2012-2013 Undergraduate Academic Assessment Plan

Industrial and Systems Engineering

College of Engineering

Siriphong Lawphongpanich
lawphong@ise.ufl.edu

Industrial and Systems Engineering, College of Engineering Undergraduate Academic Assessment Plan

1. Mission Statement

Below are the missions of our university, college, and department, respectively.

- **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."

- **The College of Engineering Mission:**
  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.
- **Industrial and Systems Engineering Department's Mission:**
  The mission of the undergraduate program is to provide a top quality, state-of-the-art education in industrial and systems engineering and to foster leading-edge instruction. The program seeks national recognition by peer institutions and key employers of industrial and systems engineering graduates.

Our department's mission "to provide a top quality, state-of-the-art education … and foster leading-edge instruction" directly supports (a) our college's mission to foster and provides world-class programs in engineering education and (b) our university's commitment to pursue and disseminate new knowledge through the three interlocking elements: teaching, research & scholarship, and service.

2. Student Learning Outcomes (SLOs)

2.1.Content Knowledge

a) Apply knowledge of mathematics, science and engineering principles to industrial and systems engineering problems.
b) Design and conduct experiments relevant to industrial and systems engineering processes and problems, as well as to analyze and interpret the data.

2.2.Critical Thinking

Design industrial engineering decision support systems and manufacturing/service system processes to meet desired needs within realistic economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability constraints.

2.3.Communication

Communicate technical information effectively in speech and in writing to other industrial engineers and managers.

3. Curriculum Map

Curriculum Map for:

Program Industrial and Systems Engineering College of Engineering

Key: **I**ntroduced **R**einforced **A**ssessed

Courses SLOs	COP 2271 & 2271L	EIN 3101C	STA 4321 & 4322	ESI 4327C	EIN 4354	EIN 4905	ESI 4312	ESI 4313	EIN 4321	ESI 4221C	ESI 4356 & 4357	ESI 4523	EIN 4401	EIN 4343	EIN 4335
Content Knowledge															
2.1a	I		I	I	I	R	I	I	R	R	A1	I	R	R	A2
2.1b						I			R	I	A1				A2
Critical Thinking															
2.2						R	I	I	R	R	A1	I	R	R	A2
Communication															
2.3		I				R				R	R				A2

I= Introduced, R = Reinforced,
A1 = Assessed with Outcome Scorecards (see Section 5),
A2 = Assessed with Senior Design advisors and project sponsor evaluations (see Section 5)

4. Assessment Cycle

Assessment Cycle Chart

Assessment Cycle for:

Program Industrial and Systems Engineering College of Engineering

Analysis and Interpretation: June 1st – July 15th
Improvement Actions: Completed by August 15th
Dissemination: Completed by August 30th

Year / SLOs	10-11	11-12	12-13	13-14	14-15	15-16	17-18	18-19
Content Knowledge								
2.1a	x		x		x		x	
2.1b		x		x		x		x
Critical Thinking								
2.2	x	x	x	x	x	x	x	x
Communication								
2.3	x	x	x	x	x	x	x	x

5. Methods and Procedures

SLO Assessment Matrix

The SLO Assessment Matrix is new for the 2012-13 Academic Assessment Plans. We have populated the matrix to the extent possible with the information we have available. Please complete the matrix.

Assessment Method - For each SLO, please enter the assessment method you are using – exam (course, internal, or external), project, paper, presentation, performance, etc.

Measurement – list the measurement procedure you use for this outcome. It can be a faculty-developed rubric with the minimum acceptable level identified, an exam score and the minimum passing score, or other measurement.

SLO Assessment Matrix for 2012-13

2012-13 Student Learning Outcome	Assessment Method	Measurement Procedure
Apply knowledge of mathematics, science and engineering principles to industrial and systems engineering problems.	Outcome scorecards; Senior Design Project	Rubric
Design and conduct experiments relevant to industrial and systems engineering processes and problems, as well as to analyze and interpret the data.	Outcome scorecards; Senior Design Project	Rubric
Design industrial engineering decision support systems and manufacturing/service system processes to meet desired needs within realistic economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability constraints.	Outcome scorecards; Senior Design Project	Rubric
Communicate technical information effectively in speech and in writing to other industrial engineers and managers.	Senior Design Project	Rubric

The assessment methods consist of the following:

- Direct Assessment:
  - Outcome Scorecards from course instructors https://docs.google.com/spreadsheet/viewform?formkey=dEpZU294MnFsbjl6NV81cHhpcTRLYXc6MQ#gid=0
  - Senior Design (Capstone) Project Evaluation by project sponsors, course instructor and team advisors.
- Indirect Assessment:
  - Exit Interviews of graduating each semester
  - Co-Op/Internship Performance Evaluations from employers https://docs.google.com/spreadsheet/viewform?formkey=dGZUQTBCRGFDdHR4NG54cmRPUEpUWFE6MQ#gid=0
  - Annual Alumni Survey https://docs.google.com/spreadsheet/viewform?formkey=dC1uWTVnRTBFSklvSUtTOENwdEpzQ1E6MQ#gid=0

Our assessment process displayed in Figure 5.1 below.

