Project Proposal Guidelines
ME481 Spring 2021

Objectives

• Demonstrate an understanding of the technical design problem, articulated in your own words. Provide an understanding of the “physics” of your problem.

• Describe the overall context of your project. Address factors such as economic (e.g. business case like overall market size/value, key competitors, and current trends), environmental (e.g. sustainability), social and cultural, global, ethical, and safety.

• Summarize relevant technical literature and benchmark/analogous products and/or research (use proper referencing techniques).

• Define your stakeholder and articulate and rank stakeholder objectives.

• Translate stakeholder objectives into an appropriate mission statement and accompanying project objectives and requirements.

• Propose a viable concept of operations (and system architecture if appropriate).

• Provide an initial Work Breakdown Structure (WBS) and project timeline with appropriate milestones.

• Articulate key challenges and/or risks and setbacks you may encounter.

• Introduce yourselves as individuals and demonstrate your plan to function as a well-organized team.

Written Proposal
Throughout the report, do not just make assertions—rather, back up the assertions with evidence. Use first order mathematical and physics estimates as well as references from journal articles, books, or other sources that are well respected

Title Page1 [1 page maximum]
• First line: “ME 481 2021 Spring – Project Proposal Report”
• Second line: Your own descriptive title/team name
• Logo (project, team, and/or sponsor)
• Names of all team members and their team role titles
• Final line: “Instructor: A Zachary Trimble”

Executive Summary [1 page maximum]
The Executive Summary should give the reader all the important information and findings of the document without having to read any further. Summarize both the project and the contents of the report. In other words, you must capture the reader’s interest; summarize the purpose, importance and impact of the project; and inform the reader what they can expect to learn about the project from this particular report. Because of its content and location this section is the most widely read section of the document. For that reason, the section should be well written and carefully proofread. First impressions matter. Incorporate into the executive summary the project mission statement in italics.

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1 Should be paginated with “i, ii, iii, iv,…”
The mission statement should be a smooth part of your executive summary and not an after-thought or add on.

Table of Contents
List of Figures and Tables (should show page numbers)
Acronyms and Abbreviations
Technical Report Body [10 pages maximum]

Address the report objectives. Below is a suggested outline, but you have freedom to address the objectives in whatever way is best for your project.

1. Introduction

Start out by describing the magnitude, purpose, importance, and impact of your problem, generally by defining statistics, number of people affected, severity of the problem for those affected, or size of the market your product will try to enter, but don’t be “fluffy”. In your own words, provide an explanation for why there is a need to expend the effort required to execute a project such as what you are proposing. Make effective use of graphics, charts, etc.

1.1. Technical Context

Describe the scientific and technological background to your problem (e.g., are you primarily dealing with challenging fluid mechanics, heat transfer, mechanisms, etc.) Explain some of the physical phenomena at play in your design space that a “typical” engineering student may not have been previously aware of (e.g., transient viscous flow, convective heat transfer, etc.) for which you had to conduct your own in-depth research into the literature. This is where you also define some of the unique terms and jargon of the field encompassing your project.

1.2. Business Context

Aside from a technological challenge, any successful solution must also be able to be sold as part of a viable business in order to be successful. Describe the business ecosystem your sponsor (if applicable) and project will have to operate within. Include information on:

- The intellectual property space you may work with; are there many existing patents that constrict your own design freedom? If so, describe how they work and where you may be able to add your own novel solution into the mix. Also describe who will end up with ownership of any intellectual property you will be generating as part of this project.

- The key competitors and their approximate market share, with the most recent statistics you can find. Will you have to try and sell a product in a space with little competition, or will you have to exist alongside some very well-established organizations?

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2 Should be paginated with “1, 2, 3, …”
2. **Design Problem Definition**
   Make sure to make effective use of graphics (e.g. concept of operation, system architecture).

   2.1. **Overall Goal**
   In a single sentence, or a few sentences, define the overall goal for your project. Don’t forget to include mention that your solution will be executable within the constraints of the time/funds/resources of your team and the class.

