This project will prepare students to meet the Process Operations Professionalism II Objectives 1, 3, and 4. The purpose of this individual design project is to get students to practice their resourcefulness and project management techniques as well as apply the design process that we will be undertaking for the majority of this course in the capstone project. This will get students familiar with each individual step of the design process including scope, background research, options, final decision, and conclusion (presentation of results and explanation of final design).

Students must think of a design project that they would like to plan and complete on their own. This could be anything that includes planning and designing.

**Scope:**

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:** So now that the problem or project is well defined, research must take place to learn all the background information that will be needed to design your options that will fix your problem or complete your project. Effective resourcefulness techniques must be utilized to use credible resources for the pertinent information needed in this project. The research you complete depends entirely on the design project and what you are trying to accomplish. A good way to learn about your problem is to research what other people have done in the past with similar problems or projects and learn from their mistakes and successes. You may have to research how something works, how it is made, explaining the existing condition or layout, different types of building materials, if there are any standards or codes that you must meet, are there patents on the something similar, what is the best material, component, or algorithm for building xyz, where does it get used, what are the different parts of xyz, etc. You are gathering knowledge and understanding that you can then apply to your design options.

For your individual design project, you must complete background research on what people have done in the past for similar problems or projects and at least two other different questions that will help you learn about and complete your project. You will then research answers and knowledge for these three questions and complete a background document explaining your questions, how answering these questions will help you, and the answers you found using MLA citation format. Effective resourcefulness techniques must be used with credible resources.

**Options and Detailed Designs** – After you have done background research that gives you sufficient information and ideas to fix your problem or complete your project, you can now use that new-found knowledge to design options that meet your project needs. If you are completing a project for a client or a boss, it is nice to complete a few detailed designs, so they have all the information in front of them and they can choose the one that best meets their needs. The design presented, the amount of design options given, and the depth and thoroughness of the designs depend entirely on the type of project you are doing/who you are doing it for. Detailed designs may have written explanations and descriptions, drawings (blueprints, schematics, sketches, etc), material lists, estimated costs associated with material and labor, time estimates, safety, environmental impacts, just to name a few. This gives the reader a detailed and thorough look into different designs that meets the project design purpose, deliverables, the design criteria, and constraints.

For your individual design project, you must complete one detailed design option that will meet the purpose, deliverables, design criteria, and constraints of your project. Please include a written explanation/description of your design, a drawing, material list database with estimated costs, and how you will address any safety issues or concerns associated with it.

**Conclusion:** Normally after detailed design options are completed, the team goes through a decision-making process on which option to recommend and why. Since during this individual design process, only one detailed design is completed, you must then wrap up the design report with a conclusion section that briefly describes how their design meets the design criteria, constraints, safety considerations, expected deliverables, and purpose of the project by providing evidence.

**Presenting the Findings:** Once you have completed your detailed design report that allows you to solve your problem or complete your project, it is essential to be able to communicate this design to others. You may have a wonderful idea, but if you cannot effectively describe your idea, others will not understand.

You will create a five-minute power point presentation that includes the following information:

* The design process that you went through to create your design/idea to fix your problem
* Your full project from start to finish:
  + Your full scoping descriptions that help define your problem i.e. justification, criteria, description, deliverables, assumptions, constraints, safety considerations, etc.
  + Your background research. What you researched, why you researched it, and what you found.
  + Your final design: a detailed explanation, estimated materials list with costs, drawings, etc.
  + Conclusion: how it meets your scope, provide evidence
* Next steps of your project: what will happen next?

Presenters will also be graded on their professional presentations skills.

* Not reading from slides
* No filler words “umm” “like”
* Good eye contact with audience
* Quality slides minimal text and high visuals
* Good use of your hands, not in pockets or fidgeting
* High energy, not monotone
* Loud enough to hear
* Professional vocabulary
* Able to answer questions at the end of the presentation