

University of Pittsburgh
School of Engineering
Student Assessment System

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July 7, 2005

With the introduction of the new ABET (Accreditation Board for Engineering and Technology) accreditation criteria [1], the more than 1600 US engineering programs have had to develop and implement systems for continuous improvement. Faculty must demonstrate that the outcomes important to the mission of the institution and the objectives of the program are being met via sound measurement, and must give evidence that these results are applied to the further development and improvement of the program.

Hence, outcome assessment and continuous curriculum improvement have now come to the forefront of engineering education. One cost-effective method to enhance an engineering school's evaluation program is the use of closed form questionnaires. Surveys allow for quantitative feedback that allow educators to generate usable statistics, and when using on large numbers of students, closed form questionnaires are relatively easy to administer and analyze [2] compared to other assessment methods, such as portfolios, authentic assessment, concept maps, etc. Further, questionnaire results can be very valuable when used for comparison purposes, such as comparing different levels (freshman, sophomore, junior, senior), different departments within a school, or across several schools for benchmarking purposes.

Even so, accurate assessment requires well developed and tested surveys, an administrative technique that is unobtrusive of faculty and student time, and an accurate means to store data for analysis and generate meaningful reports for programmatic improvements. Generally, though, the majority of engineering "pencilpaper" surveys are administered during valuable class time. In addition, extra time is required to enter student responses so that they are ready for analysis and reporting. Using "paper-pencil" surveys also increases the opportunity for data errors. For example, students can mark several responses or accidentally skip a question, the scanner can possibly misread questionnaire responses, or the data entry person can make errors when entering the information.

With initial funding by the Engineering Information Foundation and the National Science Foundation, the University of Pittsburgh has developed the On-line Student Survey System (OS³) to facilitate ABET assessment.

THE ABET SURVEYS

At the University of Pittsburgh, a series of questionnaires were developed and tested by faculty in the department of Industrial Engineering and are an integral part of the School's on-going assessment and accreditation process [3-5]. The surveys were designed to assess and track students at appropriate points in their academic careers. Depending on their level, all engineering students take either the *Pittsburgh Freshman Engineering Attitudes Survey*© (pre and post surveys), the *Sophomore Engineering Learning and Curriculum Evaluation Instrument*©, or the *Junior Engineering Learning and Curriculum Evaluation Instrument*© each academic year. When students become seniors, they take the *Senior Exit Survey*© during the semester prior to graduating. Three to five years post graduation, students are asked to take the *Pittsburgh Alumni Survey* ©.

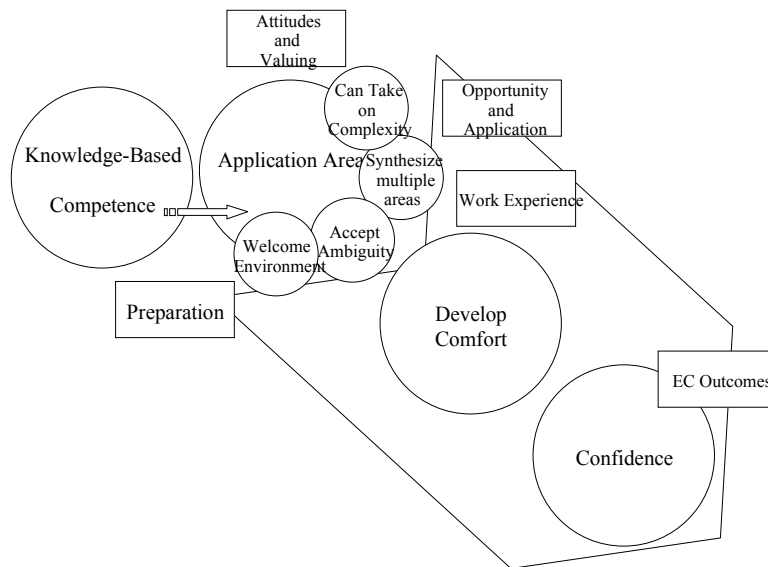


Figure 1: Conceptual Model Of How An Undergraduate Achieves Confidence In ABET Outcomes

Each survey was developed based on one of two conceptual models of the engineering education system. The first model, shown in Figure 1, is based on Bloom’s general taxonomy of the cognitive domain [6] and Krathwohl’s taxonomy of affective domain [7]. As Figure 1 demonstrates, obtaining confidence in the ABET outcomes requires that students must first gain knowledge-based competence in their course work. Through application of the knowledge students begin to take on more complexity in engineering problems, accept more ambiguity, welcome different engineering environments, and are able to synthesize multiple areas. This application comes from hands-on opportunities in laboratories and work experience and sufficient preparation in the requisite preceding course work, as well as a development of one’s attitudes towards engineering and the profession. Through these aspects, students develop a level of comfort towards their profession and ultimately confidence the outcomes. This sequence is heightened as students mature and matriculate through the educational system, and the surveys reflect each of these aspects.

