**Capstone Project Component Overview**

Team Contract – **Separate instruction sheet**

Gantt Chart – **Separate instruction sheet**

# Scope Documentation

The scope of a design plan defines the problem you are trying to solve or the project you are trying to accomplish. Someone not involved in the project should be able to read the scope section of the design plan and completely understand you project and the problem at hand. They should understand why you are doing the project, what the project is going to accomplish, what is specifically included and not included in the project, what do you have to take into consideration and the limitations that you face when designing reasonable options.

Scope must include these 7 descriptions that will help define the project:

1. **Product scope description** – What will this project accomplish? The results of why you are doing this project. [*Who*] need(s) *[what]* because of *[why]?*
2. **Justification** – Why do you want to complete this project? (normally necessary or financially justified)
3. **Acceptance criteria** – Set three to five criteria that your design must meet for it to be considered acceptable. These must be included in your final deliverable.
4. **Deliverables** – What is the end deliverable? What will you be turning into the customer? A step by step plan? A schematic? A product?
5. **Project Exclusions** – What are you not including in the project? What will the project not include? This is included to narrow project scopes down so that it is not overwhelming or all encompassing. (Depending on the project this may not be included)
6. **Constraints** - Restrictions that limit what you can achieve, how and when you can achieve it, and how much achieving it can cost. These are limitations that the end deliverables must be designed around.
   1. **Budget constraints** – Do you have any budget constraints? Do you have a set budget that you cannot surpass?
   2. **Time constraints** – Do you need this accomplished by a specific deadline?
   3. **Resource constraints** – Do you need specific people to help you, specific equipment that you must use, or information constraints?

7)  **Assumptions** - Statements about how you will address uncertain information as you conceive, plan, and perform your project. (Depending on the project this may not be included)

8) **Safety Considerations** – What are some safety issues, concerns, or criteria that must be considered or designed around when completing the design process.

# Background/Research Documentation

Using resourcefulness techniques previously learned in this class, use credible resources (internet, subject matter experts, technical manuals, and databases) to learn and document the background Rankine Cycle. In the research document include your research on the Rankine cycle as a whole unit, where it is used and how it works as well as research on all of its components. Include what each component does, how it works, and why it is an important part of the Rankine cycle. Please include referenced pictures with descriptions for the Rankine Cycle as well as its components. What have others previously done in the past when making and these components?

# Initial Design Options Documentation

The initial design options documentation is a detailed description of each individual part of the Rankine Cycle and should act as a blueprint for the building process. A picture should be included for each component. The picture can be computer generated or hand drawn (as long it is neat and professional). It if it hand-drawn, you can either take a high-resolution quality photo of it with your phone to insert it into the word document or you can scan it and email it to yourself from the College’s printers. The components you should have an initial design include:

* Boiler
* Turbine
* Condenser
* Generator
* How the components will be connected

Pictures: These should be highly detailed and someone outside the team should be able to look at it and get a good idea of how to build it.

* Should be drawn to scale with a key.
* Parts should be labeled.
* Should look professional

Component Description: A paragraph or two describing the component should also be included.

* A description of the picture above. What is it showing the reader?
* How it will work?
* Why you went with this design?
* What is it made out of?

# Final Component Design Explanation Documentation

This section will explain your final designs for each component. It will include the following three items for each component of the Rankine Cycle:

1. A drawing of the component that is scaled and shows dimensions and/or labels
2. A picture of the part that you made
3. An explanation of the component, the finalized bill of materials for the component (taken from the database), and how is it different or similar to the initial design.

# Database of Material and Finances

**Database for material and finances for the Rankine Cycle Project:**

**Creating a database will further your understanding of effective project management by demonstrating budget and resource management techniques.**

Short Definition: An organized collection of data

Long Definition: A database is an electronic information storage unit that holds an assortment of data that is organized to be easily accessed, managed, and updated.

Goal: To create a database (in excel) that is organized and documents all parts of the Rankine Cycle you are building. The database should have the Rankine Cycle broken down into each individual component (Boiler, Turbine, Generator, Condenser, Additional Material for Connecting the Components). Each component should have its own tab. There should also be a tab for the overall cost of the Rankine Cycle Project. When creating a database, include the following information in the columns:

Piece/Material/Part, What it will be used for, Size (description), Quantity, Price ($0 if it was donated), Where it was bought (who donated it), When it was Purchased (or donated), Who Purchased it (who contacted the person for the donation). At the bottom of each sheet there will be a total of the money that has been spent on each system component of the Rankine Cycle. Calculations must be used so that this total will automatically update. On the Rankine Cycle Project Tab (overall cost tab), all the total costs for each component will be listed (and calculations used so that it automatically updates as changes are made) as well as the total money spent on the project. At the top right of this page a box will be created that lists the total money left in your account. This will also use calculations to automatically update.

This will create a database of all the material used for the project and where the material was purchased from as well as the financials.

# Working Model Explanation Documentation

This should include the following items for the complete Rankine Cycle:

1. Pictures of the building process (with descriptions)
2. Pictures and an explanation of your final design
3. Paragraph on how your final design is different than your initial component design

# Working Model Initial Testing Begins

Testing should begin before the final graded test day in front of faculty so that improvements can be made and leaks can be fixed.

# Areas of Improvement Documentation

1. Areas of improvement (if you were to do this project again or continue to improve it)
   1. Continuous improvement is always an important outlook to have, because nothing is perfect. It is important to look back and reflect on what went well and ways you can improve for next time to learn from the experiences. What are some improvements that could be made in the design, building materials, team dynamics, purchasing, documentation, etc?

# Project Conclusion Documentation

1. How did your test/project go?
2. Did you meet all the project constraints and design criteria and if so, how did you?
   1. Did you meet the project budget, timeline, scope? How?

# Final Test to Show Working Model

This is the final test where you show faculty members your working Rankine Model. A verbal explanation of what is happening within the Rankine model is encouraged as well as pictures to be included in the report.

# Complete Project Report Due- \_\_\_\_\_\_\_\_\_\_

Individual Learning Reflection – **Separate Instructions**

# Presentation to Industry Professionals Due- \_\_\_\_\_\_\_\_\_\_\_

Team Membership Citizen Feedback – **Separate Instructions**

Team membership citizen feedback will be completed twice throughout the capstone project. It will be completed at a third of the way through and two-thirds of the way through so that students receive feedback during the beginning and the end of the project so that they can identify their strengths and improvement areas.