Industrial & Systems Engineering (PhD)

Ph.D. in Industrial and Systems Engineering Mission
Below are the missions of our university, college, and department, respectively.

University:

The University's mission is available in the [UF Catalog](). Below is an abbreviated version:

"The University of Florida's mission includes the following interlocking elements:

- ***Teaching*** *is a fundamental purpose of this university at both the undergraduate and graduate levels.*
- ***Research and scholarship*** *are integral to the education process and to the expansion of our understanding of the natural world, the intellect and the senses.*
- ***Service*** *reflects the university's obligation to share the benefits of its research and knowledge for the public good.*

These three span all of the university's academic disciplines and represent the university's commitment to lead and serve the state of Florida, the nation and the world by pursuing and disseminating new knowledge while building upon the experiences of the past. The University of Florida aspires to advance by strengthening the human condition and improving the quality of life."

College:

The College of Engineering fosters and provides world-class programs in engineering education, research and service to enhance the economic and social well-being of the citizens of Florida, the nation and the world.

Department:
The Department's mission is to develop critical thinkers and provide Industrial Engineering and Operations Research solutions for complex analytical problems in business, government and society in general.
Responsible Roles: <mark>Associate Chair (Akcali, Elif)</mark>
Program: Industrial & Systems Engineering (PhD)
Progress:

<mark>2016-17</mark> PG 1: Advanced Skills

Give graduates advanced analytical skills in areas related to industrial and systems engineering.

Evaluation Method

The following methods are used.

- General Exam at the end of the first year.
- Proposal Exam.
- Dissertation Defense.

Rubrics:

The goal is achieved if the following are true.

1. 75% of the PhD students passed their general exam at the end of the first year.
2. 75% of the PhD students passed their proposal exam.
3. 80% of the PhD students successfully defend their dissertations.

Responsible Role: <mark>Associate Chair (Akcali, Elif)</mark>
Progress:

<mark>2016-17</mark> PG 2: Independent Research

Prepare students for independent research and development in area of specialization (quality/reliability
engineering, engineering management, manufacturing, and operations research, financial engineering and risk
management, supply chain management and logistics).

Evaluation Method

Peer reviewed publications, participation in technical conferences and students' annual reports.

Rubrics:

The goal is achieved if the following are true:

1. At least 80% of the PhD students in their second year or later presented at least one paper at a technical conference.
2. At least 80% of the PhD students in their third year or later have at least one paper accepted for publication at a refereed journal.
3. At least 90% of the PhD students make a satisfactory progress toward their dissertation research according to their annual report.

Responsible Role: Associate Chair (Akcali, Elif)
Progress:

2016-17 PG 3: Diversity
Recruit and educate a diverse student population.
Evaluation Method

Number of females and underrepresented minorities

matriculating into the degree.

Rubrics:

The goal is achieved if at least 20% of graduating students are female and 10% are underrepresented minorities.

Responsible Role: Associate Chair (Akcali, Elif)
Progress:

2015-16 PG 3: Employment Opportunities
Provide graduates with full breadth of employment opportunities.
Evaluation Method

Job status of graduating students.

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Rubrics:

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The goal is achieved if at least 75% of graduating students have at least one job offer or accepted a position at graduation.
Responsible Role: <mark>Associate Chair (Akcali, Elif)</mark>
Progress:

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2015-16 PG 4: International Aspects

Acquaint students with international aspects of industrial and systems engineering problems and the profession.
Evaluation Method

International conference attendance and seminar by speakers from foreign countries.

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Rubrics:

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The goal is achieved if the following are true:

1. At least 75% of students graduated with a PhD degree attended at least one international conference.
2. At least 5 departmental seminars during the academic year were given by faculty members from foreign institutions and staff members from international companies.

Responsible Role: <mark>Associate Chair (Akcali, Elif)</mark>
Progress:

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<mark>2016-17</mark> SLO 1: Knowledge

Basic proficiency in the core methodological areas of operations research and industrial engineering, including mathematical modeling and optimization theory and algorithms.
SLO Area (select one): Knowledge (Grad)
Responsible Role: <mark>Associate Chair (Akcali, Elif)</mark>

Progress:
Assessment Method

<mark>General Exam score at the end of the first year.</mark>

<mark>Rubric: The outcome is achieved if 75% of the PhD students passed their General Exam at the end of the first year.</mark>

~~Grades in the following courses:~~

~~ESI 6912: Fundamentals of Mathematical Programming~~

~~ESI 6546: Stochastic Modeling and Analysis~~

~~ESI 6417: Linear programming and Network Optimization~~

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~~Rubric: The outcome is achieved if, in each of the three courses, at least 75% of the students received a B or better.~~

<mark>2016-17</mark> SLO 2: Knowledge

Mastery of advanced Operations Research foundational material to enable the development of new theoretical and methodological research.
SLO Area (select one):
Responsible Role: <mark>Associate Chair (Akcali, Elif)</mark>
Progress:
Assessment Method

<mark>Proposal Exam outcome.</mark>

<mark>Rubric: The outcome is achieved if 75% of the PhD students passed their Proposal Exam.</mark>

<mark>2016-17</mark> SLO 3: Professional Behavior

Ability to effectively and professionally communicate industrial engineering concepts and information in lecture format.

SLO Area (select one): Professional Behavior (Grad)
Responsible Role: <mark>Associate Chair (Akcali, Elif)</mark>
Progress:
Assessment Method

<mark>Dissertation defense and conference presentations</mark>.

<mark>All PhD students are required to pass their dissertation defense and present the results from their research at national/international conferences. All of which are observed by the students' advisers.</mark>

Rubric: The outcome is achieved if at least 75% of the students received a satisfactory evaluation from their advisers.

