Program: M.S. in Industrial and Systems Engineering.

1. **Student Learning Objectives**
The Department of Industrial and Systems Engineering (ISYE) has developed its learning objectives (or program outcomes) to be consistent with Accreditation Board of Engineering and Technology (ABET) criteria. Although the accreditation board does not review the graduate programs, the faculty initially felt that these outcomes are appropriate for our program.

The learning objectives are:

A. An ability to apply knowledge of mathematics, science, and engineering to Industrial and Systems Engineering.
B. An ability to design and conduct experiments as well as analyze and interpret data.
C. An ability to design a system component or process to meet design needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
D. An ability to function on multi-disciplinary teams.
E. An ability to identify, formulate, and solve engineering problems.
F. An understanding of professional and ethical responsibility.
G. An ability to communicate effectively.
H. A broad education necessary to understand the impact of engineering solutions in a global and social context.
I. Recognition of the need for, and an ability to engage in life-long learning.
J. Knowledge of contemporary issues.
K. Graduates have an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

The operational definition of each program outcome is presented in Table 1.

2. **Explanation of Methods**

Table 3 presents the different direct and indirect methods used to assess the different learning objectives. The table also presents a brief description of each method used, a timeline for implementation, the person responsible, and the objectives that each method addresses.
Table 3: Methods and Objectives

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
<th>Timeline</th>
<th>Person Responsible</th>
<th>Objectives Addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course survey</td>
<td>A self-assessment is performed near the end of each semester by students currently enrolled in the ISYE graduate courses.</td>
<td>Fall and Spring</td>
<td>Instructor</td>
<td>A, B, C, D, E, F, G, H, I, J, K</td>
</tr>
<tr>
<td>Thesis, Project, or Paper evaluation</td>
<td>A committee of three (advisor and 2 faculty members) evaluate the performance of the students’ performance in their thesis or project.</td>
<td>Fall, Spring, and Summer</td>
<td>Advisor</td>
<td>A, B, C, D, E, F, G, H, I, J, K</td>
</tr>
<tr>
<td></td>
<td>In the case of a paper, the advisor evaluates the students’ performance based on the paper that was written and presented by the student.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The masters’ degree requirements in Industrial and Systems Engineering are designed to provide maximum flexibility for the students to choose their own course plan in consultation with their advisors. All the students are required to register for the graduate seminar (1 hour), complete a minimum of 24 to 30 hours of course work (24 hours for thesis option; 27 hours for project option; 30 hours for paper option), and complete the thesis (6 hours), project (3 hours), or a paper (1 hour).

**Course Survey**

The instructor of each course lists the program outcomes and course outcomes in their syllabus. At the end of the semester, a survey is conducted to find out from the students if the course and program outcomes were met. A sample of the survey used for one of the graduate level course is enclosed in Appendix A1. Depending on the content of the course, individual faculty members get to decide the appropriate outcomes assessed in their courses.

**Thesis, Project, or Paper Evaluation**

The student performance in their thesis and project work is evaluated by the advisor and the committee members. The committee typically consists of three faculty members, including the advisor. The committee judges the students’ work based on the research contribution, thoroughness, experimental results, etc.

The students can also elect to do a paper (1 hour) instead of a thesis or a project. In which case, the advisor will judge the students’ performance.