

PREPARATION GUIDE FOR PROJECT SPECIFICATION DOCUMENT

2026

In a Project Specification Document (PSD), you should clearly and precisely define the engineering problem, main goal, objectives, and scope of the project. The document should describe the proposed methodology and technical approach, relevant professional and realistic design considerations, success criteria and verification methods, as well as the project management and risk management plans. The potential scientific, technological, social, economic, environmental, and other broader impacts of the project should also be discussed where relevant.

You should use the PSD template and follow all formatting requirements specified in the template, including font size, line spacing, citation and reference format, and other document preparation rules. The PSD is limited to 20 pages, excluding the title page, table of contents, and references. Your PSD should include all the sections listed below.

Title Page

This page should include:

- Title of project in capital letters
- Date
- Name and ID of the team members
- Supervisor(s)

Note that title page will be a separate page and the other sections will have section numbers.

Table of Contents

A table of contents should be provided after the title page. It should list all numbered sections and subsections together with their corresponding page numbers.

1. PROBLEM STATEMENT

Provide a concise overview of the project in a few sentences (not more than half page). Clearly state the engineering problem to be addressed, what you propose to do to address it, and the main expected outcome of the project. The purpose of this section is to enable the reader to understand the essence of the project without referring to the subsequent sections.

Keep this section brief. Note that detailed background, motivation, objectives, methodology, and evaluation plans should be presented in the corresponding sections of the document.

2. PROBLEM DESCRIPTION AND MOTIVATION

Provide a detailed description of the problem and the motivation for the project. Present the necessary background and/or context for understanding the nature, significance, and engineering aspects of the problem.

Clearly explain why the problem is important or worthwhile to address. Analyze the characteristics of the problem and briefly justify why it constitutes a complex engineering problem. Where directly relevant, identify the UN Sustainable Development Goal(s) related to the problem and briefly explain why they are relevant to the problem context.

You should provide answers to the following questions:

- What is the motivation for this project?
- Why is the problem important or worthwhile to address?
- What are the main technical and/or contextual challenges associated with the problem?
- Why does the problem constitute a complex engineering problem?
- Where applicable, which **UN Sustainable Development Goal(s)** are relevant to the problem, and why?

3. MAIN GOAL AND OBJECTIVES

Provide the main goal of the project and the objectives required to achieve it. A **goal** is a broad statement describing the overall intended outcome of the project, whereas

objectives specify the concrete and measurable results or actions needed to accomplish that goal.

After defining the main goal, provide a bulleted or numbered list of the project objectives. All objectives should be **clear, specific, measurable, and achievable**. Each objective should be **verifiable at the end of the project through appropriate success criteria and verification methods**, as described in Section 8.

- Objective 1
- Objective 2
-

As an example, assume that the main goal of a project is “to develop a violence detection framework using closed-circuit television (CCTV) cameras.” Some of the objectives required to achieve this goal may be:

Objective 1: To collect a video dataset containing multiple people, including both violent and non-violent events such as fighting and vandalism;

Objective 2: To design and implement algorithms to detect the presence or absence of violence in the monitored video stream;

Objective 3: To design and implement algorithms to recognize the type of detected violence, such as fighting or vandalism;

Objective 4: To implement a mobile application that enables remote monitoring of the camera video and sends an alert or notification when violence is detected.

4. RELATED WORK

You should investigate similar projects and solution approaches presented in the literature. Do not merely summarize the existing work; critically compare the relevant approaches in terms of their main characteristics, strengths, and limitations. Compare your intended work with the existing ones and clearly state the main differences. Explain how the findings from the related work influence or justify your proposed approach. A comparison table summarizing the most relevant related works and their main characteristics, strengths, limitations, and differences from the proposed project is *strongly recommended*. As a conclusion sentence of this section, you may state the novelties (if any) of your project compared to the related work. **The page limit for the Related Work section is 4 pages (maximum), including the comparison table.**

5. SCOPE, CONSTRAINTS AND ASSUMPTIONS

Define the scope of your project precisely and completely. Clearly identify the system boundaries and explain which parts, functions, or components are within the scope of the project and which are outside its scope. Where applicable, specify the main inputs, outputs, interfaces, and external systems or components that interact with the proposed system.

