Project One Milestone (Team) Worksheets

MILESTONE 0 (TEAM): COVER PAGE

Team ID: Day-##

Please list full names and MacID's of all *present* Team Members

Full Name:	MacID:

Insert your Team Portrait in the dialog box below

MILESTONE 0 – TEAM CHARTER

Team ID: Day-##

Project Leads:

Identify team member details (Name and MacID) in the space below.

Role:	Team Member Name:	MacID
Manager		
Administrator		
Coordinator		
Subject Matter Expert		

MILESTONE 0 – PRELIMINARY GANTT CHART (TEAM MANAGER ONLY)

Team ID: Day-##

Only the **Project Manager** is completing this section!

Full Name of Team Manager:	MacID:

Preliminary Gantt chart

MILESTONE 1 (TEAM) – COVER PAGE

Team Number: Day-##

Please list full names and MacID's of all *present* Team Members

Full Name:	**MacID:**

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MILESTONE 1 (STAGE 1) – INITIAL PROBLEM STATEMENT

Team ID: Day-##

Stage 1: Initial Problem Statement:

What is your first draft of the problem statement? Keep it brief and to the point. One or two sentences should be enough. **For this initial problem statement, you should be focusing on the main function(s) of the wind turbine.**

MILESTONE 1 (STAGE 3) – REFINED OBJECTIVE TREES

Team ID: Day-##

For each engineering scenario, you will be submitting a modified/revised objective tree agreed upon by the group. Each branch of objective trees should have a minimum of 3 layers. This can be hand-drawn or done on a computer.

Engineering Scenario #1

The title of the scenario

Team objective tree diagram for scenario #1

Please insert a copy of the refined and finalized team objective tree for scenario #1.

Team ID: Day-##

Engineering Scenario #2

The title of the scenario

Team objective tree diagram for scenario #2

Please insert a copy of the refined and finalized team objective tree for scenario #2.

Team ID: Day-##

Engineering Scenario #3

The title of the scenario

Team objective tree diagram for scenario #3

Please insert a copy of the refined and finalized team objective tree for scenario #3.

Team ID: Day-##

Engineering Scenario #4

The title of the scenario

Team objective tree diagram for scenario #4

Please insert a copy of the refined and finalized team objective tree for scenario #4.

MILESTONE 2 (TEAM) – COVER PAGE

Team Number: Day-##

Please list full names and MacID's of all *present* Team Members

Full Name:	**MacID:**

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MILESTONE 2 (STAGE 1) – DESIGN REQUIREMENTS FOR A TURBINE BLADE

Team ID: Day-##

Objective Tree of turbine blade for assigned engineering Scenario

→ Please insert a copy of your team objective tree for the design of a turbine blade based on your assigned engineering scenario.

Turbine Blade Problem Statement:

→ Write a complete problem statement for the design of a turbine *blade* based on your assigned engineering scenario.

MILESTONE 2 (STAGE 2) – SELECTION OF TOP OBJECTIVES FOR A TURBINE BLADE

Team ID: Day-##

List the top three objectives of a turbine blade for your assigned engineering scenario

1:

2:

3:

Include a rationale for selecting each of these objectives

→ Write *maximum* 100 words for each objective

Objective 1: Lightweight

Rationale:

Objective 2:

Rationale:

Objective 3:

Rationale:

MILESTONE 2 (STAGE 3) – METRICS

Team ID: Day-##

For your selected top three objectives fill out the table below with associated metrics (including units) for each objective.

Objective 1:	Lightweight
Unit/Metric:	Mass (grams)

Objective 2:	Visually Appealing
Unit/Metric:	

Objective 3:	
Unit/Metric:	

MILESTONE 2 (STAGE 4) – REGULATIONS

Team ID: Day-##

Insert your group discussion below

MILESTONE 3A (TEAM) – COVER PAGE

Team Number: Day-##

Please list full names and MacID's of all *present* Team Members

Full Name:	**MacID:**

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MILESTONE 3A (STAGE 1) – MATERIAL SELECTION: PROBLEM DEFINITION

Team ID: Day-##

1. Copy-and-paste the title of your *assigned* scenario in the space below.

2. MPI selection
   → List one primary objective and one secondary objective in the table below
   → For each objective, list the MPI
   → Write a short justification for your selected objectives

	Objective	MPI-stiffness	MPI-strength	Justification for this objective
Primary	Minimizing mass			
Secondary	Minimizing volume			

MILESTONE 3A (STAGE 3) – MATERIAL SELECTION: MATERIAL ALTERNATIVES AND FINAL SELECTION

Team ID: Day-##

Document results of each team member's materials selection and ranking on the table below.

- All different types of steel (carbon steels, alloy steels, stainless steels) have very similar Young's moduli. **For this stage in Project 1, please group all variations of steels into one family as "steel"**. Please put **steel** in your material ranking list only once and indicate in a bracket which steels made the top ranks.