The specific content of each questionnaire is as follows.

The *Pittsburgh Freshman Engineering Attitudes Survey*© (PFEAS) measures several facets of students’ attitudes at the beginning and the end of their Freshman year; e.g., their opinions about aspects of the engineering profession and the reasons that they chose to study engineering. This survey also rates the students’ self-assessed confidence in their background (preparatory) knowledge and skills, and their perceived ability to succeed in engineering. Students also rate their study skills and their interest in working in groups. In total, the pre-survey contains 50 items that are rated on either five-point Likert scales or ordinal-based self-assessed confidence scales. The questionnaire items have been statistically clustered into 13 attitude and self-assessment measures. The post version of

the questionnaire includes these same statements plus 20 additional items that capture the eleven outcome themes enunciated by the ABET Criterion 3.

The Sophomore Engineering Learning and Curriculum Evaluation Instrument© and the Junior Engineering Learning and Curriculum Evaluation Instrument© measure the same aspects as the PFEAS, but also add the student's self-assessed preparedness of their current level given their educational experiences during the previous year. The junior instrument asks additional questions about students' work experiences and how they relate to the outcomes. The Senior Exit Survey© asks supplementary questions about students' future educational plans and employment information.

The *Pittsburgh Alumni Survey*© instrument was originally developed from the alumnus' perspective of reflecting on the overall educational system he/she experienced as a student. That is, the student enters the educational system and is exposed to several processes that are core to an engineering curriculum (the curriculum, the culture, the in-class room instruction, and experience) and those that enhance the education or enable an individual to go to school. After four or more years of education, a student graduates possessing certain knowledge, skills, and attitudes as delineated by the ABET outcomes. Alumni are asked to provide overall ratings about their degreed program and the engineering school, as well as rate their level of competence in the outcomes at time of graduation. Individuals then provide a candid critique on their education, as described by the model.

All questionnaires have been thoroughly tested for reliability and validity. Since the inception of the first questionnaire in 1993, a number of schools have adopted one or more of the questionnaires in an effort to better understand the characteristics of their engineering students [8], study attrition and probation issues [9-11], provide an evaluation tool for educational interventions [12-13], as well as to measure ABET outcome related issues. The University of Pittsburgh first used the questionnaires in obtaining re-accreditation in 1999 under the new criteria. Over 20 schools have used the PFEAS© instrument and four schools have used one or more of the other instruments.

Though less costly and time consuming than most assessment methods, costs associated with paper-pencil versions of the questionnaires becomes quickly unwieldy. The paper form of the surveys is "scannable" and takes roughly one to two hours per 500 surveys to scan into a database. Depending on the nature and depth of the data analysis that a particular school requests, an additional two to four hours is required to produce a report. This does not include administrative costs and time associated with administering the questionnaires or printing and shipping costs. Given the popularity and need of the surveys, a web-based solution was highly desirable.

Obtaining Summary "Grades" from the Surveys

A common set of questions that focuses on attainment of the ABET outcomes is included on the Freshman Post, Sophomore, Junior, Senior and Alumni surveys. A grading system was developed which reflects the distribution of responses. A summary set of grades is

provided to each program each year. The results are “graded” as shown in Table 1 where the best rating is a 5 and the poorest is a 1. Figure 2 gives an example of the grades for ABET outcome 3b.

Table 1: Grading Criteria for Online Surveys

Grade	Criteria
A+	$\geq 75\%$ of responses in categories 5 and 4; $\geq 50\%$ rated as 5
A	$\geq 75\%$ of responses in categories 5 and 4; $\geq 37.5\%$ rated as 5;
A-	$\geq 75\%$ of responses in categories 5 and 4; $< 37.5\%$ rated as 5
B+	50 to $< 75\%$ in categories 5 and 4; $\geq 37.5\%$ rated as 5
B	50 to $< 75\%$ in categories 5 and 4; $\geq 25\%$ rated as 5
B-	50 to $< 75\%$ in categories 5 and 4; $< 25\%$ rated as 5
C+	Highest frequency of ratings for category 3 but $< 50\%$ in category 3; number of (4+5) $>$ number of (1+2)
C	50 to $< 75\%$ in category 3
C-	Highest frequency of ratings for category 3 but $< 50\%$ in category 3; number of (1+2) $>$ number of (4+5)
D+	$< 75\%$ to $\geq 50\%$ in categories 1 and 2; $< 25\%$ are in category 1
D	$< 75\%$ to $\geq 50\%$ in categories 1 and 2; $\geq 25\%$ to $< 37.5\%$ are in category 1
D-	$< 75\%$ to $\geq 50\%$ in categories 1 and 2; $\geq 37.5\%$ are in category 1
F	$\geq 75\%$ are in categories 1 and 2

