Expected Outcome 1: Broad Aerospace Engineering Knowledge

Graduates of the Ph.D. program in Aerospace Engineering will have a broad understanding of the fundamental areas of aerospace engineering and other fields related to their specialty.

Assessment Method 1: Ph.D. Qualifying Examination

Assessment Method Description
The qualifying examination is a written examination that will usually be taken at the end of the first 12-month period of enrollment in the Ph.D. program. This examination is administered each Fall and structured as follows: separate, written examinations (approximately three hours in length) are given in the subjects of Mathematics, Aerodynamics/Propulsion, Dynamics/Controls, and Structures/Structural Dynamics. All Ph.D. students must pass the Mathematics examination and their choice of two of the other three examinations. The level of material covered in these examinations will be based upon the assumptions that the student will have a background equivalent to our undergraduate program plus one year of graduate study. In order to pass the exam, the student must receive a score of at least 70% on each of the three separate subject examinations.

Findings
Six students took the exam in November 2013. 6 students took the math exam with an average score of 80%. 3 students took the dynamics and controls exam with an average score of 74%. 6 students took the Structures/Structural Dynamics exam with an average score of 75%. 3 students took the Aerodynamics/Propulsion exam with an average score of 82%. Overall, 5 out of 6 students passed the qualifying exam. 1 student was deemed to have failed the exam.

How did you use findings for improvement?
The results of the exam were shared and discussed openly with all
faculty in the department. The faculty were pleased with the results of the exam, but concerned about the amount of preparation necessary by the students to pass the exam. An open faculty meeting was held on Feb 21, 2013 to discuss the purpose and structure of the exam. The department’s Graduate Program Committee is currently reviewing the qualifying exam procedure and making recommendations for changes that better reflect our expectations for PhD students.

Additional Comments
none

Assessment Method 2: Graduating Graduate Student Survey

Assessment Method Description
Each student graduating from the PhD program in Aerospace Engineering will be asked to respond to a Graduating Graduate Student Exit survey administered by the AU OIRA. For assessment of broad aerospace engineering knowledge, the following survey questions are considered relevant to this outcome:

To what extent do you agree with the following statements about your graduate program?

1. My graduate program was academically challenging.

5. Course requirements and sequences for my graduate program were effective.

7. Opportunities existed outside of class for interactions between students and faculty members in my graduate program.

12. My graduate program prepared me to carry out research.

14. My graduate program kept pace with recent trends and developments in the field.

For each question, the survey respondent could select “Strongly disagree,” “Disagree,” “Agree” or “Strongly Agree”

Findings
Four students responded to the survey for this time period. The response to each questions were:
1. All 4 strongly agreed.

5. 2 strongly agreed, 1 agreed and 1 disagreed.

7. All 4 strongly agreed.

12. All 4 strongly agreed.

14. 2 strongly agreed and 2 agreed.

**How did you use findings for improvement?**
The findings indicate that the students find the education in our program to be challenging and up-to-date. There appears to be some improvements possible in regards to recent trends and developments as well as course sequences. The graduate faculty are planning to review the graduate course offerings over the next year and will consider course sequencing in specific subject areas. In addition, we plan on introducing more external seminar speakers to provide students with more opportunities to learn about recent trends and developments.

**Additional Comments**
The Graduate Program Committee is considering changes to the survey questions.

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**Expected Outcome 2: Communication**
Graduates of the Ph.D. program in Aerospace Engineering will be able to communicate their ideas effectively with their technical peers and with others outside their discipline.

**Assessment Method 1: Publications**

**Assessment Method Description**
For each student graduating from the PhD program in Aerospace Engineering, an average of one refereed journal paper and one conference paper will be accepted for publication, on which the student was an author or co-author. This assessment method is determined by responses to a Graduating Graduate Student Exit survey administered by the AU OIRA. The survey asks:
How many peer reviewed conference papers or posters (single or co-authored) did you present during the period of your graduate studies at Auburn University?

How many peer reviewed journal articles (single or co-authored) did you have accepted during the period of your graduate studies at Auburn University?

**Findings**
There were four responses for the PhD program. PhD students average 3.5 conference publications per student and 0.5 journal articles per student.