Consolidation of Individual Material Rankings					
	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5
MPI 1:					
MPI 2:					
MPI 3:					
MPI 4:					

As a team, fill out the table below and narrow down the possible materials for your assigned scenario by choosing the 3 materials which showed up the most across all MPI rankings in the table above.

- For this stage in Project 1, if **"steel"** is one of your three material finalists, please specify which steel your team chose to continue with, based on which showed up the most in your team's consolidated table.
- Remember to save the datasheets of all 3 material finalists

Narrowing Material Candidate List to 3 Finalists	
Material Finalist 1:	
Material Finalist 2:	
Material Finalist 3:	

Team ID: Day-##

As a team, compare material alternatives and make a final selection based on either a simple decision matrix or a weighted decision matrix (up to your team to decide)

→ As a team, consider *at least* 3 additional criteria that are relevant to your assigned scenario and discuss your 3 materials finalists for each criterion

- Feel free to pause at this stage and do some quick research on the materials finalists
- You may refer to the material finalists' datasheets for any relevant information that will enable your discussion.
- To help you come up with your additional criteria, below are some question prompts that you may consider. Please note that you are not limited to these suggestions, and they may or may not be relevant to your assigned scenario

Additional Criteria	**Possible question prompt**
Ease of access to material	Is the material easy to source in the country, are there tariffs due to international trade policy?
Chemical, weather and/or corrosion resistance	Will the material degrade over time (e.g. due to chemical resistance, corrosion resistance, fatigue resistance)?
Ease of maintenance	Consider maintenance if the part got damaged. Based on the material, is it easy to fix or will the entire part need replacement?

→ Remember that:

- Your MPI ranking takes into consideration both material and mechanical properties relevant to the objectives of your assigned scenario.
- Your additional considerations should not include previously evaluated objectives e.g. If minimizing the carbon footprint was either your primary or secondary objective, then it should not be an additional criterion

→ Compare the material alternatives and make a final selection based on either a simple decision matrix or a weighted decision matrix (up to your team to decide)

- *Applies to a weighted decision matrix only:* choose a range for the weighting (e.g., 1 to 5) for each criterion. The higher the number on the weighting, the more important that criterion is.
- Choose a range for the score (e.g., 1 to 5) for each material on each criterion. Give each material a score based on how successfully it meets each criterion. The higher the score, the better the material is for that criterion.
- Add additional rows as needed.
- Add up the total score for each material alternative.

Fill one of the following templates only:

Simple Decision Matrix - Template			
	Material 1:	*Material 2:*	*Material 3:*
Criterion 1			
Criterion 2			
Criterion 3			
…			
TOTAL			

Weighted Decision Matrix - Template							
	Weighting	*Material 1:*		*Material 2:*		*Material 3:*	
		Score	Total	Score	Total	Score	Total
Criterion 1	3	5	15				
Criterion 2	2						
Criterion 3	4						
…							
	TOTAL						

→ State your chosen material and justify your final selection

Justification	
Chosen Material:	
Discuss and justify your final selection in the space below (based on the decision matrix results and any other relevant considerations).	

Summary of Chosen Material's Properties

Material Name	Average value
Young's modulus E (GPa):	
Yield strength σ_y (MPa):	
Tensile strength σ_{UTS} (MPa):	
Density ρ (kg/m^3):	
Embodiment energy H_m (MJ/kg)	
Specific carbon footprint CO_2 (kg/kg)	

SCENARIO SPECIFIC TURBINE BLADE DESIGN (TEAM) – COVER PAGE

Team Number: Day-##

Please list full names and MacID's of all *present* Team Members

Full Name:	**MacID:**

MULTIVIEW TURBINE BLADE SKETCH AND JUSTIFICATION

Team ID: Day-##

1. Sketch of Turbine Blade

Insert a multiview sketch of your team's scenario specific turbine design. Multiview sketch must include front, top, and right-side view.

2. Justification of Turbine Blade

Include an explanation on how your turbine blade design meets your assigned scenario. Be sure to discuss the creative elements behind your design and provide justification for them.

MILESTONE 4 (TEAM) – COVER PAGE

Team Number: Day-##

Please list full names and MacID's of all *present* Team Members

Full Name:	**MacID:**

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MILESTONE 4 (STAGE 2) – REFINE THICKNESS REQUIREMENT

Team ID: Day-##

1. Refine Thickness Requirement to Satisfy Deflection Constraint

Refined turbine blade thickness *t* (mm):	
Insert screen captures of the refined deflection simulation and provide evidence that the deflection satisfies the design constraint. Must show scale that is present on the left side of the screen.	

MILESTONE 4 (STAGE 3) – PEER INTERVIEW

Team ID: Day-##

→ Meet another team with a different scenario

- Discuss differences in your design process
- Compare:
  - Primary/secondary objectives
  - Chosen materials, thickness, etc.
- Discuss the relevance of your scenario-specific turbine blade design to your assigned scenario and any design challenges you have encountered.

1. Peer Interview Notes

Discuss what you have learned from another group.

Note: Please be mindful that you are expected to write a short reflection on what you have learned from the other team in your final deliverable. Do not forget to discuss your scenario specific design as well.