General Guidelines for Technical Presentations

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Objectives

This exercise is designed to improve the following skills:

- The ability to explain and discuss technical material to an engineering audience.
- The ability to develop and use effectively overhead slides for presentations.
- The ability to speak effectively and maintain interest before an engineering audience without using notes.

Situation

You are to assume that your presentation is to a technical staff at a company or at a conference of technical experts. Therefore, speak as a professional. The audience has a good degree of technical understanding but may not be familiar with your experiment or results. Your purpose is to convey information, increase the audience knowledge about the subject and convince the audience about the importance of your work. In this case, your group has approximately 30 minutes to deliver a preliminary proposal over the final experiment that you're planning to do. This type of oral prelim is used by doctoral candidates at many universities – including this one. It is also typical of the approach followed in many large companies in industry; often several teams are competing for limited internal resources, and a common way to pare down the number is through short oral presentations.

Structure

a) Each student will conduct a five to seven-minute portion of the presentation. Please try to evenly distribute the time allocated to each group member ± 2 minutes or so. Smaller groups (of three or less) should apportion the time accordingly so as not to exceed 30 minutes – including time for questions.

b) Seven to 10 minutes should be allowed for questions (if any) from the audience. Note that questions may be asked at any time during the presentation.

c) The performance of your team members will have some impact on how well your

segment of the presentation comes across to the audience. Therefore, it is best to practice as a group.

d) All presentations will be held in rooms equipped with computer-connected projectors. The computers will have the university standard MS Office software, running on the latest university installation of MS Windows. You should bring your presentation on a flash drive or CD. You may also use web-based presentation apps, such as Presi: http://prezi.com/

e) It is important to clearly state the goals and objectives of your extension since these will impact your presentation grade.

f) The first slide should include your names *in the order that you will present.*

Grading

The evaluators, subject to scheduling availability, will include the instructor, the GTA (and any others who are available), the faculty advisor for the experiment, and the other students in the section. Each evaluator will assign a numerical score from 0 to 100.

The scores from the students in the section will be averaged and given a 25% weighting. The scores from the other evaluators will be averaged and given a 75% weighting. Example grading sheets and instructions are included at the end of this document.

Individual scores will count towards the individual's grade, and group scores will be used only to provide feedback.

Written comments (including comments regarding the group) will be transcribed and returned to the individual speaker. Thus, each speaker will be given enough feedback regarding his or her presentation to make assessments regarding areas of strength or weakness. The written comments will be anonymous.

Note: *You must present to receive any credit for this lab!* If you absolutely cannot be present during your group's presentation, you must provide a video of your part. Please make every effort to be present during your group's presentation; should the video fail, which has happened nearly every time in the past, you will receive zero credit.

Hints for a Good Presentation

1. Make sure that the audience knows what the principal objectives are in the proposed study (experiment) you will be presenting.

2. Use precise language. The language of engineering and mathematics must be very precise to convey understanding. Also, strive to be concise; do not include any verbiage that isn't necessary to convey your message.

3. Make sure the graphics and text on your slides are clear and large enough to be read by a person furthest away from you in the presentation venue. In other words, your slides should not be an eye exam.

4. Do not use note cards. Use the slides to guide you and the audience through your presentation.

5. Speak clearly and with ***enthusiasm.*** Avoid speaking rapidly due to being nervous.

6. Look at the audience. It helps to make eye contact with several people throughout the room periodically as you speak. This is called *audience engagement*. Focusing on one person at a time generally draws their attention, and can also help lower your anxiety – especially if that person is smiling!

7. Use gestures to help in emphasizing a point or for clarity only. Point to projection screen, not the computer screen! Avoid standing still like a statue, but don't run around the stage either.

8. When discussing plots indicate axis labels ***first.*** Make sure the audience knows what you are trying to explain.

9. Maintain time constraints. You will be cut off if you exceed your time limits.

10. Be organized with clearly stated points and conclusions. You must convince the audience of the importance of your work

11. Make sure the audience knows who is presenting. It helps to list the presenters in the order that they will present on the cover slide, and then *introduce the next speaker* as you finish your part.

12. ***Fielding questions from your audience***:
    a. Make sure you first understand the question before attempting to answer it. This is one of the most common errors committed by nervous presenters!
    b. Answer questions as clearly and concisely as you can.
    c. Admit when you don't know the answer.
    d. Never become defensive – even if the questioner becomes aggressive or even offensive. You can always agree to disagree!
13. ***PRACTICE!!*** Nothing takes the place of practice. When you practice, have a group member or colleague time each section. You might want to memorize key "sound bytes" that say exactly what you want the audience to hear.