   2.2. **Primary Stakeholder Objectives**
   Describe the highest priority (i.e., top 3-5) objectives described by your stakeholders, and provide a rationale for their importance. What must your solution absolutely be able to accomplish to be considered successful?

   2.3. **Primary Requirements**
   For the same highest-priority objectives you described above, describe the associated project/functional requirement(s) you and your teammates created. Explain how your requirement(s) prove you’ve met each objective, and give details of how each will be measured in a validation experiment.

3. **Project Management/Proposed Approach**
   What are your time and money constraints/needs and what are the general tasks and risks. What are the key milestones that must be reached for your project (i.e. not just class milestones)?

   3.1. **Work Breakdown Structure (WBS)**
   Create a visual WBS and then explain the rationale behind your organization. Be sure to include both management tasks as well as technical ones.

   3.2. **Project Timeline**
   Create a clear graphical milestone timeline and describe what it means to achieve each milestone.

   3.3. **Potential Challenges/Risks**
   You are all but guaranteed to encounter unexpected events (both positive and negative) that will require a deviation from your initial project plan. In this section, describe what you think could be your top three to five most likely negative events that may warrant a revision to your design and/or timeline. Suggest at least one possible means to deal with each event. Show that you have reasonable backup plans that will keep your project on track.

4. **Conclusion**

5. **References** (Does not count against page limit)

**Appendices** (Does not count against page limit)

1. **List of Requirements**
   Include a link to your requirements tracking document and to your action items tracking document.

2. **Team Structure**
   Describe your core team roles, as well as who may be tasked with leading the design of each subsystem or responsible for each technological “field” (e.g., structural design, electronics, FEA, manufacturing). Three of the roles must be Project Manager or Chief Executive Officer (CEO) primarily responsible for the time budget, Chief Engineer or
Chief Technology Officer (CTO) primarily responsible for the performance budget, and Financial Manager or Chief Financial Officer (CFO) primarily responsible for the money budget. Provide an organizational chart.

3. **Gantt Chart**
   Include a link to your current Gantt chart

4. **Literature Survey**
   Provide a link to your live annotated bibliography
   This section includes a complete annotated bibliography literature review including all articles which are of particular relevance but were not directly referenced in the text. Unlike traditional references in the text, where URLs and Wikipedia are justifiably frowned upon, this contains all references. *This is a resource for the team and should be continually updated and in front of the team throughout the project.* The Literature Survey should cover a thorough list of available products, patents, make and models, and relevant developmental research, etc. The format should generally follow:
   - Search terms or category
     - Full Reference
       - Contributor (eg. A Trimble)
       - Short discussion of how and or what this reference contributes to this project (i.e. customized, not a regurgitation of the abstract).

5. **Team Policies and Expectations (i.e. Team Contact)**
   All team members will sign the hardcopy of this document. At a minimum your team contact must include:

5.1. **Team decision-making process**
   Describe how your team will make decisions. There will be disagreement throughout the project, so agree now how you will make a controversial decision. As a team you are agreeing to this process and thus if the decision is made “in process” you are agreeing to fully support the decision once it is made – to have full buy-in – even if you didn’t initially agree. Some example decision paradigms include the “czar” method (one person makes the final decision), democratic methods, unanimous decision, etc. You may utilize or combine different methods for different decision types (e.g. fiscal, technical, or administrative decision types), as long as your method is explicit and all-encompassing in scope.

5.2. **Team meeting policy**
   Your team meeting policy should specify three things: (1) recurring full meeting times and “location” (and recurring sub-team meeting times and locations if applicable), (2) policies for scheduling team meetings (who has the power to schedule meetings, and how long in advance should notice be given), (3) reaffirm your commitment to follow the SPACER meeting protocol, and (4) required individual preparation for meetings (what should be sent out beforehand, and what should be brought to meetings) – commit to PREP in appropriate situations.

