

Doctor of Engineering Assessment Report for Spring 2005 – Spring 2006

Program Goals/Outcomes

The goals and outcomes for this program were developed by the Graduate Affairs Committee (GAC) of the Engineering College, which is the governing body responsible for academic matters of the doctor of engineering program. These goals/outcomes have been modified since they were originally determined in 1995, based on program assessments. Upon graduation, our students should have:

1. A deeper, more general, and more fundamental understanding of the principles underlying a particular field of study, as well as those underlying related fields.
 - a. Depth of knowledge
 - b. Breadth of knowledge
2. A familiarity with advanced methods of analysis and synthesis that are more powerful and more generally applicable than those taught at the undergraduate level.
3. The ability to independently read and understand the significance and limitations of the relevant literature.
4. The ability to formulate, initiate, and complete new and innovative research projects that contribute to the advancement of the field.
 - a. Impact on advancement of the field
 - b. Adequacy of the scope of the research
 - c. Adequacy of the depth of the research
 - d. Novelty of the research
5. To communicate effectively in written and oral form
 - a. Quality of the writing style
 - b. Organization of the written dissertation
 - c. Organization of the presentation
 - d. Clarity of the language usage
 - e. Ability to answer questions
 - f. Quality of slides
6. Do application-oriented research of an inter-disciplinary nature
 - a. Application-oriented research
 - b. Interdisciplinary nature

Research

A rubric was developed by the GAC that specifies the specific criteria need to meet each of the goals/outcomes described above. This rubric is completed by each member of student's dissertation committee at the conclusion of the student's defense. The evaluation forms are completed anonymously by committee members. This instrument has been modified and expanded since the first version was developed. This rubric is enclosed in the appendix.

Findings

Each goal/outcome is evaluated on a 1 – 3 scale, with 1 as unacceptable, 2 as satisfactory, and 3 exemplary. The expected level of achievement is that more than 90% of the students should be rated as satisfactory on each criteria, and that the average score should be 2.3 or above. The results from eight graduates from the past year are shown in the table below and are graphically represented in figure 1.

Objectives/Criteria for Evaluation	No. responses meeting or exceeding criteria/total no. responses	Average score
1. A deeper more general and more fundamental understanding of the principles underlying a particular field of study as well as those underlying related fields.		
a. Depth of knowledge	28/28	2.82
b. Breadth of knowledge	27/28	2.81
2. A familiarity with advanced methods of analysis and synthesis that are more powerful and more generally applicable than those taught at the undergraduate level.		
27/28		
2.81		
3. The ability to independently read and understand the significance and limitations of the relevant literature.		
28/28		
2.78		
4. The ability to formulate, initiate, and complete new and innovative research projects that contribute to the advancement of the field.		
a. Impact on advancement of the field	27/28	2.63
b. Adequacy of the scope of the research	28/28	2.71
c. Adequacy of the depth of the research	27/28	2.66
d. Novelty of the research	28/28	2.64
5. To communicate effectively in written and oral form.		
a. Quality of the writing style	28/28	2.71
b. Organization of the written dissertation	28/28	2.79
c. Organization of the presentation	28/28	2.79
d. Clarity of language usage	28/28	2.82
e. Ability to answer questions	28/28	2.86
f. Quality of slides	28/28	2.89
6. Do application-oriented research of an inter-disciplinary nature		
a. Application-oriented research	27/28	2.85
b. Interdisciplinary nature of research	27/28	2.7

