Expected Outcome 1: Knowledge of Advanced Engineering Economics

All graduates will demonstrate comprehensive knowledge of the following three subjects:

1. How to value an investment opportunity
2. How to develop project cash flows for an investment project considering operating, investing, and financing activities
3. How to consider risk and uncertainty in strategic investment decisions

Assessment Method 1: Test questions.

Assessment Method Description

This assessment method is based on finding mathematical solutions to problems which were given on tests. The tests covered the three subjects mentioned above. One test was given for each subject. The students passed the test by answering correctly more than 70% of the questions on the test.

Findings

37 students responded to the test questions. The findings are as follows:

<table>
<thead>
<tr>
<th>Subject</th>
<th>% of students who passed the test</th>
</tr>
</thead>
<tbody>
<tr>
<td>How to value an investment opportunity</td>
<td>80%</td>
</tr>
<tr>
<td>How to develop project cash flows for an investment</td>
<td>65%</td>
</tr>
<tr>
<td>How to consider risk and uncertainty</td>
<td>50%</td>
</tr>
</tbody>
</table>

How did you use findings for improvement?

In the future students will be introduced to more full length cases to address the various elements such as risk and uncertainty on investment decisions.

Additional Comment
Expected Outcome 2: Knowledge of Advanced Statistics

All graduates will demonstrate comprehensive knowledge of the following three subjects:
1. Design and analysis of a single factor experiment
2. Design and analysis of a randomized block experiment
3. Design and analysis of factorial and fractional factorial experiments

Assessment Method 1: Test questions.

Assessment Method Description
This assessment method is based on finding mathematical solutions to problems which were given on tests. The tests covered the three subjects mentioned above. One test was given for each subject. The students passed the test by answering correctly 70% or more of the questions on the test.

Findings
34 students responded to the test questions. The findings are as follows:

<table>
<thead>
<tr>
<th>Subject</th>
<th>% of students who passed the test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design and analysis of a single factor experiment</td>
<td>94%</td>
</tr>
<tr>
<td>Design and analysis of a randomized block experiment</td>
<td>94%</td>
</tr>
<tr>
<td>Design and analysis of factorial and fractional factorial experiments</td>
<td>100%</td>
</tr>
</tbody>
</table>

How did you use findings for improvement?
It will be an improved focus on applying the material in real-world problems.

Expected Outcome 3: Knowledge of Industrial Engineering Core Subjects

All graduates will demonstrate comprehensive knowledge of the following three core subjects

- Linear programming and network flows, emphasizing algorithms and theory
- Design economics and cost estimating techniques and their
application to various manufacturing and service operations
- Advanced concepts of experimental design including blocked designs, analysis of variance regression approach, and fractional factorials in base-2 designs with an emphasis throughout on developing and improving industrial products and processes.

**Assessment Method 1:** Pass 3 core courses with a grade of C or better in each course.

**Assessment Method Description**
Final letter grades for each ISE masters students in each of the 3 core courses in the last 2 offerings are counted.

**Findings**

**INSY 7300-001 Fall 2011**
- MS (ISE) 27: 1 student made D; all the rest made A, B, or C

**INSY 7300-001 Fall 2012**
- MS (ISE) 38: 3 students made D; all the rest made A, B, or C

**INSY 6600-001 Spring 2012**
- MS (ISE) 26: 1 student made F; all the rest made A, B, or C

**INSY 6600-001 Spring 2013**
- MS (ISE) 42: All students made A, B, C

**INSY 7420-001 Spring 2012**
- MS (ISE) 30: 1 student made F; 3 students made Ds; all the rest made A, B, or C

**INSY 7420-001 Spring 2013**
- MS (ISE) 36: 1 student made D; all the rest made A, B, or C

**How did you use findings for improvement?**
Students must repeat courses if they receive below a C letter grade. This rule is enforced.
Expected Outcome 4: Knowledge of Linear Programming and Network Flows

All graduates will demonstrate comprehensive knowledge of the following three subjects:
1. The simplex method
2. Duality theory and its implications
3. Optimization of network flows

Assessment Method 1: Test questions.

