precision, security, and effectiveness. It will allow for easy verification of student presence within lecture halls and will sync with the university's website for real-time attendance management.

#### • Scope:

The scope of the project includes developing a widget for the existing university mobile application, integrating Face ID and location-based services for attendance tracking. Real-time attendance data will be recorded by the system and uploaded to the university's website.

#### Objectives:

- 1. Automate attendance tracking via Face ID and geolocation.
- 2. Ensure real-time synchronization with the university's attendance system.
- 3. Use biometric authentication to increase security.
- 4. Give all parties involved an easy-to-use and effective user interface.

#### Deliverables:

- o A widget integrated into the university's mobile application.
- o Face ID and geolocation-based authentication systems.
- o A real-time synchronization mechanism with the university's attendance system.
- o User access levels for administrators, students, and instructors.

#### • Project Integration:

This project will work in conjunction with existing university systems and the mobile application. It will integrate via APIs to communicate with the university's database and schedule management system.

# 1.2 Assumptions, Constraints and Risks

Assumptions	• The software will be divided into main tasks. And it will be assigned to whoever qualifies for the job. Therefore, the project will be submitted without any delay or error with the supervision of our project leader. Each member will work 8 hours per week.
Constraints	<ul> <li>The project must be completed within the given academic term.</li> <li>Budget constraints may limit the scope of the hardware and software used.</li> <li>The system must comply with university security and privacy standards.</li> <li>Some conflict with working hours on the project because of other projects and midterms, and quizzes,</li> </ul>
Risks	<ul> <li>Schedule: Delays in obtaining API access from the university may impact timelines.</li> <li>Technology: Compatibility issues with students' devices or unreliable geolocation accuracy within buildings.</li> <li>Resources: Limited development resources may affect the speed of implementation.</li> <li>External Interfaces: Reliance on third-party facial recognition software and university systems could introduce risks of integration issues.</li> </ul>

Table 1: Table of assumptions, constraints, and risk

# 1.3 Project Deliverables

Deliverable	Date	Quantity	Delivery To	Delivery Media	Delivery location		
Project definition	(25 Aug. – 29 Aug.)						
Submit Project proposal	(8 Sep. – 12 Sep.)		Dr. Nehad Mohammed Ibrahim		Soft copy	75	
Submit Software Project Management Plans [SPMP]	(06 Oct. – 10 Oct.)						
Submit a status report	(13 Oct. – 17 Oct.)						
Submit Project Requirements [SRS]	(27 Oct. – 31 Oct.)	1		Mohamm oft copy		oft copy	Blackboard
Submit Project Design [SDS]	(03 Nov. – 07 Nov.)			$\infty$		B]	
Submit Project Test Plan [STS]	(24 Nov. – 28 Nov.)	Dr. Neb		Dr. Nek			
Delivery of the Project	(08 Dec. – 12 Dec.)						
Project Presentation	(15 Dec. – 19 Dec.)						

Table 2: Project Deliverables

# 1.4 Schedule and Budget Summary

The system and presentation submission are scheduled for December 2024. The total budget required to develop the Automated Attendance System is **37,000 Saudi Riyals (SAR)**. The budget includes costs for development, integration of Face ID and geolocation services, testing, and deployment. Below is a breakdown of the project phases along with the duration and estimated costs for each phase:

Major Activity	Duration
Defining and Analyzing Requirements	3 weeks
Design Interfaces and Database	3 weeks
Implementation	3 weeks
Testing	3 weeks
Deployment and Submission	1 week

Table 3: Schedule Summary

#### 1.5 Evolution of the Plan

This is the first version of the Software Project Management Plan (SPMP) for the Automated Attendance System. Changes should be approved first by Dr. Nehad Mohammed Ibrahim, after which the updated version should be uploaded to the team.

#### 1.6 References

- 1. IEEE Standard for Software Project Management Plan. [Online] 1998.IEEE Std 1058-1998.
- 2. Somerville, Ian, "Software Engineering", Addison Wesley (10th edition): 2016, ISBN:10:1-292-09613-6, ISBN-13:978-1-292-09613-1.

# 1.7 Definitions and Acronyms

Automated Attendance System	A system that uses Face ID and geolocation technologies to automate the attendance process at a university.	
Face ID	A biometric authentication technology that uses facial recognition to identify individuals.	
IEEE Standard	A universal standard template used by individuals and organizations of different technical origins to document.	
Geolocation	The use of technology to determine the physical location of a person or device.	
Real-time Synchronization	The capability to automatically update data across systems as changes occur instantaneously.	
Automated Attendance System	A system that uses Face ID and geolocation technologies to automate the attendance process at a university.	
User Access Levels	Different permissions granted to users based on their roles (administrators, students, instructors).	
Biometric	refers to the use of unique physical characteristics of individuals for identification and authentication purposes. In the context of attendance systems, it typically involves technologies that recognize and verify a person's identity base on face ID.	