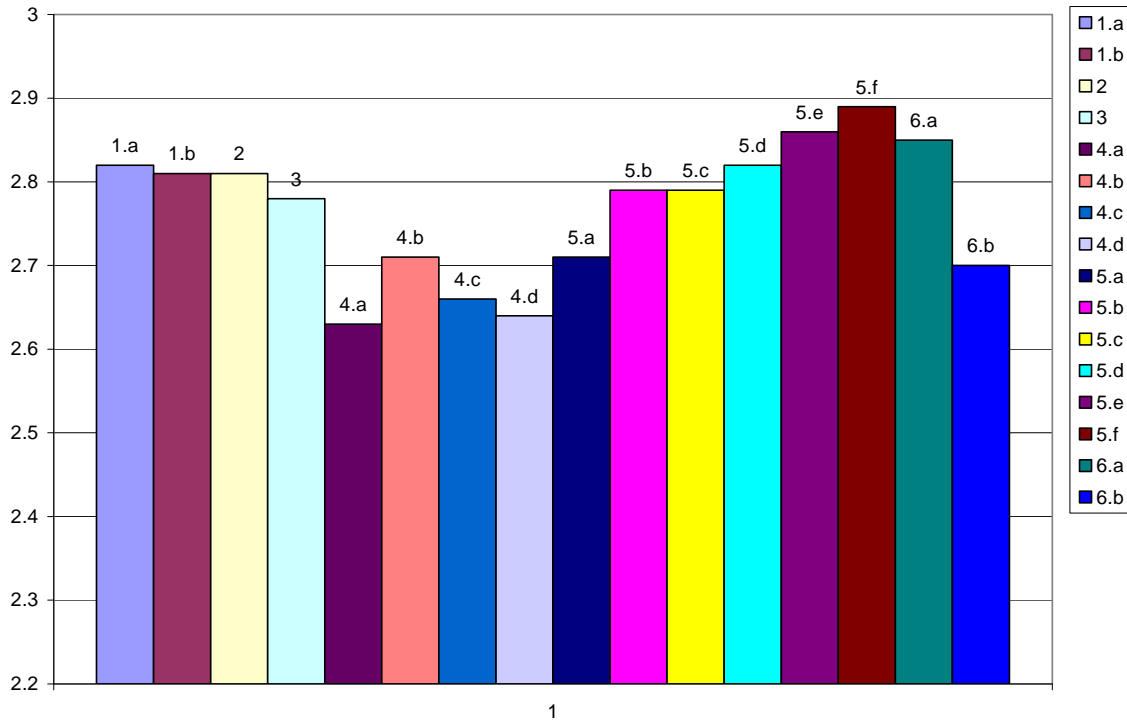


Figure 1. Graphical representation of the Doctor of Engineering Program - Assessment of Student Academic Achievement Objectives

Furthermore, 7 out of 8 graduates (close to 90%) had papers accepted for publication in peer-reviewed journals or in conferences as a result of their dissertation work, at the time of the defense. Collectively these students produced 21 (journal/conference) publications.

These results indicate that our program is meeting and surpassing the stated goals/outcomes. In almost all categories improvements were made compared to the previous year even though the previous year was a very good year by itself.

Major Comments in 2005 Assessment Review Report and Corrective Actions

- *“It is unclear how the information is shared with faculty, i.e. a faculty discussion. In addition, how often such information is shared is not listed in the report.”*
- *“The rubric is extremely helpful in this regard”*
- *“A comparison of the data with previous years, e.g. the graph on pg. 3 would be helpful.*
- *Clear goals/outcomes and nice rubric!”*
- *“Think about some assessment measures that could be made earlier in the academic program.”*
- *“Assessment only occurs at the end of the program, no indirect measures”*

Actions in Response to 2005 Assessment Report

“Clear goals/outcomes and nice rubric!”

“The rubric is extremely helpful in this regard”

Actions

- Goals, outcomes shall remain unchanged.
- The rubric will be slightly modified to include publications in conference proceedings.

“It is unclear how the information is shared with faculty, i.e. a faculty discussion. In addition, how often such information is shared is not listed in the report.”

Actions

The Director of Doctor of Engineering Program who administers the program submitted the results of last year’s university assessment review for consideration and feedback to the following faculty groups:

- Graduate Affairs Committee which is the governing body responsible for academic matters of the doctor of engineering program
- Department chairs and the College Dean [Attachment 1]
- The entire college faculty during a College Faculty Meeting [Attachment 2]

“A comparison of the data with previous years, e.g. the graph on pg. 3 would be helpful.