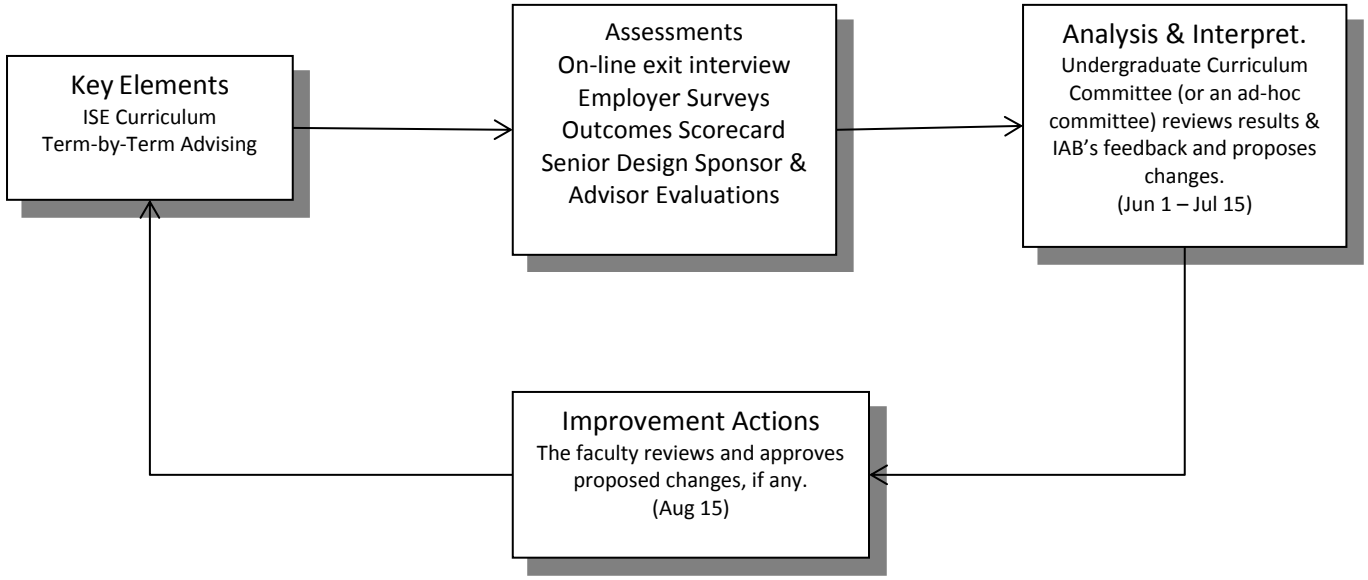

Figure 5.1: Industrial and Systems Engineering Student Learning Outcome Assessment Process

6 Assessment Tools and Rubrics: Example

This section provides examples of tools and rubrics used to measure the following Student Learning Outcome in EIN 4335 Senior Design Project:

Outcome 2.1a: Apply knowledge of mathematics, science and engineering principles to industrial and systems engineering problems.

Brief description of EIN 4335:

- Students must participate in a project team consisting of 3 to 5 students.
- The course instructor assigns each team a real-world project from companies and local non-profit organizations.[1]
- Each team is assigned a faculty advisor (usually other than the course instructor) who acts as a technical consultant.
- Student teams meet with project sponsors and faculty advisors on a weekly basis to discuss their approaches to solving the problems and provide updates on their progress.
- Student teams attend 50-miniute classes three times per week during some of which teams must report/present their progress to the class.
- Student teams must present their work to our faculty, project sponsors and students in our curriculum at the end of the semester in a setting similar to a session at a professional conference.
- Student teams must submit a mid-term and final report for instructor evaluation.

Assessment Tools and Rubrics: Two assessment tools are used in EIN 4335. They include

1) Ratings from project sponsors: After the project is completed, project sponsors are asked to rate student teams between 1 (low) and 5 (high) on their ability to apply knowledge of mathematics, science and engineering principles to industrial and systems engineering problems using the criteria in Table 6.1 below.
   Rubric: We consider a Student Outcome to be achieved if at least 80% of the teams receive ratings of 4 or higher.
2) Ratings from faculty advisors: After the project is completed, faculty advisors are asked to rate student teams between 1 (low) and 5 (high) on their ability to apply knowledge of mathematics, science and engineering principles to industrial and systems engineering problems using the criteria in Table 6.1 below.
   Rubric: We consider a Student Outcome to be achieved if at least 80% of the teams receive ratings of 4 or higher.

[1] A company typically contributes $1000 - $5000 per project to cover expenses. Projects from local non-profit organizations are often performed *pro bono*.

EIN 4335: Rubric for the Senior Design Project

Rating	Criteria
5	Apply correct mathematical, scientific and/or engineering concepts, principles or models to formulate and/or solve the assigned problem with no conceptual or procedural error.
4	Apply mostly correct mathematical, scientific and/or engineering concepts, principles or models to formulate and/or solve the assigned problem with minor conceptual or procedural errors.
3	Apply essentially correct mathematical, scientific and/or engineering concepts, principles or models to formulate and/or solve the assigned problem with some conceptual or procedural errors.
2	Apply partially correct mathematical, scientific and/or engineering concepts, principles or models to formulate and/or solve the assigned problem. The model, formulation and/or solution procedure contain significant number of errors.
1	Apply incorrect mathematical, scientific and/or engineering concepts, principles or models to formulate and/or solve the assigned problem. The model, formulation and/or solution procedure are incorrect, impractical, infeasible, and/or ineffective.

Assessment Oversight

Name	Department Affiliation	Email Address	Phone Number
Siriphong Lawphongpanich	Undergraduate Coordinator	lawphong@ise.ufl.edu	352-392-1464
Joseph C. Hartman	Department Chair	jchartman@ise.ufl.edu	