All presentations will take place in 140 Toomey Hall during your scheduled lab period on a date specified in the ME4842 Canvas course calendar.

Typical Presentation Outline

TITLE Slide – Should include:

- **Title**
- **Names of the presenters in the order they will present**
- Section and group
- GTA's name
- Date

OUTLINE slide: establish the outline of presentation and stick to it.

INTRODUCTION and RATIONALE slides: state the motivation, objectives, and purpose of your proposed study clearly.

THEORETICAL DISCUSSION slides: provide background information. Here is where you present the relevant information you found in the peer-reviewed literature, and how it informs your proposed study. You should also present any derivations that support the mathematical model predicting the phenomena that you plan to measure. It's also a good idea to simulate the mathematical model using published physical parameters to graphically illustrate the expected behavior of the system under study.

EXPERIMENTAL SETUP AND DATA ANALYSIS slides: describe the necessary experimental equipment and setup, and illustrate how you plan to acquire the relevant data. Be as specific as possible regarding how you plan to estimate and account for experimental uncertainties. You should also emphasize the feasibility of your proposed study. Do we have the resources to successfully perform the study? How much time do you estimate will be required?

BUDGET slides: provide an estimated (the more accurate the better) itemized budget including the BOM (bill of materials) to the best of your current knowledge.

ME 4842 Oral Presentation Evaluation Guidelines (supplied to all evaluators)

You are to give each student an overall score and the entire group an overall score. The group score is only used for group feedback only. You may use any number from 0 to 10 inclusive. A score of 10 should be reserved for truly exceptional presentations. An average presentation (neither terribly bad nor particularly good) should be around 8. Try to be consistent between presenters. You may base your evaluation on any criteria you choose, but please attempt to be honest, reasonable and fair. The following items are given as possible evaluation considerations that you may like to consider. If you choose to itemize sub-scores or comments for some or all of these items, simply refer to them by number on the evaluation sheet. Ultimately the overall score that you assign should be based on your overall impression. The evaluation will be divided into two parts: (1) *quality of the presentation* (both individual and group) and (2) *technical content* relative to the ME4842 final experiment proposal requirements.

(1) Quality of Presentation

Individual Considerations:

1. Organization
2. Audience engagement (eye contact with audience)
2. Sufficient practice
3. Enthusiasm
4. Speaking voice (volume, pronunciation, timing, variety, etc.)
5. Clarity of speech. Take note of the speaker's use of "ahs," "ers," or "ums" to punctuate his or her sentences!
6. Body language (mannerisms, not standing with hands in pockets, etc.)
7. Quality and effectiveness of visual aids
8. Appearance (at least dress in business casual clothes – i.e. no t-shirts)
9. Ability to answer questions

Group Considerations:

10. Appropriate content and level of detail
11. Understanding of technical content
12. Organization of entire presentation
13. Introduction and background
14. Conclusions and recommendations (definite, relevant, follows from presentation, etc.)
15. Figures and graphics

Evaluation Rubrics (Weighting Factors)

CONTENT (50%)
Content refers to both the technical explanation of the results obtained, and the quality of the materials (figures, graphs, etc.) used during the explanation. Technical content includes the quality and accuracy of the technical explanation, as well as the quantity of information offered. In other words, did the presenter provide enough information for the audience to understand the topic? Did the presenter present extraneous filler that did not contribute to your understanding? Did the presenter make any obvious technical errors? Did the presenter answer questions effectively? Was the content of the presentation approximately the same for each presenter, or did one speaker monopolize the time allotted? Conversely, did one speaker barely cover anything at all compared to the others?

DELIVERY (30%)

PHYSICAL: Did the presenter engage the audience with appropriate gestures and mannerisms, or remain stock still, with hands in his or her pockets? Did the speaker gain and maintain eye contact with members of the audience? Doing so usually helps to engage the audience and get them on your side!

VOICE: Did the presenter modulate his or her speech appropriately throughout the allotted time, or speak primarily in a monotone? Modulating the volume and pitch of the voice can be used effectively to signal transitions between topics.

Speakers should also speak with adequate volume to be heard throughout the room, and use vocal emphasis at key points.

Speakers should speak as clearly as possible. This means not mumbling or "trailing off" at the end of sentences, as can happen when a speaker turns towards the projection screen while speaking at a barely sufficient volume.

MANNER: Speakers should project enthusiasm for their topic! Did the speaker look uncomfortable or nervous? Practice will usually minimize nervousness.

LANGUAGE (20%)

APPROPRIATENESS: Speakers should strive to use language appropriate for a technical presentation. This usually means avoiding colloquialisms, slang, or attributing animate qualities to inanimate objects. For example: "The computer knew how to calculate…" In addition, speakers should refrain from using too much qualitative language, such as "good, great, awesome, difficult, poor, etc., without specific examples and justification.