Actions

Done – shown below:

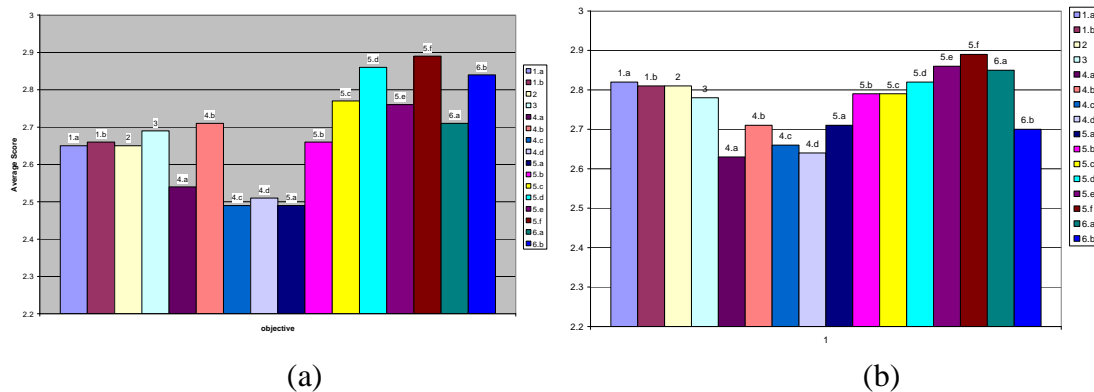


Figure 2. A juxtaposition of the last year’s graph (a) and this year’s results (b) shows that in almost all categories improvements were made compared to the previous year.

“Think about some assessment measures that could be made earlier in the academic program.”

“Assessment only occurs at the end of the program, no indirect measures”

Actions

The following measures will be used as assessment measures earlier in the academic program.

- Doctoral qualifying exam
- Publications in conference proceedings prior to graduation
- Dissertation committee feedbacks at regular intervals

No changes will be made to the other assessment activities, nor to the statements of the goals/outcomes. Faculty members were advised to work more closely with their students to address the issues that showed relatively lower average scores.

APPENDIX

- Doctor of Engineering Program Rubric
 - Attachment 1
 - Attachment 2

Doctor of Engineering Program Assessment of Student Academic Achievement Objectives

This evaluation is to be completed by each member of the student's doctoral dissertation committee, upon completion of the defense. Return form to the department secretary. Please check the appropriate box in each row.

The objectives are to develop in the student:	Level of Achievement		
Objectives/Criteria for Evaluation	Exemplary	Satisfactory	Unsatisfactory
1. A deeper, more general, and more fundamental understanding of the principles underlying a particular field of study, as well as those underlying related fields.			
a. Depth of knowledge	Student shows excellent understanding of fundamental principles directly related to the project.	Student displays good understanding of fundamentals directly related to project.	Understanding of fundamental principles directly related to the project is weak.
b. Breadth of knowledge	Student shows good understanding of related principles.	Knowledge of related subjects is adequate.	Knowledge of related subjects is weak.
2. A familiarity with advanced methods of analysis and synthesis that are more powerful and more generally applicable than those taught at the undergraduate level.	Student is competent in the most advanced techniques needed for research in the field. Student can synthesize and integrate results and relate them to the hypothesis.	Student is competent in experimental/analytical techniques needed for research in the field. Student can accept or reject hypotheses.	Student is competent in analytical techniques, with little understanding of the principles underlying the techniques. Student has difficulty in addressing the hypothesis.
3. The ability to independently read and understand the significance and limitations of the relevant literature.	Student actively searches all works directly and indirectly related to the project. Student can identify the strengths and limitations of various methods.	Student has read the literature related to project, and understands how project fits into the literature.	Student has read only some of the articles related to the project.
4. The ability to formulate, initiate, and complete new and innovative research projects that contribute to the advancement of the field.			
a. Impact on advancement of the field	Work has strong impact on the field.	Work has incremental impact on field.	Work has no impact on the field.

