University of Pittsburgh at Johnstown

Department of Electrical and Computer Engineering

COE/EE 1195

Engineering Practice (Design) and Professional Development

"Project Proposal" Course

PRIMER: Step 1 - The Project Proposal

Revision Date: 1/4/2020

Background

This document provides the necessary background information to officially commence the Pitt-Johnstown Senior Project: The PROJECT PROPOSAL. Prior to writing the "final" Project Proposal, students should have a generally agreed upon project idea, that have been vetted by University faculty through several informal / preliminary ungraded proposals. While not uncommon to submit multiple Project Proposals, if the student heeds the faculty advice, and address all the comments, concerns, and recommendations from the "Initial" and "Modified" Project Proposal(s), the final (formal) Project Proposal should be merely a formatted compilation of the previous submissions.

Grade Value

The PROJECT PROPOSAL comprises 20% of the EE/COE 1195 grade. Considering the proposal is the "foundation" of the Senior Project, the value of the PROJECT PROPOSAL is very significant.

Written final (formal) PROJECT PROPOSAL:	7.5% EE/COE 1195 Instructor Grade + 7.5% remaining faculty grade
Proposal (oral presentation to Seminar)	5% (composite (average of all evaluators))

Guidance:

The project proposal is written to substantiate the need for a given project and the feasibility of completing the project. The proposal is used by engineers to sell a project to management and the customer. The need can be substantiated by clearly defining the problem, the objective of the project and the method of approach to be used. Once the need is established, the resources needed to implement a solution should be estimated as accurately as possible. Even if people in the company agree that a need exists, they need to know how much it will cost to "solve" the problem or do the project. Also, the proposal should convey that the project team understands the project, has sufficient background knowledge of the project, and able to "pull it off".

The Project Proposal MUST clearly demonstrate your proposed ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

The written proposal for this course should follow the format given below.

Proposal Content

All proposals should include the information listed below:

A. Title Page including:
   1. University of Pittsburgh at Johnstown
      Department of Electrical Engineering and/or
      Department of Computer Engineering
      Course Number, Course Name
   2. Project Title
   3. Group Members
   4. Date Submitted

**Optional: Background Information. If you want to convey information to the faculty about your project, in an informal or personal matter, include immediately following the cover pager, and prior to the formatted proposal. Students may wish to discuss a project's personal attachment. This is the only section of the report supporting the use of personal pronouns.*

B. Project Description

A clear and concise description of the project, including:

1. Project Justification - what problem will be solved by your project?

   Why is your project worthwhile? You need real valid arguments!

   The following section headers must be present:

   - **Problem Identification**
   - **Engineering Formulation**
     - Effectively frame the problem, and communicate the problem-solution from an engineering perspective. Express the complex engineering methodology, bridging the problem-solution gap.
     - This step is very important. Problem identification is usually apparent, versus the *engineering problem* identification. The engineering problems/tasks are distinct.
     - The FINAL DESIGN (end of semester) <u>MUST</u> demonstrate the *engineering problem* solution.
   - **Proposed Solution**

2. What will you design and build, and what will it do? How will it function?

   Be specific! **Clearly articulate how you will apply principles of engineering, science, and mathematics**. Understand, eventually, you will provide multiple designs / alternatives. This is not the final solution. Refer to the sketch (3) in your descriptions.

3. A sketch of the final design (conceptual), showing controls and indicators (w labels).

C. Facilities Requirements

1. Laboratory Facilities that you will need to access. Equipment requirements.
2. Estimated Cost (and how determined). May use the internet for budget pricing.
3. Estimated Man-hours (be realistic!) Break the project into tasks. Include all of the administrative, project proposal and design, and project management tasks

D. Conclusion

1. Summary of the document.
2. Include the specific UPJ coursework applied to the project.

<u>Proposal Format</u> – Follow general guidelines for technical reports. For Example:

a) Formal writing guidelines used by your project sponsor (if applicable).
b) "UPJ Engineering Standards for Homework and Technical Reports".
c) "Rules for Writing Objective Formal Prose", see Appendix I.
d) "Mechanics of a Report", see Appendix II

APPENDIX I: RULES FOR WRITING OBJECTIVE FORMAL PROSE

What to Avoid

1. Avoid contractions

Contractions render prose less formal.

2. Avoid the use of the personal "I"

Note that qualifiers such as "I think" are especially irrelevant. However, the personal "I" can and must be used in certain types of letters, such as job application letters. It is also acceptable in oral presentations, but over-use will make the writer or speaker sound egotistical.