Table 4: List of Terminologies

Acronym	Meaning
API	Application Programming Interface
SAR	Saudi Riyals
SPMP	Software Project Management Plan
SRS	Software Requirements Specification
SDS	Software Design Specification
STS	Software Test Specification

Table 5: List of Acronyms

#### 1.8 Document Structure

This document follows the IEEE standers, and it consists of six main sections. The first section is the project overview, it provides an overview of the purpose, scope, and objectives of the project, the project assumptions and constraints, a list of project deliverables, a summary of the project schedule and budget, the evolution of the Plan, and any definitions used in this document. The second section is the project organization. It contains external interfaces, internal interfaces, and the role and responsibility of each team member. The third section is the managerial process plan. It has a startup plan, and it includes its estimation, staffing, and project staff training. Also, the third section consists of the work plan, which has a work breakdown structure, schedule allocation, resources allocation, and budget allocation. Also, it has the project tracking plan, which consists of the requirement management, schedule control, quality control, reporting, and the project metrics: even the risk management plan and project closeout plan. The fourth section is the technical process plan. It has the process of modal, methods, tools, techniques, infrastructure, and product acceptance. The fifth section is the supporting process plan which includes the documentation. Finally, the sixth section is additional plans.

# 2. Project Organization

#### 2.1 External Interfaces

Our software program "Automated Attendance Systems" has a leader who is responsible for communication with external parties, such as our project supervisor Dr. Nehad Mohammed Ibrahim as well as our clients. The team leader should be able to effectively communicate between the team and the External entities, being a mediator and ensure that everything is clear between all parties.



Figure 1: Shows the External interfaces

#### 2.2 Internal Structure

The "Automated Attendance Systems" will be worked on, design, and implemented by all team members, who are Ali Albaqqal, Ahmad Alsowayan, Hassan Alibrahim, Hassan Alzourei, Hussain Alghubari, and Feras Alameer. The project is supervised by Dr. nihad mohammed Ibrahim to ensure that the project fits the criteria and that it's running smoothly. Ali Albaqqal is the team leader which follows a hierarchical structure as shows in Figure (2). The leader will be responsible for making sure that everything is going according to plan and deal with multiple issue that face the flow of the project, as well as managing the team and ensures that the deadlines are met with satisfactory results. Hence, the leader has distributed the tasks for each member after a meeting with the team according to their skillset and availability. Team member will use e-mails and zoom meetings to discuss and update team members about their tasks in the project.

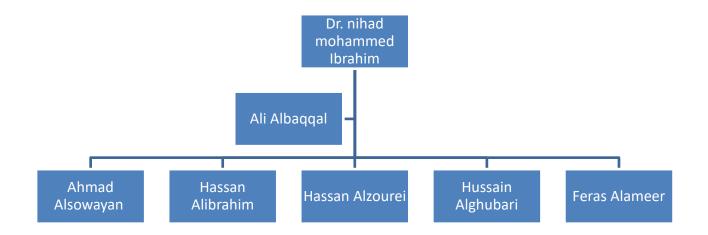


Figure 2: Shows the Internal Structure

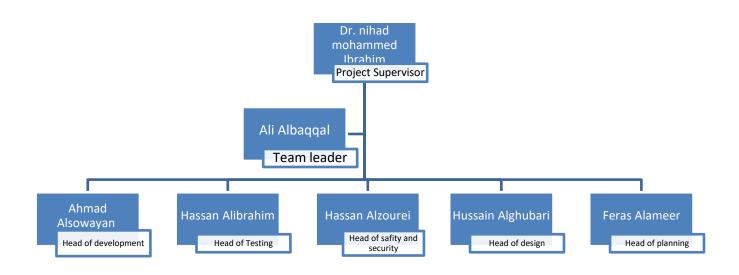


Figure 3: Shows Project Organizational Structure

# 2.3 Roles and Responsibilities

The project work was divided evenly which made every team member get the part that they're best at in order to achieve the best results.



Figure 4: Roles and responsibilities

# 3. Managerial Process Plans

This section of the Project Management Plan specifies the project management processes for the project. This section defines the plans for project start-up, risk management, project work, project tracking and project close-out.