B: An ability to design and conduct experiments, as well as to analyze and interpret data	• Designing and conducting an experiment to obtain measurements or gain additional knowledge about a process	FreshmenPost	B	C
	• Designing an experiment to obtain measurements or gain additional knowledge about a process	Sophomore	C	C
	• Designing an experiment to obtain measurements or gain additional knowledge about a process	Junior	C-	C
	• Designing an experiment to obtain measurements or gain additional knowledge about a process	Senior	A-	B+
	• Designing an experiment to obtain measurements or gain additional knowledge about a process	Alum Then	B	C+
	• My ability to design and conduct an experiment to obtain measurements or gain additional knowledge	Alum Now	A-	B
	• Analyzing and interpreting a set of data to find underlying meaning(s)	FreshmenPost	B	C+
	• Analyzing a set of data to find underlying meaning(s)	Sophomore	B-	B-
	• Analyzing a set of data to find underlying meaning(s)	Junior	B-	C+
	• Analyzing a set of data to find underlying meaning(s)	Senior	A-	B+
	• Analyzing a set of data to find underlying meaning(s)	Alum Then	B	B-
	• My ability to analyze and interpret a set of data to find underlying meaning	Alum Now	B+	A-

Figure 2: Example Grade – Outcome 3b.

The Advent of OS³

The goal of the On-Line Student Survey System (OS³) has been to provide a web-based system for administering surveys at any school without requiring technical knowledge of the implementation of the OS³ system. As Figure 3 depicts, the OS³ consists of three components: *student*, *local administrator*, and *global administrator*. The *student* users participate by answering a number of surveys throughout their college experience. The *local administrator* is the individual at the school where the survey is being conducted and is responsible for administering the surveys through a web-interface. The *local administrator* decides which survey should be administered, to whom and for what length of time.

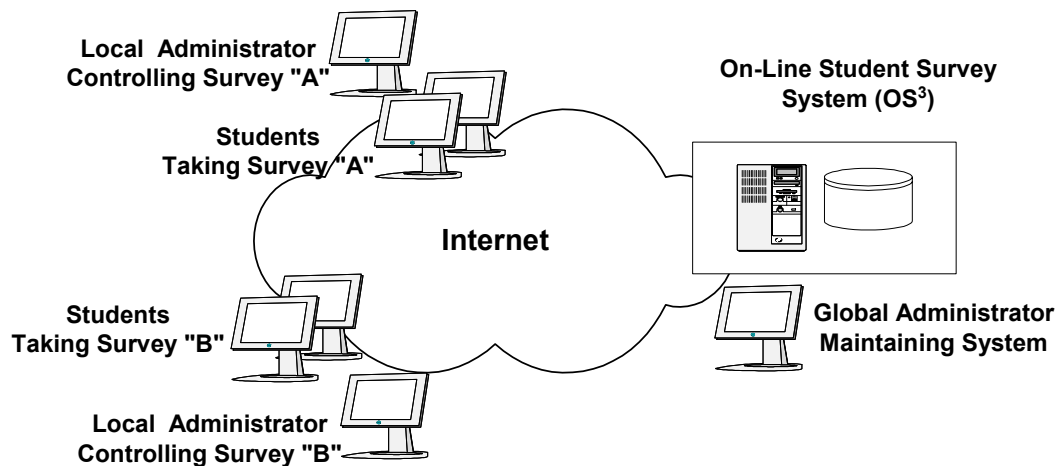


Figure 3: A Network View of OS³

To maintain cross-institutional data integrity, the *global administrator* controls the addition and modification of the surveys, and providing local administrators access to the system. The goal is to provide the *local administrators* with the necessary tools to administer the survey themselves. While the OS³ server is located at the University of Pittsburgh, the *local administrator* has control over the appearance of survey and can customize the interface to include the local school's logo and colors.