If your project is based on or makes use of another project or existing work (e.g., a previous student project, an open-source project, or a completed or ongoing project of your supervisor), clearly describe the relationship between them. Distinguish the existing or reused components from the work to be designed and implemented within your project, and specify the required inputs, outputs, or interfaces between them.

Clearly identify the constraints of the project. Constraints are known factors that impose boundaries or limitations on the project or its solution. These may include resource limitations, hardware and memory constraints, software and technology constraints, platform limitations, availability of data, or other known conditions that directly affect the scope or implementation of the project. Broader realistic constraints and design conditions are discussed separately in Section 7.2.

Additionally, discuss the assumptions made during project planning. Assumptions are conditions that are considered to be true for planning purposes but have not yet been verified and therefore may later prove to be false. For example, you may assume that currently unavailable data will become accessible, that the number of simultaneous users will not exceed a certain level, or that an existing network infrastructure will provide sufficient bandwidth. Try to verify or eliminate as many assumptions as possible during the project.

6. METHODOLOGY AND TECHNICAL APPROACH

Describe the technical approach that you plan to use to solve the problem. The proposed solution should be explained clearly and at an appropriate level of technical detail. Where applicable, use block diagrams, flowcharts, system architecture diagrams, or similar representations to illustrate the overall approach. Your document should include the following 5 subsections.

6.1 Proposed Approach and System Architecture

Describe the overall solution approach and the main components of the proposed system. Explain how these components interact with each other and how the proposed architecture addresses the engineering problem defined in the previous sections.

Where appropriate, illustrate the proposed solution using block diagrams, flowcharts, system architecture diagrams, data-flow diagrams, or other suitable technical representations.

6.2 Engineering Principles, Methods and Techniques

Explain the relevant mathematical, scientific, computational, and/or engineering principles underlying the proposed approach. Describe the theories, algorithms, methods, models, and techniques that you plan to use in the project.

Explain why the selected methods and techniques are suitable for solving the problem and how they contribute to achieving the project objectives.

6.3 Alternative Approaches and Design Decisions

Where reasonable alternative solution approaches or important design alternatives exist, briefly describe and compare them. The comparison may consider relevant technical and/or non-technical criteria such as performance, complexity, resource requirements, cost, scalability, reliability, security, or applicability to the project.

Justify the major design decisions and explain why the selected approach is preferred for the project.

6.4 Tools and Technologies

Identify the main engineering and computational tools, software frameworks, libraries, simulation environments, hardware platforms, datasets, development environments, and other technologies that you plan to use in the project.

For the major tools and technologies, explain why they are technically appropriate for the proposed solution, what role they will play in the methodology, and discuss any relevant capabilities and limitations that may affect the design, implementation, or evaluation of the project.

Where alternative tools or technologies are available, briefly justify the selection of the major ones when the choice has a significant effect on the proposed solution.

Any technical limitation or dependency that may pose a significant risk to the project should also be addressed in Section 9.5 (Risk Management).

6.5 Evaluation and Validation Plan

Describe how the proposed solution will be evaluated, tested, or validated. The evaluation plan should be consistent with the project objectives and the success criteria defined in Section 8.

Where applicable, specify the experimental or test setup, data to be collected, test scenarios, evaluation metrics, baseline or comparison methods, and the methods that will be used to analyze and interpret the results.

Not all projects require the same type of evaluation. Depending on the nature of the project, appropriate validation may include performance evaluation, functional testing, correctness analysis, simulation, comparison with existing methods, usability testing, protocol or standard compliance testing, or other suitable approaches.