## 3.1 Start-up Plan

#### 3.1.1 Estimates

Our initial estimates were based on conducting a preliminary analysis on the hardware and software costs needed to achieve the planned objectives, with the overall estimate reaching **37,000 SAR**.

With hardware being the most expensive aspect of the project, several hardware products and retailers were considered for use, ranging from attendance clients to several different biometric scanners that vary in methodology. Ultimately, a reasonable budget was attained with the decision to rely on established university servers instead of creating dedicated solutions. That brings the overall estimation to **29,000 SR**, taking 78% out of the product budget estimation.

With the decision to create the product as an extension of the university's application (myIAU), some resources need to be allocated towards familiarizing the dev team with the inner-workings of the application, ranging from learning the language used, to API-calls and databases. This, along with unit testing and general project management should consume the rest of the project's estimated budget, which is **8,000 SR**.

The above-mentioned calculations were based on solution-research and wage distribution amongst project members. As the project's vision comes further into fruition, more estimation methods that weren't viable for use will be considered to avoid any complications that the project may encounter.

## **3.1.2 Staffing**

The project's staff members consist of five junior computer science undergraduate students with various skills and experiences that should help create a dependable product such as general management, app-development, database design, communication & networking, and more.

Role	Tasks
Project manager (1)	<ul> <li>Project Management</li> <li>Team Coordination</li> <li>Communicate with University</li> <li>Time Management</li> </ul>
Developers (2)	<ul> <li>Research Hardware Requirements</li> <li>Understand API &amp; Database</li> <li>Integrate Drivers</li> <li>Engineer Software Solution</li> </ul>
UI/UX Designer (1)	<ul><li> Graphical Interface Design</li><li> Proper Communication with Developers</li></ul>
Tester (1)	<ul><li> Testing Prototypes</li><li> Providing Feedback</li><li> Solution Comparison</li></ul>

Figure 5: Listed Staff Roles and Responsibilities

#### 3.1.3 Project Staff Training

Staff training proves to be crucial for the project's success, as all personnel are undergraduate students. Developers will be trained using different sources and methods to familiarize themselves with the language used to create the myIAU app, as well as the API the application uses to communicate with the servers, and the database that stores the attendance information in said servers. The Designer will undertake several courses in graphical design that will enhance their ability to study and add upon the already existing university application. Finally, the project manager and tester will attend consultations to fortify their experiences in their respective fields.

#### 3.2 Work Plan

#### 3.2.1 Work Breakdown Structure

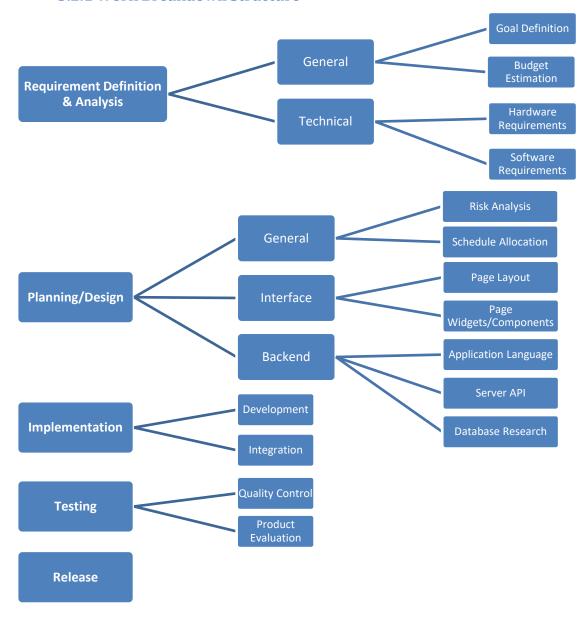


Figure 6: Work Breakdown Structure

	Resource	Duration	Deliverables	Acceptance Criteria
Requirement Analysis & Design	User	3 Weeks	Document	Meets User Needs
Planning/Design	Requirement Document	3 Weeks	Document	Object/Design Defined
Implementation	Planning/Design Document	3 Weeks	Program	Working Program
Testing	Implementation Product	3 Weeks	Document	No Major Bugs
Release	-	1 Week	Presentation	-

Table 6: Work Breakdown Structure

## 3.2.2 Schedule Allocation

		Week												
		3	4	5	6	7	8	9	10	11	12	13	14	15
Deliverable	Project Definition	<b>,</b>												
	Project Proposal	<b>\</b>	7											
	SPMP		7	<b>√</b>	<b>√</b>									
	SRS				<b>√</b>	7	7							
	Status Report						<b>\</b>	<b>√</b>						
	SDS							<b>√</b>	<b>√</b>	<b>√</b>				
	STS									<b>√</b>	<b>\</b>	<b>-</b>	√	
	Presentation												<b>√</b>	1