Avoid using possessive adjective forms such as 'our' and 'your' when describing a quantity that you measured or derived. For example: "We then calculated our head

loss…" Or, "Here's how you find your natural frequencies."

CORRECTNESS: Correct grammar is essential! During the evaluation, the audience should pay attention to the speaker's grammar, and note any errors in word use or pronunciation. Speakers should be clear and concise, and keep the amount of "verbal pauses" to a minimum. This includes: "ah…," "er…," "you know...," and similar utterances.

Take care to avoid subject-verb disagreements such as: "The pressure and flow rate is used to calculate…"

(2) Technical Content of the Presentation and Compliance with the Final Experiment Requirements.

The following are the basic requirements for the final experiment:

1. It must contain an experimental component – i.e. measurement of a system property or properties.
2. It must be based on sound physical principles.
3. It must be of technical sophistication appropriate for seniors in mechanical engineering – i.e. if an average high school student could perform your proposed experiment, it's most likely too simple for ME4842. Basically, it should require mastery of subjects that you learned during your undergraduate engineering studies.

There are two allowable types of experiment in ME4842:

A. The experiment may statistically test a hypothesis pertaining to a measurable property after some sort of treatment, and must include at least 10 trial samples. For example, the effects of a certain heat treatment on the hardness and ultimate strength of annealed carbon steel may be quantified in this manner. The hypothesis that a certain heat treatment schedule would increase the hardness of the steel samples could be tested by first measuring the hardness of each sample before heat treatment, and then again after. The one-sided Student T test may then be applied to determine the probability that the difference in mean hardness between the before and after samples was due to random variation. This is known as the *null* hypothesis. A low probability of the means being due to random variations, say, 5%, allows the rejection of the null hypothesis, and the confirmation that the heat treatment increased the hardness of the samples. This kind of experiment does not seek to explain how or why the observed effect occurred – only that it was caused by the treatment applied. In other words, there is no predictive mathematical model involved.

B. The experiment may validate a mathematical model. In this case, you will attempt to measure or estimate a parameter or parameters used in a known mathematical model derived from first principles. Such models exist in all fields and areas of the physical sciences, and are usually based on physical laws.

Examples include Newton's laws, Fourier's law, or the various conservation laws, such as the conservation of energy. The convective fin experiment, where the convection coefficient, *h,* is estimated, is an example of this type of experiment. It is usually best if all experimental hypotheses can be reduced to mathematical models. This type of experiment is usually less time consuming than option A.

Final Experiment Proposal Requirements

The requirements for the final experiment proposal include the following:

1. You should submit your proposal to your GTA by the published deadline to allow time to modify it. He or she will review it and return it to you promptly for revision if it is missing any requirements. It must be in PDF format because of (1) equation encoding issues between the Windows and Macintosh operating systems, and (2) because it will be digitally signed upon approval to authorize purchases.
2. Must include enough detail for a technically trained, non-specialist to determine feasibility and rationale for performing the experiment.
3. Must explain specific goals for the study – i.e. what you hope to determine.
4. Must include a literature review citing relevant background information. *The S&T library has provided a webpage specifically for ME4842 with information directly relevant to the kind of literature review you will conduct in preparation for your final experiment.* This website may be accessed here: http://libguides.mst.edu/mechanical.
5. Must include at least one source from the primary, peer reviewed, literature – i.e. archival journals, or conference proceedings. These may be found in our library or ordered via ILL (order early!). See: http://libguides.mst.edu/az.php You must cite your references within the narrative of your proposal – e.g. "so-and-so et al. [1] found such-and-such, so it should be feasible for us to demonstrate ..."
6. The bibliographic format must comply with professional standards, and must provide enough information to quickly locate the source document. The examples used in the ME4842 text follow the IEEE Transactions bibliographic format, but others are also acceptable.
7. Must include a detailed budget estimate. All purchases MUST be approved by Dr. Stutts.

ME 4842 Preliminary Final Experiment Proposal Presentation Evaluation Form[1]

Evaluator classification (circle one): (1) Student (2) GTA or Faculty

Presenter's Section:_____ Group:_____

Compliance with ME4842 Final Experiment Requirements Score:_____ (30%)
Comments:

Demonstrated Feasibility: Score:_____ (20%)
Comments:

Completeness of Proposal: Score:_____ (20%)
Comments:

Technical Sophistication:

Score:_____ (20%)

Comments:

Novelty/Interest Level Generated: Score: _____ (10 %)
Comments:

[1] This form will be replaced by an equivalent electronic form before the presentation.