7. PROFESSIONAL AND REALISTIC DESIGN CONSIDERATIONS

Engineering solutions should be developed in accordance with relevant professional practices, standards, realistic constraints, ethical principles, and legal or regulatory requirements. In this section, discuss the considerations that are relevant to the design and implementation of your project and explain how they influence your engineering decisions. Your document should include the following 5 subsections.

7.1 Engineering Standards and Professional Practices

Identify the engineering standards, technical specifications, protocols, professional codes, or accepted engineering practices that are relevant to your project. Examples may include IEEE, ISO, IEC, IETF, or other domain-specific standards and specifications as well as accepted professional practices such as version control (e.g., Git) and modeling notations (e.g., UML). Explain **how and where** the relevant standards or professional practices will be applied in the project and how they affect the design or implementation of the proposed solution. Do not merely provide a list of standards. If no formal engineering standard is directly applicable to the project, state

this briefly and identify any relevant professional guidelines or accepted engineering practices that will be followed.

7.2 Realistic Constraints and Design Conditions

Identify the realistic constraints and conditions that are relevant to the design of your proposed solution. Depending on the nature of the project, these may include environmental and sustainability considerations, life-cycle issues, energy and resource utilization, reuse of resources, manufacturability or deployability, health and safety, social considerations, policy-related or political considerations, and other project-specific constraints or conditions.

Economic factors that directly impose constraints or trade-offs on the engineering design should also be considered where relevant. The overall economic feasibility of carrying out the project will be discussed separately in Section 9.4.

For each relevant constraint or condition identified, explain how it affects the engineering design, what limitations or trade-offs it introduces, and how it will be addressed in the proposed solution. The discussion should go beyond merely naming the constraint and should demonstrate its actual influence on design decisions.

You should discuss **at least three** realistic constraints or design conditions that are relevant to your project. **In addition, any other constraints or conditions that have a meaningful influence on the engineering design should also be addressed.**

7.3 Ethical and Inclusive Engineering Considerations

Discuss the ethical and professional responsibilities relevant to the project. Depending on the nature of the project, these may include privacy, security, intellectual property, responsible use of data, potential bias or unfair outcomes, transparency, impartiality, non-discrimination, diversity, and inclusiveness.

Explain the potential ethical concerns and describe the design decisions or precautions that will be taken to address them.

7.4 Legal and Regulatory Considerations

Identify any legal, regulatory, licensing, certification, permission, or compliance requirements that may affect the development, testing, deployment, or use of the proposed solution. These may include, where applicable, software and data licenses,

intellectual property rights, privacy and data-protection requirements, medical or financial regulations, safety requirements, or permissions required for testing or deployment. Explain how the relevant legal or regulatory requirements affect the design or implementation of the project. If no specific legal or regulatory requirement is directly applicable, state this briefly.

8. SUCCESS CRITERIA AND VERIFICATION

Define how the successful completion of the project and the achievement of its objectives will be determined. For each objective specified in Section 3, provide one or more clear and measurable success criteria.

For convenience of evaluation, **rewrite each objective from Section 3** so that the objective and its corresponding success criteria can be reviewed together without referring back to the previous sections.

Whenever possible, success criteria should be quantitative and expressed using appropriate metrics and target values. Examples may include accuracy, F1-score, response time, latency, throughput, resource utilization, reliability, energy consumption, or other project-specific measures. If a quantitative criterion is not appropriate, define a clear and verifiable qualitative criterion.

For each success criterion, also specify **how it will be verified**. The verification method may include experiments, functional tests, performance measurements, simulations, comparison with baseline or existing methods, user evaluation, compliance testing, analytical verification, or other appropriate methods.

The success criteria should be consistent with the project objectives defined in Section 3 and the evaluation and validation plan described in Section 6.5.

Present the objectives, success criteria, target values, and verification methods in a table similar to the following:

Table 1. Success criteria and verification methods for the project objectives.

