

Prince Sultan University		جامعة الأمير سلطان
College of Engineering		كلية الهندسة
CME Department		قسم هندسة الاتصالات والشبكات

EE 490 Senior Design Project Final Report

[Project Title]

Submitted by:

Student 1 Name (Student ID)

Student 2 Name (Student ID)

Student 3 Name (Student ID)

Supervisor:

Supervisor Name

Department of Communications and Networks Engineering

College of Engineering, Prince Sultan University

Semester 252 – 2025/2026

Instructions:

Use this template as a writing guide. Replace all bracketed placeholders, keep only the subsections relevant to your project, remove the instructional text provided under each subsection after completing your writing, and move extended material such as raw data, meeting minutes, and lengthy calculations to the appendices.

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1. Introduction

1.1 Background and Problem Statement

Briefly explain the project context, the engineering problem being addressed, and why this problem matters.

[Write here]

1.2 Objectives, Scope, User Needs, and Design Criteria

State the main objectives of the project and clearly define what is included within its scope and what is outside it (e.g., simulation, laboratory prototype development, laboratory testing, and/or outdoor testing, as applicable). Then identify the main stakeholder or user needs and translate them into clear functional requirements, performance targets, and measurable design criteria that guided the final design.

[Write here]

1.3 Project Constraints

Describe the key realistic constraints that influenced the design and implementation. Constraints differ from design specifications; they are practical limitations that affect design decisions and trade-offs, such as cost, size, available materials, applicable standards, and project time.

[Write here]

2. Literature Review

Summarize the most relevant previous work, comparable systems, published methods, or related technologies connected to the project topic. Highlight the key findings from the literature, identify limitations or gaps in existing approaches, and explain briefly how the present project differs from or improves upon them.

[Write here]

3. Engineering Design and Methodology

3.1 Engineering Principles

Present the main technical concepts, theories, and engineering principles that form the foundation of the project. These should be project-specific principles relevant to the selected solution (e.g., for a radar-based drone-detection system: radar target detection principles, range and Doppler estimation, micro-Doppler effects, antenna and propagation principles, clutter effects, and signal-processing concepts used to distinguish drones from other objects, as applicable). Explain how these principles were used to analyze and solve the engineering problem and to support the proposed solution. Include a high-level block diagram of the proposed system, showing the main components or subsystems and their relationships, to illustrate how the engineering problem was formulated into a complete solution.

[Write here]

3.2 Applicable Standards and Codes

List the engineering standards and codes relevant to the project, and explain how they were considered in the design, implementation, or testing. Every report must include the applicable engineering standards, with the name and citation of each standard (e.g., IEEE 1451), a brief description, and how it was used in the project.

[Write here]

3.3 Alternative Concepts and Trade-Off Analysis

Describe the main alternatives considered, the criteria used to compare them, and why the final solution was selected.

[Write here]

3.4 Final Design, System Architecture, and Cost

Present the selected design, the system architecture, the main components or subsystems, and the bill of materials or estimated cost.

[Write here]

3.5 Development, Modeling, and Integration

Explain how the system was developed, modeled, programmed, fabricated, assembled, or integrated.

[Write here]

3.6 Design Factors Considered

Describe the specific design decisions made in consideration of public health, safety, welfare, and global, cultural, social, environmental, and economic factors. For each factor, explain its relevance to the project, how it was considered in the design, and how it influenced requirements, constraints, trade-offs, or the final solution. Each factor must be addressed; if a factor had limited relevance or did not affect the design, briefly explain why.

[Write here]

3.7 Ethics and Professional Responsibility

Discuss the ethical and professional responsibilities relevant to the project. Identify any ethical issues, stakeholder concerns, risks, consequences, duties, or limitations associated with the proposed solution (e.g., privacy, cybersecurity, reliability, fairness, safe use, or honest communication of system limitations), and explain how informed engineering judgments were made in addressing them or in defining how they should be responsibly managed in practice. Also explain how those judgments considered the impact of the solution in global, economic, environmental, and societal contexts (e.g., accessibility, affordability, energy use, environmental impact, social acceptance, or quality of life).

[Write here]

4. Testing, Evaluation, Results, and Discussion

4.1 Validation Plan and Evaluation Setup

Describe the testing, simulation, or experimental setup and the procedure used to evaluate the design.

[Write here]

4.2 Results, Data Analysis, and Discussion

Present the main results, analyze the data, interpret the findings, and compare performance with the design requirements.

[Write here]

4.3 Limitations and Engineering Judgment

Identify important limitations or performance gaps observed during testing or evaluation, explain their likely causes and implications, and state the engineering conclusions drawn from the results.

[Write here]

5. Conclusion and Reflection

5.1 Conclusion and Major Achievements

Summarize the final outcome of the project and highlight the most important achievements.

[Write here]

5.2 Lessons Learned and New Knowledge Acquired

Reflect on the main technical lessons learned, problem-solving experience, and the new knowledge, tools, methods, or skills gained through the project, and explain how they contributed to the successful completion of the work.

[Write here]

5.3 Teamwork Experience

Reflect on how the team functioned throughout the project, including roles and responsibilities, collaboration, leadership, task planning, communication, and the main challenges encountered. Also, explain the main lessons learned about teamwork and coordination.

[Write here]

5.4 Future Work

Suggest possible improvements, extensions, or next steps that could further develop the project.

[Write here]

6. References

List all cited sources using the required citation style. Use the IEEE references format throughout the report.

[Write here]

7. Appendices

Appendix A: Project Logbook

Include weekly progress notes, development records, major milestones, and evidence of teamwork and coordination. Screenshots may be included where appropriate.

[Write here]

Appendix B: Detailed Calculations, Drawings, or Schematics

Provide lengthy technical details that support the report but would interrupt the flow if placed in the main body.

[Write here]

Appendix C: Raw Data and Additional Results

Provide raw measurements, simulation outputs, supplementary tables, or additional figures.

[Write here]

Appendix D: Budget and Bill of Materials

Include detailed cost information.

[Write here]

Appendix E: SO2 Mapping

Include a mapping of the project evidence to the Student Outcomes 2.

SO2 Design Aspect	Evidence Section Number	Page number(s)
Problem statement, stakeholder or user needs, and design criteria		
Devising the System / Component / Process/block diagrams		
Applicable standards, codes, or regulations		
Alternative concepts and creativity		
Trade-offs used to select the final concept		
Final design, architecture, and major components		
Development, modeling, integration, iteration, or improvement		

SO2 Design Aspect	Evidence Section Number	Page number(s)
Public health, safety, and welfare factors		
Global, cultural, social, environmental, and economic factors		
Constraints that influenced the design		
Evaluation of the design against requirements		