Assessment Method Description
This assessment method is based on finding mathematical solutions to problems which were given on tests. The tests covered the three subjects mentioned above. One test was given for each subject. The students passed the test by answering correctly more than 70% of the questions on the test.

Findings
35 students responded to the test questions. The findings are as follows:

<table>
<thead>
<tr>
<th>Subject</th>
<th>% of students who passed the test</th>
</tr>
</thead>
<tbody>
<tr>
<td>The simplex method</td>
<td>97%</td>
</tr>
<tr>
<td>The dual simplex method</td>
<td>49%</td>
</tr>
<tr>
<td>Minimal cost network flows</td>
<td>79%</td>
</tr>
</tbody>
</table>

How did you use findings for improvement?
Additional homework problems will be assigned for Duality Theory and Optimization of Network Flows. Students will be provided access to lecture notes and practice problems from the undergraduate version of this course (to support foundational understanding of the topics).

Additional Comments
Expected Outcome 5: Satisfaction and Employment or Continuing Education of Students who have Completed the Program.

100% of the students completing the program should be "satisfied" with the program and should either obtain employment or continue their education. The survey is self-reporting and is not verified through any means.

Assessment Method 1: Graduate School Exit Survey

Assessment Method Description
The Graduate School conducts a survey of graduating students with 18 questions through Qualtrics. The survey is voluntary. This survey is new and we have only recently been given access to the results.

Findings
There were 28 responders to the survey for our MISE/MS program.
1. 26/28 students would still go to Auburn (92.9%); 23/27 (85.2%) that answered this question would either probably or definitely recommend our program to others.
2. 25/28 (89.3%) rate our program either good or excellent.
3. There were 14 statements that students could rate as "Strongly disagree", "Disagree", "Agree", or "Strongly Agree"; 4 would be the highest aggregate numerical score. All of our scores were between 3 and 4 except for 1. The highest score was 3.50 for "My graduate program was academically challenging". The lowest score (2.93) was "My graduate program prepared me to teach". The next lowest score (3.07) was "The courses I needed were available." The next lowest score (3.00) was "My graduate program prepared me to carry out research."
4. Only 11/24 students responded positively to the question "Have you located employment that you will begin or continue upon graduation?"
5. There was a negative comment about the confusion of what classes a student should take in the joint MBA/MISE program.
6. There were also several comments from an outreach student summarized:
   - Lack of feedback from some teachers
   - Outreach students are allowed one extra week for assignments and exams - this is much needed and appreciated
   - Do something to facilitate communication among outreach students
How did you use findings for improvement?
1. Of the 3 lowest scores in the ratings, 2 had to do with preparing students to teach or do research. This is not an expected outcome of our MS/MISE program so probably shouldn't be asked. The other lowest rated score concerns courses not being offered enough. This probably concerns the optional core. We plan to put a motion to the faculty to remove the optional core from our program.
2. We will work with the Graduate School to refine the survey so that we may learn more from it. For example, a question is asked about finding employment; the way the question is worded will force students who are continuing their education toward a PhD to answer "No" that they haven't found employment.
3. A committee has been formed to create an online community for graduate students, including outreach and on-campus graduate students. The committee has already met 2 times and is making progress.
4. Other items will be addressed as resources allow.

Additional Comments
Assessment Method 2: Department Graduate Student Survey

Assessment Method Description
The department has its own survey that is administered to graduating students. It is voluntary and self-reported like the Graduate School survey. Here is a copy of the survey instrument:
Graduate Student Exit Survey  
Industrial & Systems Engineering  
Auburn University

Note: this information is kept confidential and is used purely for making improvements in our programs. Thank you for helping us become better!