Objective	Success Criterion / Metric	Target	Verification Method
Obj. 1: [Rewrite objective]	[Metric / criterion]	[Target]	[Verification method]
Obj. 2: [Rewrite objective]	[Metric / criterion]	[Target]	[Verification method]
Obj. 3: [Rewrite objective]	[Metric / criterion]	[Target]	[Verification method]
Obj. 4: [Rewrite objective]	[Metric / criterion]	[Target]	[Verification method]

If an objective requires more than one success criterion, use separate rows for the corresponding criteria while keeping the same objective statement.

Example:

Consider the example given in Section 3, where the main goal of the project is to develop a violence detection framework using closed-circuit TV cameras. The project objectives and corresponding success criteria may be specified as follows:

Table 2. Success criteria and verification methods for the objectives of the sample project

Objective	Success Criterion / Metric	Target	Verification Method
Obj. 1: To collect a video dataset containing multiple people, including both violent and non-violent events such as fighting and vandalism.	Number and composition of collected videos	At least 1000 videos , with 50% containing violence and all videos including multiple people.	Dataset inspection and statistical summary of the collected data
Obj. 2: To design and implement algorithms to detect the presence or absence of violence in the monitored video stream.	F1-score for violence detection	At least 0.90 F1-score	Evaluation on an independent test dataset
Obj. 3: To design and implement algorithms to recognize the type of detected violence, such as fighting or vandalism.	F1-score for violence-type classification	At least 0.75 F1-score	Evaluation on an independent test dataset containing both violence categories
Obj. 4: To implement a mobile application that enables remote monitoring of the camera video and sends an alert or notification when violence is detected.	Video-streaming delay	Maximum 2 seconds under the specified network conditions	End-to-end latency measurement
	Notification functionality	A notification should be successfully sent when violence is detected	Functional and integration testing

9. PROJECT MANAGEMENT AND RISK MANAGEMENT

Describe how the project will be planned, organized, monitored, and managed throughout its duration. The management plan should clearly define the major work packages, responsibilities of the team members, project schedule, milestones, required resources, and major project risks. Your document should include the following 5 subsections.

9.1 Work Plan and Work Packages

Divide the project into clearly defined work packages or major tasks. For each work package, briefly describe its purpose, major activities, expected outputs or deliverables, and estimated duration.

Where applicable, indicate the dependencies among work packages and identify activities that must be completed before subsequent tasks can begin.

The work plan should be consistent with the project objectives, methodology, and evaluation activities described in the previous sections.

9.2 Roles and Responsibilities

Clearly specify the responsibilities and duties of each team member. The distribution of work should reflect **meaningful and identifiable individual contributions** to the project.

For each work package or major task, identify the team member primarily responsible and, where applicable, other contributing members. Responsibilities should be distributed in a balanced manner, while also ensuring effective collaboration among team members. The roles and responsibilities should make it possible to distinguish each team member's individual contribution to the project.

9.3 Project Schedule and Milestones

Provide a detailed project schedule showing the planned timing and duration of the work packages and major activities.

Define clear **milestones** representing significant points of progress in the project and identify the corresponding deliverables or expected outcomes.

Use a **Gantt chart** to present the project schedule. The chart should show the timing of the major tasks, their dependencies where applicable, and the important project milestones.

9.4 Economic Feasibility

Based on the project plan and the technical resources identified in Section 6.4, provide a preliminary assessment of whether the proposed project can be carried out within reasonable economic and resource constraints. Consider the major development and

implementation costs and assess whether the required resources can be provided within the available project conditions. Where relevant, briefly discuss any major cost-related factors that may affect the project plan or the feasibility of completing the proposed solution. A detailed business plan is not required.

9.5 Risk Management

Identify the major risks that may affect the successful completion of the project. Risks may arise from technical difficulties, availability or quality of data, hardware or software dependencies, integration problems, resource limitations, schedule delays, external dependencies, or other project-specific uncertainties.