<mark>2016-17</mark> SLO 4: Skills

Ability to assimilate foundational material, describe important research contributions, and independently plan future research activities that advance the state-of-the-art in the student's field of expertise.
SLO Area (select one): Skills (Grad)
Responsible Role: <mark>Associate Chair (Akcali, Elif)</mark>
Progress:
Assessment Method

Qualifying Examination and Dissertation Proposal Defense:

Before admission to candidacy, all Ph.D. students must pass a Qualifying Examination and Dissertation Proposal, requiring students to write a brief document summarizing their work. Students additionally answer any written questions posed by their committee, and present their research findings in front of their committee.

Rubric: The outcome is achieved when at least 75% of PhD students pass their qualify exam and successfully defend their dissertation proposals.

<mark>2016-17</mark> SLO 5: Knowledge

Contribution of significant new research to the student's field of expertise, either in theoretical foundations or practical applications.
SLO Area (select one): Knowledge (Grad)
Responsible Role: <mark>Associate Chair (Akcali, Elif)</mark>
Progress:
Assessment Method

Dissertation Defense:

All Ph.D. students must defend their dissertation before graduation. The dissertation is evaluated based on the significance of new contributions to the field. The dissertation committee, including at least one committee member from outside the department, is responsible for evaluating the dissertation.

The outcome is achieved when at least 75% of the PhD students successfully defend their dissertation proposals.

Ph.D. in Industrial and Systems Engineering Detail
Start: 7/1/2016
End: 6/30/2017
Progress: Completed
Providing Department: Industrial & Systems Engineering (PhD)
Responsible Roles: <mark>Associate Chair (Akcali, Elif)</mark>
Research (Graduate and Professional AAPs only)

The Doctor of Philosophy (Ph.D.) degree is the terminal degree in the Industrial and Systems Engineering (ISE) field, and challenges graduate students to establish considerable depth in their field of study, gain world-class depth in their area of specialization, and contribute novel research that is published in top academic publication outlets. Whereas the Ph.D. coursework requirements satisfy the requirement of establishing a base of knowledge from which the students can launch their research, and elective courses allow students to build their expertise within their specification, the research component of this program differentiates it from the other graduate programs in ISE.

A member of the graduate faculty at the University of Florida advises the dissertation, and each dissertation committee member must also be a member of the graduate faculty. (The graduate faculty is a subset of University of Florida faculty whose responsibility includes the development of novel research contributions. Non-graduate-faculty members can be appointed to a committee

by special petition.) A student's research is evaluated in three primary stages. During the first stage, the student begins research on an array of unsolved problems or new challenges in the field, receiving active guidance from the dissertation advisor and complementary guidance from the committee members (as appropriate). This stage begins at the time the advisor and student are confident with fundamentals in the field, and continues up through the dissertation defense (see below). The second stage is the dissertation proposal and qualifying exam, and the third stage is the dissertation defense itself. These exams are described in the Measurement Tools subsection.

Assessment Timeline (Graduate and Professional AAPs only)
See the attached.

- PhD Assessment timeline

Curriculum Map (UG AAPs only)
Not required.

Assessment Cycle (All AAPs)

See the attached.

- PhD Assessment Cycle

Methods and Procedures (UG and Certificate AAPs)
Not required.

SLO Assessment Rubric (All AAPs)
See the attached.

- PhD Assessment Rubrics

Measurement Tools (Graduate and Professional AAPs Only)

There are three knowledge SLOs for the Ph.D. program. The first regards basic knowledge, and is assessed specifically by student performances on the final examinations in ESI 6912: Fundamentals of Mathematical Programming, ESI 6546: Stochastic Modeling and Analysis, and ESI 6417 Linear Programming and Network Optimization. The course instructor completes a scorecard to this effect (http://www.ise.ufl.edu/about/sacs-accreditation/). The second SLO, regarding mastery of fundamental Operations Research material, is tested via a rigorous General Examination (GE), taken after the student's first year in the program. This program is an eight-hour examination, requiring four hours of test-taking on each of two consecutive days. The examination questions are designed to test the extent of the knowledge gained within the core Ph.D. courses required of all students. In particular, the committee seeks to determine whether or not the background obtained by the student is sufficient to conduct high-quality research. These examinations are also pass/fail, and the results are documented and communicated to the students. Finally, the third SLO deals

with the contribution of significant research to the field. This SLO is measured by the dissertation defense, which is a pass/fail decision by the dissertation committee. The committee examines the quality of the written work, and assesses the extent to which the student has himself or herself personally mastered the material.

The skills SLO is measured by the Qualifying Examination and Dissertation Proposal (QE/DP), and by the dissertation defense, respectively. The former consists of a defense of the student's research work done thus far in his/her career at Florida, and (optionally) of written and oral questions. The QE/DP begins with a student presentation on his/her research (typically between 30-60 minutes), with questions from the dissertation committee either during or after the presentation. The committee members may elect to quiz the student on his/her foundational knowledge, investigate technical questions pertaining to additional research, and on extensions of the research that are planned for the future. Additionally, the committee members may ask written questions of the students ahead of the QE/DP. A pass/fail decision is reached by the committee, returned to the student, and documented. The professional behavior SLO is measured by a rubric for the dissertation defense is completed by the student's dissertation committee chair. The criteria evaluated by the committee chair include the quality of the presentation materials, the correctness and significance of the content, presentation mechanics, and the ability of students to answer questions posed during the defense. An example rubric is attached.

- PhD Assessment Methods

Assessment Oversight (All AAPs)
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Academic Assessment Plan Entry Complete: ☑