Table 7: Schedule Allocation

# 3.2.3 Resource Allocation

Task	<b>Human Resources</b>	Non-Human Resources	
Requirement Definition & Analysis	All Staff	<ul><li>Computers</li><li>Conference Software</li><li>Internet</li><li>Documentation Program</li></ul>	
Planning/Design	All Staff	<ul> <li>Computers</li> <li>Conference Software</li> <li>Internet</li> <li>Documentation Program</li> <li>IEEE Specification</li> </ul>	
Implementation	<ul><li> Project Manager</li><li> Developers</li><li> UI/UX Designer</li></ul>	<ul><li> IDE Software</li><li> Computers</li><li> Conference Software</li><li> Internet</li></ul>	
Testing	<ul><li> Project Manager</li><li> Tester</li><li> Developers</li></ul>	<ul><li>Documentation Program</li><li>Computer</li><li>Internet</li><li>Conference Software</li></ul>	
Release	All Staff	None	

Table 8: Resource Allocation

## 3.2.4 Budget Allocation

The project budget totals 37,000 SAR, with 78% allocated to hardware costs, which amounts to 29,000 SAR. The remaining budget is distributed as follows: 3,500 SAR for Requirement Definition & Analysis, 3,500 SAR for Planning/Design, 2,500 SAR for Implementation, and 1,000 SAR for Testing. Deployment and Submission incur no additional costs. This allocation ensures that most of the budget is focused on hardware while still adequately funding the essential phases of the project.

# 3.3 Project Tracking Plan

#### 3.3.1 Requirements Management

controlling the changing system's requirements is important to the project's success. We will be regularly checking all requirements through the development of our system. User's requests or any other modifications will be checked by all team members to decide how they will affect the project's budget, timeline, and quality.

#### 3.3.2 Schedule Control

Weekly meetings will be held to track progress, set deadlines for each task, and regularly review and adjust the project schedule. By early recognizing any missed deadlines or challenges, the team will be able to adjust and modify these problems as needed to make sure that the project is still on track.

#### 3.3.3 Quality Control

One of the main priorities is maintaining quality. We will keep testing the system through the whole operation to make sure it's working properly. This will include performance tests on the authentication function to ensure there will be no problems, as well as assessing the accuracy of GPS tracking and facial recognition.

**User Interface:** This design is clear with instructions, and easy to use for both teachers and students.

**Functionality Management:** The instructors will have the ability to add, remove, and track attendance records and user accounts in case of a malfunction.

**Accessibility Assurance:** The program will be routinely updated to remove any difficulties and make sure instructors and students can access the system freely.

#### 3.3.4 Reporting

Every team member will receive updates on the latest progress. We'll use communication platforms like discord, WhatsApp or face to face to plan meetings and ensure everyone is up to date. The team will get routine reports that include information about the current situation, work completed, and any challenges faced. This reporting system will help to keep all the team members informed.

## 3.3.5 Project Metrics

Four primary criteria will be used to assess the project's success: cost, time, productivity, and quality. Using these metrics, we will keep informed on our general progress and identify threats early.

Metrics	Comments
Quality	Fixing any problems found during testing and making sure the final system meets user requirements while functioning as expected.
Productivity	In order to measure the team's efficiency, we are required to measure each individual performance.
Cost	We are going to keep monitoring the project to make sure it stays within the budget. By regularly reviewing our budget, we'll make sure we don't go over it.
Time	The data collected on the time taken on each task will assess if we are finishing our project on time.

Table 9: Metrics for project performance

# 3.4 Risk Management Plan

The success of risk management is necessary to the project's overall result considering budget, time and quality. The following table lists potential risks along with prevention approaches:

Risk	Probability	Impact	Prevention		
Facial recognition inaccuracy	Moderate	High	Testing in various environments to ensure consistency.		
Imprecise GPS location data		Moderate	Optimize the system and, if achievable, enhance the GPS sensitivity.		
Missed deadlines Moderat		High	Keep lines of communication open with your teammates and create backup plans.		
Budget overrun	Low	High	Monitor API expenses and do routine budget checks.		

Table 10: Risk Assessment and Prevention Plan

## 3.5 Project Closeout Plan

We will evaluate all stages and each step we've taken at the end of the project to make sure all requirements were met and no further problems in the system. To record lessons learned for upcoming projects, team members comments will be asked for once the system is complete and functioning properly.

