Detailed Design Critique Assignment

Due: In Studio week of 2012-11-26 **Submitter: Team** **Weight: 10%**

Overview

The "detailed design" phase of a design activity starts with the preferred conceptual design and ends with a set of deliverables that refines the conceptual design and provides additional engineering details that can lead to implementation or production of the design. During the detailed design phase the scope of activity is restricted to refining the preferred conceptual design; **issues related to the design brief or to alternative conceptual designs are out of scope.**

In Praxis I the detailed design phase results in a three-part deliverable comprising engineering drawings, a solid model suitable for 3D printing, and a critique-style Question-and-Answer presentation. Teams may optionally include one or more prototypes.

Stakeholders

The Conceptual Design Team (i.e. the authors of the Conceptual Design Report)

- This team asks you to refine their conceptual design into a detailed design. You were not asked to alter key design decisions, select an alternative concept, or revisit the original Design Brief.

The Teaching Team

- This group is available to provide advice on process, suggest reference designs, prompt reference to lecture and studio materials, critique proposed design decisions, suggest research topics, assist with solid modeling and engineering drawings, etc.

The Design Brief Team (i.e. authors of the original Product Design Brief)

- This team is, in effect, the client. They are indirect stakeholders, in that they initiated the project but have had no further direct influence. Once the detailed design has been completed, they will be interested in the chain of deliverables produced in response to their Design Brief.

Your Team

- You want to demonstrate not only that you have understood the conceptual design, but that you can interpret it to make appropriate decisions to model a solution.

High-level Objectives

- Develop a quality detailed design in response to a Conceptual Design Report and low-fidelity prototype(s)
- Generate a variety of engineering-appropriate representations of a detailed design
- Use praxis (i.e. the melding of experience, judgment, and formal models, tools, and techniques) to work effectively and efficiently

Detailed Objectives

- Identify the primary and secondary design decisions embodied in a conceptual design

- Use engineering resources (e.g. handbooks, standards, codes, practicing engineers, engineering researchers, ideation tools, concept selection tools, etc.) to make detailed design decisions in response to conceptual design decisions
- Develop a solid model of a detailed design
- Develop engineering drawings of a detailed design
- Develop design prototypes of varying fidelity and with varying purposes as necessary
- Prepare a Question-and-Answer format Design presentation in which your team shares its detailed design that satisfies the requirements of the given Conceptual design

Constraints

Content

- Must not change any key design decisions embodied in the preferred conceptual design; should not change other embodied design decisions. (metric: comparison against the key design decisions outlined in the Conceptual Design Report)
- Must develop at least three (3) detailed design decisions based on the preferred conceptual design presented in the Conceptual Design Report (metric: count)
- Must present an in-depth discussion of at least (2) detailed design decisions (metric: count)
- Must include one or more engineering drawing(s) of the detailed design (metric: visual inspection)
- Must include one solid model prototype of the detailed design concept, both in the native format of the solid modeling tool used (e.g. SolidWorks, OpenSCAD, Catia, etc.) and in the interchange format suitable for 3D rendering and printing (STL)
  (metrics: presence + a successful render or print of the model(s))
- Must submit Solid model file in .STL format studio to allow for 3D printing submitted through the journals site 72 hours before your studio (metric: submission time, file type)
- Must provide engineering drawing(s) and solid model(s)as separate files submitted through the journals site by 9pm the night of your studio (metric: presence)
- Should not present any alternative conceptual designs (metric: presence)
- A visual display of design decisions made and the detail design that supports the discussion during the critique (metric: presence, utility in conveying information easily)
- Must submit a properly formatted list of sources used, hardcopy during the Critique(metric: presence, credibility of sources, and assessment against the requirements for the chosen referencing system)

Delivery

- Must prepare appropriate resources – visual and verbal – for a 6-8 minute Q&A presentation that demonstrates the detailed design

- May prepare prototype(s) of varying fidelity used to increase understanding of the details of the design (metric: presence)
    - Physical prototype(s) must be brought to studio during the week of 2012-11-26.

Criteria

For all criteria, “more”, “higher”, or “greater” will be preferred.

- The performance of the detailed design relative to the requirements provided by the Conceptual Design Report
- The prioritization and selection of conceptual design decisions to be refined into detailed design decisions
- The appropriate use of investigation and ideation techniques to develop candidate detailed design decisions
- The quality and adherence to standards of the engineering drawing(s) and solid model
- The quality of research that informs the detailed design decisions
- The quality of engineering argument
- The clarity of textual, graphical, and verbal communication
- The usefulness of any physical representations
- The ability to improve the conceptual design within the constraints