
Exam Project

1. Purpose of This Lab

In this lab, you will:

1. Form your project team (**up to 4 students**).
2. Choose a **mobile + robotics integrated application** that you will develop as your final exam/project.
3. Write a detailed **Project Proposal** describing:
 - The purpose of the app and robot system.
 - Target users and use case.
 - Features and screens on the Android app.
 - The robotics component and the communication method.
 - Navigation and UX design.
 - Work distribution and timeline.

This proposal will be graded and will define the expectations for your final project.

2. Team Formation

1. **Team size:**
 - Maximum: **4 students**
 - Minimum: 1 student
2. **Team rules:**
 - Choose **one Team Leader** who will submit all deliverables.
 - All members must contribute to **both Android and robotics aspects**.
 - Each member must be able to explain any part of the project.
3. **Team and idea registration:** <https://forms.gle/rRvsYdg6L7hs3kkU8>

Note: The final application (Android + robotics demo/video) must be submitted before the exam week.

3. Project Topic Guidelines

Your project must integrate:

A. A Mobile Application (Android)

It must satisfy all standard course requirements, including:

- At least 3 main screens.
- Persistent data storage (local DB or remote API/Firebase).
- At least one non-trivial feature such as:
 - Login/authentication
 - CRUD operations
 - Search/filtering
 - Dynamic lists or detail screens
 - Real-time data updates or dashboards

B. A Robotics Component

Your project must include a **robot or robotic system**, using any of the following:

- Physical hardware: Arduino, ESP32, Raspberry Pi, robotic arm, mobile robot, sensors
- A robotics simulator: Webots, Gazebo, V-REP, Tinkercad Circuits, custom Python simulation

The robot must perform **at least one meaningful task**, such as:

- Moving (navigation, patrol, path-following)
- Acting on user commands (servo control, arm manipulation)
- Reading sensors and sending data to the app (temperature, distance, fire/smoke detection, etc.)
- Detecting the environment or reacting to conditions

C. Android ↔ Robotics Communication

Choose **one method**:

- Bluetooth (HC-05/HC-06/ESP32 BLE)
- Wi-Fi (MQTT, HTTP, WebSocket)

- USB OTG
- Cloud messaging

Examples of Acceptable Projects

(Students choose their own idea; these are inspirations only.)

- Patrol robot + Android remote controller
- Greenhouse automation dashboard + Arduino sensors
- Delivery robot controlled and monitored via smartphone
- Robotic arm controlled by Android sliders/buttons
- Fire detection robot sending alerts to an Android app
- Line-following robot with Android monitoring interface
- Elderly assistance robot notifying the Android caregiver app

4. Deliverables for This Lab (Project Proposal)

Your team must submit a **Project Proposal Document** with the following sections.

4.1. Project Overview

Include:

1. **App and Robot System Title**
2. **Short description (3–5 lines)** explaining:
 - What the **Android app** does
 - What the **robot** does
 - The problem the system solves or the value it provides
3. **Target users**
 - Who will use your system and why

4.2. Functional Requirements (What the system can do)

List **6–12 core features**, covering both Android and robotics.

For each feature:

- **FR#: Feature Name**
- **Description:** What the user can do, how the Android app interacts with the robot
- Mark as:
 - **Must-have** (essential for the MVP)
 - **Nice-to-have** (optional)

Note: Include at least:

- 3–5 Android-specific features
- 2–4 robotics-specific features
- 1–2 Android ↔ robot communication features

4.3. Non-Functional Requirements (How the system behaves)

Provide **3–5 requirements**, such as:

- Stable communication (Bluetooth/Wi-Fi)
- Intuitive navigation and clean UI
- Fast loading time for main screens
- Safety considerations for robot operation
- Proper sensor error handling
- App works consistently in portrait orientation

4.4. Screens and Navigation

Describe each main Android screen.

For each screen:

- **Name** (Home, Control Panel, Sensor Dashboard, Robot Status, Login, etc.)
- **Purpose**
- **Main UI components** (buttons, lists, sliders, charts, maps)
- **Actions available to the user**
- **Navigation rules** (how the user moves between screens)

Wireframes are optional but recommended:

- You may draw them by hand or with design tools
- Include them clearly in your document

4.5. Work Distribution and Project Plan

Provide:

1. Timeline / Milestones

Example:

- Week X: Android UI skeleton completed
- Week Y: Robotics prototype assembled
- Week Z: Communication between app and robot implemented
- Week Z+1: Storage/dashboard completed
- Final week: Testing, optimization, and report

2. Responsibilities

For teams up to 4 students:

- Student A: Android UI/UX
- Student B: Android logic + storage
- Student C: Robotics hardware + sensors
- Student D: Communication + integration + testing

If only 1–2 students: distribute tasks into phases.

This ensures the project is realistic and manageable.

5. What Is Graded in This Lab (Proposal Marking Criteria)

Your grade is based on **clarity, structure, feasibility**, and how well your idea aligns with the mobile + robotics integration.

1. Clarity & completeness of the idea – 25%

- Clear explanation of app + robot purpose

- Realistic and relevant user problem

2. Functional requirements – 20%

- Well-defined features
- Balanced Android + robotics scope

3. Screens & navigation – 20%

- Clear screens list
- Logical and consistent navigation

4. Non-functional requirements – 15%

- Awareness of usability, communication stability, performance

5. Work plan & team responsibilities – 10%

- Realistic schedule
- Clear distribution

6. Presentation & organization – 10%

- Clean document format
- Good labeling and structure

6. Submission Instructions

1. One submission per team.
2. Format: **PDF**.
3. File name format:
ProjectProposal_.pdf
4. Submit before the deadline through the official platform.

7. In-Lab Checklist

- Team formed (1–4 students).
- Team registered.
- Android + robotics idea selected.

- Draft created for:
 - Overview
 - Functional requirements
 - Screens list
 - Non-functional requirements
 - Work plan
- Ready to complete the full proposal for submission.