**How did you use findings for improvement?**
While the conference publications are above our threshold, the average number of peer reviewed journal articles is below expectations. It should be noted that several students’ ability to publish in archival journals over this time period was hindered by the proprietary nature of their research. Nonetheless, the Graduate Program committee is discussing various initiatives to encourage a higher rate of publication amongst PhD students.

**Additional Comments**
The Graduate Program Committee is considering changes to the survey questions to extract a finer level of detail about publications including first author status, consideration of papers that are in review and the addition of oral presentations made at professional conferences and meetings.

**Assessment Method 2: General Doctoral Examination**

**Assessment Method Description**
The Graduate Faculty of the Aerospace Engineering Department has adopted the following format for the Ph.D. General Doctoral Examination. Written Portion: This examination is intended to cover advanced topics in the student's area of specialization and closely related areas. This examination will be open-book and can be administered in a single sitting of three-to-four hours in length, or as a take-home examination over several days. The type of questions may include the set-up and solution of specific problems and the discussion of fundamental principles. Oral Portion: This examination consists of a
presentation and defense of the student's dissertation proposal before the Advisory Committee. A minimum 30 minute presentation is required, followed by up to two hours of questions and discussion.

**Findings**
Four students passed the general doctoral examination within the last year.

**How did you use findings for improvement?**
The Graduate Program Committee is pleased with the results of the general doctoral examination.

**Additional Comments**

**Assessment Method 3: Final Examination**

**Assessment Method Description**
The final examination consists of the defense of the candidate's dissertation. Each Ph.D. candidate must present the results of his/her dissertation research in a 30 minute graduate seminar, which is open to the public.

**Findings**
No students completed a final exam over this period of time.

**How did you use the findings for improvement?**

**Additional Comments**
Several students will be completing their final exam within the next year. The Graduate Program Committee is considering adopting a formal assessment survey to be administered at future final examinations.

**Assessment Method 4**
Graduate Seminar Course

**Assessment Method(s) Description**
All MS and PhD AE graduate students are required to prepare and give a seminar presentation once per year. The seminar includes a written component (seminar abstract and announcement), a multi-media component (presentation, typically via Powerpoint) and an oral
component (presentation itself). The subject of the seminar must be technical in nature and related to Aerospace Engineering. Students are provided feedback during a Q&A session following each presentation.

Findings
The seminar series is well received by the students and provides an excellent forum to practice technical presentation skills.

How did you use findings for improvement?
Currently, feedback to students is provided orally, but not documented. The Graduate Program Committee is considering documenting student skills in certain areas such that progress can be tracked over the course of a student’s degree program.

Additional Comments

Expected Outcome 3: Creative and Independent Research
Graduates of the PhD program in Aerospace Engineering will understand the principles and standard methods in one of the major subdisciplines within Aerospace Engineering at such a level as to have the expertise to teach in the discipline of specialty and to conduct and direct research to solve new problems in the discipline.

Assessment Method 1: Final Examination

Assessment Method Description
The final examination consists of the defense of the candidate's dissertation. Each Ph.D. candidate must present the results of his/her dissertation research in a 30 minute graduate seminar, which is open to the public.

Findings
No students completed a final exam over this period of time.

How did you use findings for improvement?

Additional Comments
Several students will be completing their final exam within the next year. The Graduate Program Committee is considering adopting a
formal assessment survey to be administered at future final examinations.

**Assessment Method 2: Publications**

**Assessment Method Description**
For each student graduating from the PhD program in Aerospace Engineering, an average of one refereed journal paper and one conference paper will be accepted for publication, on which the student was an author or co-author. This assessment method is determined by responses to a Graduating Graduate Student Exit survey administered by the AU OIRA. The survey asks:

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**Findings**
There were four responses for the PhD program. PhD students average 3.5 conference publications per student and 0.5 journal articles per student.

**How did you use findings for improvement?**
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**Additional Comments**
The Graduate Program Committee is considering changes to the survey questions to extract a finer level of detail about publications including first author status, consideration of papers that are in review and the addition of oral presentations made at professional conferences and meetings.