3. Avoid rhetorical questions

A rhetorical question is one in which the writer states the questions and then answers it. This use wastes words and violates the principle of economy in writing.

4. Avoid the use of the second person "you"

The English language fails to distinguish between "you" (singular) and "you" (plural). Consequently, the use of "you" in formal prose is vague. This pronoun form should only be used to give instructions or to make requests, and even then, it should be used sparingly. Especially avoid the construction "you know" in both oral and written presentations.

5. Avoid clichés

While all writing cannot be original, at least avoid obvious clichés like "A penny saved is a penny earned".

6. Avoid slang, technical "jargon", "media" words, "globbledgook" and "federal-ese"
    a. *Slang* reduces the level of formality in your writing. It is also subject to misunderstanding since there are no fixed meanings for most slang expressions.
    b. *Media words* are overused and trendy. The greatest offender of the present decade is "lifestyle", a terrible word.
    c. *Gobbledygook* is a mélange of jargon words often employed to bury actual meaning. Usually the author is unable or unwilling to state what is meant clearly and so loads up the sentence with unclear words and grammar. The result is often unreadable prose.
    d. *Federal-ese* is the language of government bureaucrats. Like gobbledygook, it obscures meaning.

What to do **WRITE WITH A PURPOSE!**

1. Use active voice

Use third person active voice. This will make your writing far more interesting and vigorous. Active voice gives your writing "life".

Example: Passive
The autopsy was seen by twelve students.
Active
Twelve students saw the autopsy.

Note: When the subject performs the action, you are using active voice.

2. Use possessives correctly

Learn the rules governing the formation of possessives.
Use 's for singular possessive
Use s' for plural possessive

Example: child's (singular possessive)
children's (plural possessive)
woman's (singular possessive)
women's (plural possessive)

The one exception to the possessive rule is the form "its" to show possession.
Note: It's – it is Since you have been instructed to avoid contractions in objective, formal prose, "it's" is always wrong.

3. Use the right word

Learn to distinguish between the spellings of words that are pronounced the same way but are spelled differently and have different meanings:

Example: sight – vision; the ability to see
cite – to state a source, as in to "cite" a reference
site – a location

4. Use parallel structure

Parallel structures give your writing balance and a sense of order. This is particularly true in a series of related statements. Arrange your sentence so that its parts are grammatically equal. Faulty parallelism occurs when the related ideas in a sentence are not grammatically balanced.

Example of Faulty parallel structure:
Computer programs are available which perform calculations, record-keeping and some do word processing.

Example of Correct parallel structure:
Computer programs are available which perform calculations, record-keeping and word processing.

APPENDIX II: MECHANICS OF THE FINAL REPORT

Typing

Final Reports should be typed (1.5 or double spaced) on one side of standard letter size sheets (nominal 8 ½ x 11 in). The paper should be white and of good quality and weight. Pages of the report, including appendices, if any, should be numbered consecutively centered at the bottom of each sheet.

Illustrations

Graphs, charts, sketches, line drawings, and diagrams should be created with the appropriate computer software (Visio, Word, PSpice, etc.) and they should be in the body of the report as close as possible to the reference statement. Captions should be included to describe the illustration.

Headings and Numbering

Headings and sub-headings should appear throughout the text of the report to divide into logical parts and to emphasize the major topics. These headings will assist the reader in following the trend of thought and informing a mental picture of the points of chief importance.

Formulas and equations should be numbered consecutively throughout the report, including the appendices, irrespective of any divisions in the text.

Tables should be numbered consecutively throughout the report, including the appendices.

All illustrations should be consecutively numbered throughout the report including the appendices. Illustrations are properly referred to as “figures”.

Mathematics

Type formulas and equations used in the report. A list of all symbols used in the report should appear at the beginning. The distinction between capital and small letters should be apparent. Explain what each symbol stands for and the unit in which it is expressed. If an equation or formula must be arrived at by a lengthy derivation, it is preferable that the derivation be accomplished in the appendix. Proper reference to the appendix is imperative in this case.

Drawings

All drawings, which are considered an essential part of the project, should be included with the final report. The drawings should be of sufficient detail that any related manufacturer could build the product from the drawing alone.

Language

Spelling, punctuation, paragraphing and other mechanical details of correctly written English are essential to a good report.

Computer Programs

Any computer programs, which are considered significant to the project, should be documented. Be certain to include the revision number of the software and date of release.