5.3. **Expected contribution of work**
   This section should describe the general expected weekly contribution of work from each team member. This is typically in the form of work hours, but other
“units” of work can be used (remember we expect progress not just hours spent). This should include a breakdown of expected contributions to meetings, technical, administrative, and financial workloads. As your capstone experience this is at a minimum 10-12 hours of progress per week.

5.4. **Tolerance policy for non-cooperative members**

This policy should specify how the team responds to non-cooperative team members. This should include steps on communicating, and working with problem team members. Teams have the ability, under the direction of the section instructor, to fire destructive members from their teams if necessary; however, to take this step a clearly defined hierarchal resolution process should be developed that includes, internal communication, intervention of the TA, and intervention of the course instructor at an appropriate time leading up to this step, and must be considered as a last resort after everything else has failed.

**Formatting Information**

- Use “Times New Roman” single-spaced 12-point font for all body text. Headings may be larger if desired.
- Use 1 in. margins on all pages.
- Number all pages after the Table of Contents in footer of each page. Use roman numerals for the pre-content.
- Figures and tables must be centered in the middle of the page (*i.e.*, no text-wrapping) and have a unique number and caption.

**Evaluation**

All items are graded on a 10-point scale (see the RIP Website).

<table>
<thead>
<tr>
<th>Objective/Element</th>
<th>Weighting</th>
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<tbody>
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<td>Executive Summary</td>
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<td>Mission Statement</td>
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<td>Problem Description</td>
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<td>Stakeholders</td>
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<td>Objectives and Requirements</td>
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<td>Literature Review</td>
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<td>Team Contract</td>
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<td>Quality, Conciseness, Effectiveness</td>
<td>0.1</td>
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</tbody>
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**Oral Presentation**

- **Audience:** Your stakeholders and the ME 481 course
- **Format:** Formal (If possible questions will be held to the end)
- **Location:** Zoom
- **Date:** February 17, 2021 during class and lab.
Time: 30 minutes (encompassing both presentation and questions/feedback)

Participation: All team members must present

Attendance: All students must attend all presentations. You are expected to be an active peer reviewer and ask meaningful questions and provide meaningful feedback.

Dress Code: Business professional (Hawaiian)

Evaluation: Based on the presentation evaluation criteria posted to the course website.

- **If Your Project Has Sponsor(s):** You must also invite your sponsor(s) to your oral presentation and make every effort to schedule your presentation so that they can attend. If your sponsor(s) are unable to attend, it is your responsibility to arrange for a teleconference or video recording of the full 30 minute period. I will not record the zoom.
- All slides (except Title Slide) must show the slide number and the total number of slides in the main presentation (not including Backup Slides) e.g. 14/37
- The name of the presenter should be on the first slide of a contiguous set of slides that the student is presenting. The student’s initials should be on each other section.
- The presentation should cover all the information in the technical report.

Submission Information

- **Deliverables:** Due at 1500 on Friday, February 19, 2021
  - Digital copy of your report
    - File naming convention:
      “me481_2021s_proposalReport_[abbreviated team name].pdf”
    - Abbreviated names:
      o db – Diamond Bakery
      o ht – Hawaiian Telecom
      o kanaloa – Kanaloa
      o uhdt - UHDT
  - Digital copy of your slides
    - File naming convention:
      “me481_2021s_proposalPresentation_[abbreviated team name].pdf”

- **Submission:**
  - Both electronic deliverables must be submitted as attachments to a single email written by the project manager, addressed to the instructor, and having the subject line “ME481 2020s - Team name - Project Proposal Deliverables”
  - Both the report and presentation must be in PDF format. Be careful converting google doc equations.
  - **If Your Project Has Sponsor(s):** A second email written by the project manager, addressed to the sponsor(s) and cc’d to the instructor, and having the subject line “UH Senior Design Project - Proposal Documents” must be sent with the deliverables attached.