Guidelines for Design Project Proposal

Engineering design is the creative process of identifying needs and then devising a product or a process to fill those needs. After a need has been identified, the purpose of an engineering design project proposal is to succinctly communicate to interested parties:

- Benefits of the product or process to the end customer
- Project objectives tied to the project specifications
- Strategy for achieving project objectives
- Detail plan of action divided into a number of tasks to be performed by individual member of the design team to achieve the project objectives
- Time schedule depicting weekly progress and individual/team assignments
- Cost analysis
- Design verification procedures
- Procedures to quantify prototype performance
- Relevant professional and societal considerations

The interested parties include project sponsor, faculty and your peers.

PROPOSAL FORMAT:

The following format is suggested for your team proposal. Unless otherwise stated, use Times New Roman size 12 fonts.

1. **Title Page** (center justified, right-left, top-bottom)
   Title – All capital letters, font size 16-20
   Proposal for ECSE-xxxx Senior Design Project
   Names of team members (one per line, font size 16)
   Date
   Rensselaer Polytechnic Institute
   You may choose to add a team logo on top of the title. Use multiple spacing between various items for a good visual effect.

2. **Body of the Proposal**

   - Introduction
     What is the project about and what is your/sponsor's motivation to select/sponsor the project? Review any prior work in the subject area. What is the state of the art? Who are expected end users. Describe in detail customer requirements, preliminary specifications, related technology areas, competitive benchmarks, and any related patents. Comment on the scope of effort involved in general terms.

   - Objectives
     Describe the project goals and intended functions and features. Carefully state how you have narrowed or broadened the scope of the project based on available time and labor resource. Comment on critical design parameters and what challenges might stand in the way of accomplishing your design objectives. Be ever alert to professional and societal context of the design objectives as it relates

to engineering standards, and realistic constraints that include one or more considerations of economics, environment, sustainability, manufacturing, ethics, health and safety, and social and political impact. Make sure your objectives are clear. Clear objectives lead to clear plan for generating the tasks to accomplish the design goals

- Design Strategy

  If the deliverable at the end of the semester is a product - a piece of hardware or software, or a combination of the two, use a general block diagram (a block diagram with multiple blocks – call it 'super block') to convey your design strategy. Each block in the super block must be as modular as possible, so that it can be implemented independently and re-assembled later.

  Describe the function of each block briefly and explain how it contributes to the overall design and feature list above. Include a discussion on interface with other blocks of your super block, and with super blocks designed by other teams, as applicable.

  If, on the other hand, your project were exploratory in nature because, for example, the technology needed for product development is not mature, or more than a semester is needed to finish the project, or there is high risk associated with an identified technology, or the best technology solution is not clearly identified, then your strategy would have to be modified accordingly. Your strategy would be to generate information to be used by another team working on the same project in the following semester. A block diagram format for design strategy presentation may, or may not be appropriate. This must be decided on case-by-case basis.

- Plan of Action

  The plan of action consists of various tasks needed to implement the design strategy. The tasks should be linked to the objectives and the design strategy components. The tasks should be divided among the team members for a well-rounded experience for all. To be specific, one person doing all the analysis, another simulation, and another implementation, and yet another testing, does not lead to well round experience. All must share these activities, not necessarily in exactly the same proportion. In practice, engineers usually take ownership for a subsystem, component, element, part, assembly, etc., as a block. The design processes of analysis, simulation, implementation, testing, etc. are done for each such block and as an integrated whole. Someone or some "bodies" need to take responsibility for integration. Everyone needs to pay attention and be responsible for making sure his or her respective elements of the design fit together with everything else.

- Verification

  Testing Procedures: Outline the test procedures and resulting tables, graphs, and measured values that will assess the project performance. Separate test

procedures should be given for testing individual modules and integrated subsystems, and the overall system.
Tolerance Analysis: As part of your project, describe one engineering component or subsystem, that most affect s the performance of the project. Later on you will test this component at extremes and include the result in your notebook and final report, along with any insights you have gained while performing the analysis.

- Cost and Schedule
  Cost Analysis: Include a cost of the project based on labor and material. Include a list of parts, lab equipment, shop service, which are not routinely available at no cost basis. Give estimated cost of any such items. Compute labor cost for each team member on the project as follows:

  Assumed reasonable salary ($/hour) * 2.5 * hours = $Total

  Itemize total labor cost for all partners, all material cost and cost of specialized lab equipment and shop service and determine the grand total for the project.
  Schedule: Include a timetable showing when each step in the expected sequence of design and fabrication work will be completed (generally, by week), and how the tasks will be shared among the team members. (i.e. Select architecture, Design this, Design that, Buy parts, Assemble this, Assemble that, Prepare mock-up, Integrate prototype, Refine prototype, Test integrated system).
  NOTE: Actual Costs and Schedule will be part of your Final Report. Keep a log of cost and schedule in your notebook.

- Professional and Societal Considerations:
  Describe what *professional codes and standards* may be relevant for the project. Comment on which of the following considerations may or may not be relevant to your project: *economic, environmental, sustainability, manufacturability, ethical, health and safety, social, and political.*