2.75 Deliverables Guidance Document

Updated 2 December 2014

Strategy Presentation: (20 min)

Purpose: To clarify the problem, review pertinent prior art, outline your top selected strategies and harness the class’ collective brainpower.

Description: The presentation should include:

- Concise mission statement
- Detail and limited background regarding the problem statement – Avoid restating background already given during the client’s presentation.
- Outline of prior, literature search, etc.
- Outline of Functional Requirements, associated FRDPARRC tables – It’s helpful to differentiate between critical and “nice to have” FRs.
- Three top strategies – These should be broad methods of accomplishing the primary functional requirements, rather than fully fleshed out mechanisms.
- Steps planned, including bench level prototyping and further research, to select a strategy.

Make sure to leave time for comments/questions as audience participation should be a significant part of this presentation. Do not be afraid to focus on the problems and challenges about which you are most uncertain & thus require the most guidance. Be ready to listen to input; avoid bristly defensiveness in the face of negative feedback; instead coopt the criticism.

Hand On Problem Set (HOPS): (Repeated in HOPS Assignment):

Purpose: To familiarize each student with on campus fabrication resources. The (brief) report documents the design, implementation and evaluation of your device.

Description: You will be designing and building a kinematic coupling and simple EKG circuit and writing a short (1 Page) report describing each. The reports should include:

- Brief description of governing principles and how they are used in your design.
- Description of the finished device including appropriate analysis:
  - Kinematic Coupling: Show your Hertz contact spreadsheet or Kinematic coupling design spreadsheet and mention relevant results. See spreadsheet use guide.
  - HR Monitor: Show circuit diagram and relevant analytical expressions.
- Testing and evaluation
- A Photo or part drawing.
- Focus on your success and accomplishment.

Concept Presentation: (20 min)

Purpose: To detail your team’s selected strategy and rational, outline your top selected concepts and the path forward.

Description: The presentation should include:

- Brief recap of the problem, mission statement and functional requirements – Most likely these have been updated and made more precise.
- The selected strategy and rational.
• Three top concepts and associated FRDPARRC tables – These should describe specific methods and mechanisms of executing the selected strategy, though the mechanism need not be fully designed.
• Steps planned, including further research, bench level prototyping and analysis, to select a concept.
• Any outstanding questions risks that the class can help address - As always, allow ample time for questions.
• Current, updated plan of action through final presentation.

**Design Review Presentation:** (20 min)

**Purpose:** To communicate to your classmates and the course staff the detailed design of your final concept and your plan to construct it and to solicit feedback on your progress.

**Description:**
- The selected strategy and rational.
- Breakdown of modules in order of criticality.
- Identification and detailed design of the most critical module - Solid models and appropriate results of analysis are critical to communicate the detailed design.
- Detailed fabrication plan.
- Highlight challenging areas for discussion and be sure to leave time for comments/questions – This is the last opportunity to harness the class’ collective brainpower!

**Final Presentation:**
(Maximum presentation time of 15 min (including setup) followed by ~5 min for Q&A)

There are always many questions, so shorter presentations are better.

**Purpose:** To communicate and demonstrate to your classmates, the course staff and industry visitors the results of your work during the term.