For each significant risk:

- identify the related work package or project activity,
- estimate its **likelihood** and **potential impact**,
- describe the measures that will be taken to reduce the likelihood or impact of the risk, and
- provide a **contingency plan** to be followed if the risk occurs.

A risk management table such as the following should be provided:

Table 3. Project risks, impact assessment, mitigation measures, and contingency plans.

Risk	Related WP / Activity	Likelihood	Impact	Mitigation Preventive Action /	Contingency Plan
[...]	[...]	Low / Medium / High	Low / Medium / High	[...]	[...]
[...]	[...]	Low / Medium / High	Low / Medium / High	[...]	[...]
[...]	[...]	Low / Medium / High	Low / Medium / High	[...]	[...]
[...]	[...]	Low / Medium / High	Low / Medium / High	[...]	[...]

The risk management plan should be realistic and project-specific. Avoid listing generic risks unless they have a clear potential effect on the project.

10. BENEFITS, IMPACT AND FUTURE DEVELOPMENT OF THE PROJECT

Describe the expected benefits and broader impacts of the project. Identify the main individuals, organizations, sectors, or other stakeholders that may benefit from the proposed solution and explain how they may benefit.

The discussion should consider not only the intended positive impacts but also any significant potential adverse or unintended impacts of the proposed solution. Where an impact category is not relevant to the project, this may be stated briefly with appropriate justification.

10.1 Scientific and Technological Impact

Discuss the potential scientific and/or technological contributions of the project. Explain whether the project may contribute a new method, model, prototype, dataset, software system, experimental result, or other technical outcome.

Where applicable, discuss the potential for scientific publication, technology transfer, further development, or use of the project results in future research or engineering projects.

10.2 Social, Health, Safety, Environmental and Sustainability Impact

Discuss the potential impact of the proposed solution on society, health and safety, the environment, and sustainability, where relevant.

Consider both direct and indirect effects of the solution, including possible benefits as well as adverse or unintended consequences. Where applicable, discuss issues such as energy and resource consumption, environmental footprint, accessibility, quality of life, public safety, or long-term sustainability.

For the UN Sustainable Development Goal(s) identified in Section 2, discuss how the expected outcomes and broader impacts of the proposed solution relate to these goals and may contribute to or hinder progress toward them.

10.3 Economic and Commercial Impact

Discuss the potential economic and commercial impact of the proposed solution after successful completion of the project. This may include, where applicable, potential productivity improvements, cost savings, commercialization opportunities,

development of a product or service, startup potential, import substitution, or contribution to relevant industrial sectors.

This section should focus on the potential economic impact of the project outcome, rather than the economic feasibility of carrying out the project, which is discussed in Section 9.4.

10.4 Legal and Broader Implications

Discuss any important legal consequences that may arise from the deployment or use of the proposed solution. Where relevant, also discuss broader implications for areas such as cybersecurity, public safety, critical infrastructure, national security, or other strategically important areas.

This section should focus on the potential consequences of using the proposed solution, rather than the legal or regulatory requirements that must be followed during its design and implementation, which are discussed in Section 7.4.

10.5 Future Development and Lifelong Learning

Identify the knowledge, methods, tools, or emerging technologies that the team may need to learn independently during the project. Briefly explain how these will be learned and evaluated for their suitability to the project.

Also discuss relevant technological developments or emerging alternatives that may influence the future development, extension, or improvement of the proposed solution.

REFERENCES

Provide a complete list of the references used in preparing the PSD. References may include journal articles, conference papers, books, technical reports, standards, official documentation, and reliable web sources.

Use relevant and credible sources, with appropriate emphasis on recent peer-reviewed literature where applicable. All references listed in this section should be cited in the text, and all sources cited in the text should appear in the reference list.

Follow the citation and reference formatting specified in the PSD template.