Interdisciplinary Capstone Design
Engineering Release Review

Assignment Goal

To present a formal summary of your intended design for your project, conveying how the design will meet the product requirements and a plan exists to build and validate the design prior to the EXPO.

Learning Outcomes

As a result of completing this assignment, you should be able to:

- Articulate the objective, value proposition, problem definition, and requirements for the project.
- Professionally present the key attributes of the design that enable it to meet the requirements.
- Summarize the plan to build a representative prototype of the design and validate that it meets the product requirements.

Relevant ABET Learning Outcomes

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

Approach and Rationale

The Engineering Release Review is the most critical milestone in an engineering project. In industry, it represents the point at which a design is "released" to the manufacturing team to begin building the product. As a result, the maturity of the design needs to be extremely high and well documented. Since there are many stakeholders relying on the success of your design, it is important to convey high confidence and review the details for how everything while work correctly.

Task

Working in your capstone design team, you are assigned to organize and perform an orally delivered presentation summarizing your progress and recommended path for success completion.

The suggested approach for **organizing** your presentation is:

1) Construct a set of MS PowerPoint slides to anchor your presentations
2) Structure your slide-show presentation to cover the following topics:
   a. The single objective of your project.
   b. The value proposition for your project (including articulation of the real-world problem you are working to help solve).
   c. The background and customer/product requirements for your project.
   d. A systematic review of the key attributes design to address each product requirement.
      i. For complex systems, it is helpful to start with the "big picture" functionality of the device, then break it down into subsystems and the key features of each.
      ii. Provide evidence of rapid prototyping and virtual testing that gives you increased confidence that the design will work.
   e. Provision of a complete set of Drawings and Bill of Materials for manufacturing the prototype device. (It is recommended to have the drawings reviewed with you Graduate Student Mentor and/or Shop Manager ahead of time)
   f. An overview of the Manufacturing plan for each component/assembly including:
      i. Make vs. Buy analysis

ii. <u>Sourcing</u> of components or raw materials

iii. <u>Location (or process)</u> for manufacturing

iv. <u>Who is responsible</u> for fabricating each component (with approx. timing)?

v. Estimated <u>cost</u> of each components/fabrication and a total <u>cost roll-up</u>.

    g. A summary of the <u>validation</u> approach (DVP) to confirm the project meets requirements.

    h. The overall project <u>schedule</u> and <u>budget</u> and how your plan fits within these constraints.

    i. Identification of potential <u>risks</u> with the project and how you will mitigate them.

3) In additional to slides, consider presenting any of the following to support your presentation:

    a. A <u>physical representation</u> or demonstration of an early rapid prototype

    b. Physical evidence, data, or examples supporting your decisions

The suggested approach for **performing** your presentation is:

1) <u>Choose</u> team members which are competent and well-versed in the project for speaking roles.

    a. It is **not** a requirement for every team member to speak

    b. Choose team members to represent their respective disciplines or expertise for different aspects of the project.

2) <u>Plan</u> to deliver your presentation is **~20-30 minutes**, allowing time for audience questions and discussion. *Note: This time frame typically corresponds to ~20-30 slides.*

3) <u>Speak</u> at a moderate pace and use language which is easily understandable for a wide range of audience members. Be aware of the audience and adjust to their non-verbal feedback throughout.

    a. Talk in a conversational voice and tell the "story" of your project

    b. Avoid the temptation to read your slides to the audience.

4) <u>Ensure</u> that you are speaking synchronously with your slides and other visual aids.

    a. A good strategy is to make your slides highly visual with pictures, graphs, tables, etc. and use your commentary to enhance the message.

    b. Make sure that each slide "stands alone" and provides a simple message or *key takeaway*.

5) <u>Dress</u> and <u>conduct yourself</u> in a professional manner.

<u>Logistical preparation</u>:

A. Scheduling

    a. **At least one week ahead** - verify that customer, instructor, and mentors can attend and have a specific time reserved on their calendars.

    b. **One week ahead** – secure room location and/or make travel arrangements.

    c. **Three days ahead** – have instructor and/or mentors review your slides.

    d. **Three days ahead** – email reminder to all participants.

    e. **One day ahead** – email presentation or website URL to any audience members who will be connected by phone.

    f. <u>Arrive</u> in the room for your presentation at least 10 minutes in advance of your talk.

B. Attendees

    a. Your audience will typically be comprised of:

        i. The project client/sponsor

        ii. Capstone faculty

        iii. Other interested faculty

        iv. Graduate student mentor

        v. Fellow capstone students

        vi. Shop Manager

    b. *Every capstone student should attend at least two separate design reviews.*

Assessment

The Engineering Release Review will be assessed by attendees filling out a scoresheet. Attendees will evaluate and score the presentation for each of the following criteria on a Red-Yellow-Green scale.

ENGINEERING RELEASE REVIEW RUBRIC   **Reviewer Name: _____**

Team Name: _____   **Date: _____**

Competency	Not ready Red	Yellow	Ready to go Green	Readiness (R,Y,G)
Value Proposition	*Missing* – No attempt to describe why the project is important; not relatable for the audience	*Technical only* – Partial articulation of project impact; not relatable for non-technical audience	*Engaging* - Clear articulation of larger project impact; relatable to a non-technical audience	
Product Requirements	*Superficial Formulation* - Some relevant factors identified, few measurable,	*Adequate Formulation* – Most relevant factors considered, some measurable,	*Insightful Formulation* – All relevant factors considered, many measurable	
Preliminary Proof of Concept	*Missing* – No mention of modeling, testing, or prototyping at any scale	*Satisfactory* – High-level data without specified purpose or application	*Complete* – Focused data with relevant interpretations and conclusions	
System Design (including any Models, Drawings, and BOM)	*Missing* – No overall system architecture or knowledge of how subsystems relate to one another; no models or drawings available.	*Basic* – Broad concept of a design with a basic idea of how it satisfies client needs; models, drawings, BOM partially complete	*Thorough* - Proposed solution(s) directly addresses client needs and specifications; models, drawings, and BOM available	
Manufacturing and Validation Plan	*Disorganized* – Vague idea of components to be purchased and how parts fit together; largely unaware how to fabricate needed parts; unclear path for validation	*Developed* - Selection of purchased components in progress; materials identified but may not be optimal; validation plan partially complete	*Well Planned* - Specific vendors and model numbers ready for order; tooling and fixture needs understood; drawings reviewed by shop manager; clear validation plan	
Project Management	*Wistful* – Path to completion unclear; budget uncertain	*Appropriate* - Credible timeline and budget given	*Insightful* - Contingencies considered in managing time and budget	
Risk Management	*Unaware* - No acknowledgement of project risks; relies only on a "home-run" solution	*Considerate* – Acknowledges risks and incorporates potential plans for worst-case scenario	*Mitigated* – Identifies logical risks and clear paths and fallback plans to address each	

Comment and list any readiness deficiencies
(continue on back if necessary):   Overall Readiness: _____