b. Adequacy of the scope of the research	Work has examined many facets of the problem.	Amount of work is adequate.	Amount of work done is inadequate.
c. Adequacy of the depth of the research	Work has probed deeply the principles behind the problem.	Work answers the basic questions of the problem.	Work only touched the surface of the problem.
d. Novelty of the research	Dissertation is an innovative idea from the student; student shows creativity in designing experiments and solving problems.	Student contributed originality to designing experiments and solving problems.	The student followed directions from his/her advisor.
5. To communicate effectively in written and oral form.			
a. Quality of the writing style	Written sentences are complete and grammatical, and they flow together easily. Words are chose for their precise meaning.	Writing is grammatically correct. Paragraphs and sentences may not flow together perfectly.	Writing contains grammatical errors.
b. Organization of the written dissertation	Dissertation is logically organized and easy to follow.	Dissertation organization is clear.	Dissertation is poorly organized.
c. Organization of the presentation	Presentation is clear, logical and organized. Listener can follow line of reasoning. Pacing is correct for the audience.	Listener can follow and understand the presentation.	Talk is poorly organized. Speaker jumps around from topic to topic.
d. Clarity of language usage	Speaker is comfortable in front of the group and can be heard by all.	Grammatical errors and use of slang are evident. Some sentences may be incomplete.	Speaker is difficult to understand or hear.
e. Ability to answer questions	Answered questions directly and clearly.	Student can answer questions, but with some difficulty.	Students had difficulty understanding questions and answering clearly.
f. Quality of slides	Slides enhance the presentation and are prepared in a professional manner.	Slides are adequate for the presentation.	Slides are inadequate (writing too small, too much or too little information per slide).
6. Do application-oriented research of an inter-disciplinary nature			
a. Application-oriented research	Research has practical applications that are clear.	Research may have practical applications.	The practical application of this work is completely unclear.
b. Interdisciplinary nature of research	Research required significant level of knowledge of and interaction with people from more than one discipline	Research involved some level of work or interaction with more than one discipline.	Research was completely within one discipline.

Bahman Ghorashi, Ph.D.
Associate Dean for Academic Affairs

To be answered by the research advisor only:

Have any papers resulting from the dissertation work been accepted for publication in peer-reviewed journals? _____Yes _____No

ATTACHMENT 1

Fenn College of Engineering
Chairs' Meeting
Thursday, November 3, 2005

Agenda

- | | |
|--|---------------------------|
| 1) Miscellaneous & Tech Fees | Dr. Alexander/Dr. Bellini |
| 2) Refreshment policy | Dr. Bellini |
| 3) Matching Funds | Dr. Alexander |
| 4) Joint Appointments | Dr. Alexander |
| 5) Friday's Faculty Meeting | Dr. Alexander |
| 6) Career and Transfer Day | Dr. Ghorashi |
| 7) Assessment reports | Dr. Ghorashi |
| 8) DRE assessment report | Dr. Ghorashi |
| 9) University partnership programs, e.g. LCCC | Dr. Ghorashi |
| 10) Nanyang Polytechnic of Singapore partnership | Dr. Ghorashi |

FENN COLLEGE OF ENGINEERING
Faculty Meeting
December 14, 2005 2:00 pm SH 103

Revised Agenda

- **Approval of May 10, 2005, minutes** **Dr. Alexander**
- **Approval of December 14, 2005, agenda** **Dr. Alexander**
- **UAC report** **Dr. Hizlan**
IME Honors Program presentation and approval
- **GAC report** **Dr. Gatica**
New dual-listing, MCE 603/703
New graduate course, CVE 546
Review of CVE courses changing from 3 to 4 credits
Dual degree, BS/MS, CHE/BME
Review of DRE assessment report evaluation **Dr. Ghorashi**
- **Engineering Technology** **Dr. Alexander**
- **FAC report** **Dr. Duffy**
Graduate faculty criteria
Engineering Technology
- **Other**