**Description:**
- Introduce the team and client, slide with labeled pictures of team and clinician
- One team member begins with a 1 minute “pitch” covering:
  - What’s the problem to be solved?
  - Clinical significance
  - Overview of your final solution
  - Highlight key technical features
  - This will prime the audience to pay attention to your presentation! (And avoids “Where is this going?” questions.
- Present clinical background & Problem statement
- Briefly review of the pertinent prior art and its limitations
- Summarize the Functional Requirements and technical specifications, i.e. The “DP” part of FRDPARC, e.g. a FR of ability to move a load should map to a DP of a specific torque or power.
- Demonstrate design process from Strategy to Concept – It is not necessary to beleaguer the audience with detail, rather provide justification for the final form of your prototype.
- Detailed Design – Be sure to include a slide detailing your engineering analysis, the “A” part of FRDPARC, otherwise the design you present will not be plausible.
- Fabrication and any particularly interesting difficulties encountered.
- Pertinent testing & refinement.
• How were risks addressed with countermeasures?
• Demonstrate your prototype with pictures, videos and live via document camera - Let the audience know if your prototype does not function for some reason; you must be upfront about the state of a broken prototype rather than leaving it on the counter until someone asks you to demonstrate it. The fragile state of prototypes during demonstrations behooves taking photos/videos of things working as soon as they work!
• Bullet point outline the key IP (if any) created and note the device class I, II, III and possible regulatory path 510K or PMA.
• Evaluate the functional requirements met and not met. This should be an honest assessment ... do not lie! If a target cannot be met, explain why and use it to launch the last slide.
• Future work to move forward to a product?

Shorter is better: *When in doubt, leave it out!*

Allow 5+ minutes for Q&A ... there will be many.

The evaluation form given to the audience during final presentations is shown below:

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**Final Presentation Review Form**

All guests, regardless of background, are kindly requested to help us provide feedback to the teams regarding their projects and presentations.

<table>
<thead>
<tr>
<th>Team Name:</th>
<th>Reviewer Name (Optional):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please rate the following where: 1 = poor; 3 = neutral; 5 = excellent!</td>
<td>Score</td>
</tr>
<tr>
<td>1 Did the elevator pitch pique your interest?</td>
<td></td>
</tr>
<tr>
<td>2 Was the need clearly explained &amp; justified?</td>
<td></td>
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<tr>
<td>3 Were the functional requirements &amp; specifications well defined?</td>
<td></td>
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<tr>
<td>4 Were the design decisions supported by analysis?</td>
<td></td>
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<tr>
<td>5 Was the prototype well executed?</td>
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<tr>
<td>6 Was appropriate testing conducted?</td>
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<tr>
<td>7 Are the results (positive or negative) credible?</td>
<td></td>
</tr>
<tr>
<td>8 Does the design meet the specifications?</td>
<td></td>
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<tr>
<td>9 Did the team elucidate the next development steps?</td>
<td></td>
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<tr>
<td>10 Do you believe that this prototype could be refined into a product?</td>
<td></td>
</tr>
</tbody>
</table>

Total/50

Additional Comments:

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**Final Paper:**

**Purpose:** To clearly and comprehensively document the work your team has completed during the term and to present the results of your work and any relevant supporting information.
**Description:** The final paper is collaboratively authored by all team members. A journal / conference article format is appropriate since many papers will be submitted to ASME / IEEE conferences and journals. IEEE provides nice templates [here](#) and ASME somewhat less nice ones [here](#).

Your clinician / sponsors should be invited to review the paper, contribute to the clinical background and be included as authors. Team mentors making a significant technical contribution should also be included as authors, otherwise please mention them in the acknowledgments.

An outline of sections you might include:

- Abstract
- Introduction
- Clinical Background
- Problem Statement
- Prior Art
- Functional Requirements
- Strategy & Concept
- Detailed Design (especially analysis done which could enable scaling of the device or customizing for other applications)
- Fabrication
- Testing & Refinement
- Conclusion & Future Work
- References
- Acknowledgments

Given the diversity of projects, great latitude is permitted regarding order, headings, and emphasis given to these elements. Do seek inspiration from good papers that your encountered during your prior art search.

**One Pager**

**Purpose:** To rapidly communicate the essential elements of your project on a single page of paper.

**Description:** Include a brief summary of the problem, its significance and your solution and two –three pertinent images / charts / graphs. The goal is not to try to pack all your information in but, rather, to enable someone reasonably informed, but not necessarily an expert, to understand the significance and essential elements of your work and evaluate whether it correlates with their interests. This document should be suitable to send to potential investors and collaborators, but should **not** contain any sensitive information. It must be edited to be read easily.