<table>
<thead>
<tr>
<th>Name</th>
<th>Degree</th>
<th>Graduation Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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</table>

On Campus or Outreach: ______________________

<table>
<thead>
<tr>
<th>Previous Degrees</th>
</tr>
</thead>
<tbody>
<tr>
<td>degree</td>
</tr>
</tbody>
</table>

3. Gender: Male Female

4. Ethnicity / Nationality: ________________________________
   ________________________________

5. Cumulative GPA:___________   Advisor: ________________________

6. When did you become an ISE graduate student?

7. How did you find out about the ISE graduate program?
8. If you considered other schools or degree programs for graduate work, which ones?

9. Plans after graduation:

   Further Graduate school          New Full-time work

   Full time work with current employer (name and location:
   ____________________________________________________________)

10. If you are planning to work full-time for a new employer:

    Which companies / organizations have you interviewed with?

    List the job offers that you received and which one you accepted.

    Company          Type of Business     Location     Salary / Bonus

11. If you plan to further attend graduate school, please answer the following questions.

    List the schools that you applied to.

    School          Degree          Accepted?

8
Which school and program do you plan to attend?

12. Did you have an assistantship assignment during your studies here (research and / or teaching assistant)? If so, please list assignments and provide any comments you have concerning them.

13. If you are a non US citizen, please give your country of citizenship and comment on your transition to our program and make suggestions that might improve the experience of other foreign nationals.

14. On a scale of 1 (poorly) to 5 (very well), how well did the Auburn ISE graduate program prepare you to become a successful Industrial Engineer?

15. How would you rate your understanding of the ISE basic set of skills and
knowledge?

Inadequate    Fair    Good    Excellent

16. If you had a chosen area of expertise, please list it here. (Examples: OSE, OR, Statistics, Simulation, Engineering Economics, etc.)
17. If you had a chosen area of expertise listed above, how would you rate your understanding of this area?

Inadequate    Fair    Good    Excellent

18. As a result of your ISE education, how would you rate your written communication ability?

Inadequate    Fair    Good    Excellent

19. As a result of your ISE education, how would you rate your oral communication ability?

Inadequate    Fair    Good    Excellent

20. Did you submit any technical papers to a conference or journal during your studies? If so, please list type and whether it was published / accepted or not.

21. What do you think are the primary strengths of the Auburn ISE graduate program?

22. If you focused in a particular area, what do you think are the primary strengths?
23. What weaknesses do you see in the Auburn ISE graduate program?

24. If you focused in a particular area, what do you think are the primary weaknesses?

25. If ISE could invest in one thing to make the graduate program / department / facilities better, what would you suggest?

26. Provide any other comments that you would like to make about the Industrial & Systems Engineering program at Auburn.

27. Questions regarding faculty: Please rate on a 5 point scale with 1=Inadequate, 2=Fair, 3=Average, 4=Good, 5=Excellent.
   1. How would you rate the faculty in ISE?
   2. If you focused in a particular area, how would you rate those faculty members?
   3. I felt ISE faculty were responsive to my needs.
   4. I felt ISE faculty were approachable.
   5. I felt ISE faculty were knowledgable
   6. I felt ISE faculty were helpful
28. Graduate Program Officer/Coordinator was:
   Inadequate       Fair       Good       Excellent

   Comments:

For MS/MISE students:

27. How well would you rate your MISE design project or MS thesis experience as developing a reasonable solution to a complicated problem?
   Inadequate       Fair       Good       Excellent

   Thesis or Project title:

2. If you were a non-thesis (coursework only) MISE student, how would you rate your experience?
   Inadequate       Fair       Good       Excellent

For PhD students:

29. How well would you rate your dissertation experience as making a significant research contribution in your chosen area?
   Inadequate       Fair       Good       Excellent

   Dissertation title:
2. If I could change something about my Auburn experience, it would be……………………………..

3. If I had to do it all over again, I would/would not choose Auburn/ISE because……………………..

Findings
The two graduate exit surveys have a lot of questions in common. The data from the last several years for the department survey has not been analyzed because of a lack of department resources. We are going to work with the Graduate School to either combine the surveys or at least eliminate duplication between the surveys. This seems like a better use of limited resources than to analyze largely duplicate data.

How did you use findings for improvement?
There were no findings from the department surveys in 2012-13.