Deliverables	Delivery method	Status
Defining Project	Softcopy	Completed
Project Proposal	Softcopy	Completed
Project Management Plan (SPMP)	Softcopy	Completed
Project Requirements (SRS)	Softcopy	Ongoing
Project Status Report	Softcopy	Ongoing
Project Design (SDS)	Softcopy	Ongoing
Project Test Plan (STP)	Softcopy	Ongoing

Table 11: Project closeout deliverables

After the project is finished, we will evaluate both the deliverables and the challenges we encountered while developing the system. The team will be able to improve their methods even more by assisting in the collection of vital data for future projects to come. Each participant will add to the list of strategies that worked well and offer ideas for enhancements when the project's overall effectiveness is discussed at its completion.

#### 4. Technical Process Plans

#### 4.1 Process Model

The model which is the most appropriate for the project is Agile. We chose this process model because Agile model fits with the nature of this project. Requirements are clearly understood before the initiation and are unlikely to change. In addition, there is a schedule which is determined in advance of its duration. The Agile model includes the six principal phases:



Figure 7: Principal phases of Agile method

#### 1. Requirements Gathering

Define project requirements and identify business opportunities.

#### 2. Design the Requirements

Collaborate with stakeholders to define detailed requirements.

#### 3. Construction/Iteration

Begin building the project based on defined requirements.

#### 4. Testing

Ensure the product works correctly and meets quality standards.

#### 5. Deployment

Release the product for use in the user's environment.

#### 6. Feedback

Gather user feedback on the product after release.

## 4.2 Methods, Tools, and Techniques

The project will be successfully completed using a variety of methods and tools, considering that some phases will require more tools and methods than others. Some of them lists in:

Phases	Tools	Methods	<b>Technical Standard</b>
Planning	- Microsoft Word - OneDrive Cloud	- Agile	IEEE Std 1058 - 1998
Requirement Analysis	- Microsoft Word	- Activity Diagram	IEEE Std 830-1998
System Design	- Drow.io	- UML - ER Diagram	IEEE Std 1016-1998
- Customized code by Java (NetBeans IDE) My SQL Workbench Database Wix.com's platform independent site development environment.		- Design the interface	-

Table 12: Shows methods, tools and techniques

#### 4.3 Infrastructure

Infrastructure plan					
Hardware Each member should have her own laptop or PC.					
Operating Systems Windows, Linux, or Mac OS are the operating systems the member can u					
<b>Network</b> Members can work on a local area network (LAN), it should be fast and secure.					
Software	Members can use MySQL workbench, Microsoft Word, NetBeans and many other software's.				
Facilities Each member should have their own desks or office space.					
Polices	Members must follow the polices to protect themselves from any viruses that may occur in the system.				

Table 13: The Infrastructure Plan

#### **4.4 Product Acceptance**

The major goal of the Automated Attendance System is to provide an error-free, highly secure, and user-friendly platform. This project adopts an Agile methodology to develop a system that enables students and faculty to register their attendance conveniently from within the university premises. By focusing on user needs and incorporating regular feedback, the system ensures seamless functionality and accuracy, eliminating the challenges of manual attendance tracking.

Each phase of the project will involve collaboration with stakeholders, allowing for iterative improvements and adjustments based on user feedback, ensuring that the final product meets all requirements effectively.

# **5. Supporting Process Plans**

## **5.1 Documentation**

The table below lists all the required documents, along with their submission date, format standard, document preparation, and document reviewing:

Project Phases	<b>Submission Date</b>	Format Preparation	Document Preparation	Document Reviewing		
Project Definition	29 Aug 2024					
Project Proposal	12 Sep 2024					
Project Management Plan (SPMP)	10 Oct 2024	Template provided by the supervisor		Project Supervisor:		
Status Report	17 Oct 2024		All the team members	-		
Project Requirements (SRS)	31 Oct 2024			Dr. Nehad Mohammed		
Project Design (SDS)	7 Nov 2024					
Project Test plan (STS)	28 Nov 2024					

Table 14: List of project documents

## 6. Additional Plans

The additional plans include security and support protocols to guarantee user satisfaction with our automated attendance system.

To begin with, in order to protect user data and the program as a whole, we will put strong security protocols into place. This could entail collaborating with a web application security company to carry out security evaluations, put encryption into place, and guarantee compliance to data protection laws.

In addition, a specialized support team will be formed to address complains and comments from users. Users will have a dependable way to contact this team with questions or concerns because they can reach them by phone or email. We can improve the user experience and make the required adjustments by routinely reviewing the feedback.