On the date specified by the local administrator, the OS³ system sends an email (created by the local administrator) requesting students to take the on-line survey. While the University of Pittsburgh's mail server is used to send the email messages, the *return* email address is that of the local administrator at the student's institution. Each of the students receive a customized email message that gives them a web address that they can go to by clicking on the link in their email or by typing in the address into the URL line of a browser. The student then logs in using the password provided for them. A typical survey has 50 to 70 questions and takes less than 20 minutes to complete. The results are then stored in the database and the student's password is invalidated. A confirmation screen thanks the student for taking the survey.

FRESHMAN ENGINEERING ATTITUDES PRE-SURVEY

1 This is a survey to elicit Freshman Engineers' opinions and feelings about engineering. Please do not spend more than 25 minutes to complete the questionnaire, so work as quickly as you can. (Remember, these are your own personal attitudes, not your friend s.) Your responses will remain confidential. Complete the following information as instructed.

2 Age

3 Ethnicity

- 1 African American
- 2 Asian Pacific
- 3 Hispanic
- 4 Native American
- 5 White Caucasian
- 6 Other

4 Gender

- 1 Male
- 2 Female

5 Enrollment Status

- 1 Part (< 12 hrs)
- 2 Full (>= 12 hrs)

6 Transfer Student?

- 1 No
- 2 Yes (< 24 hrs)
- 3 Yes (>= 24 hrs)

7 For each statement about engineering, please select the response that corresponds to how strongly you disagree or agree with the statement.

8 I expect that engineering will be a rewarding career.

- 1 Strongly Disagree
- 2 Disagree
- 3 Neutral
- 4 Agree
- 5 Strongly Agree

9 I expect that studying engineering will be rewarding.

- 1 Strongly Disagree
- 2 Disagree
- 3 Neutral
- 4 Agree
- 5 Strongly Agree

10 The advantages of studying engineering outweigh the disadvantages.

- 1 Strongly Disagree
- 2 Disagree
- 3 Neutral
- 4 Agree
- 5 Strongly Agree

11 I don t care for this career.

- 1 Strongly Disagree
- 2 Disagree
- 3 Neutral
- 4 Agree
- 5 Strongly Agree

12 The future benefits of studying engineering are worth the effort.

- 1 Strongly Disagree

- 2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 13 I can think of several other majors that would be more rewarding than engineering.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 14 I have no desire to change to another major (biology, English, chemistry, art, history, etc.)
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 15 The rewards of getting an engineering degree are not worth the effort.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 16 From what I know, engineering is boring.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 17 Engineers are well paid.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 18 Engineers contribute more to making the world a better place than people in most other occupations.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 19 Engineers are innovative.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 20 I enjoy the subjects of science and mathematics the most.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 21 I will have no problem finding a job when I have obtained an engineering degree.

- | | | |
|----|---|--|
| | 1 | Strongly Disagree |
| | 2 | Disagree |
| | 3 | Neutral |
| | 4 | Agree |
| | 5 | Strongly Agree |
| 22 | | Engineering is an exact science. |
| | 1 | Strongly Disagree |
| | 2 | Disagree |
| | 3 | Neutral |
| | 4 | Agree |
| | 5 | Strongly Agree |
| 23 | | My parent(s) are making me study engineering. |
| | 1 | Strongly Disagree |
| | 2 | Disagree |
| | 3 | Neutral |
| | 4 | Agree |
| | 5 | Strongly Agree |
| 24 | | Engineering is an occupation that is respected by other people. |
| | 1 | Strongly Disagree |
| | 2 | Disagree |
| | 3 | Neutral |
| | 4 | Agree |
| | 5 | Strongly Agree |
| 25 | | I like the professionalism that goes with being an engineer. |
| | 1 | Strongly Disagree |
| | 2 | Disagree |
| | 3 | Neutral |
| | 4 | Agree |
| | 5 | Strongly Agree |
| 26 | | I enjoy taking liberal arts courses more than math and science courses. |
| | 1 | Strongly Disagree |
| | 2 | Disagree |
| | 3 | Neutral |
| | 4 | Agree |
| | 5 | Strongly Agree |
| 27 | | Engineering is more concerned with improving the welfare of society than most other professions. |
| | 1 | Strongly Disagree |
| | 2 | Disagree |
| | 3 | Neutral |
| | 4 | Agree |
| | 5 | Strongly Agree |
| 28 | | I am studying engineering because it will provide me with a lot of money, and I cannot do this in other professions. |
| | 1 | Strongly Disagree |
| | 2 | Disagree |
| | 3 | Neutral |
| | 4 | Agree |
| | 5 | Strongly Agree |
| 29 | | Engineers have contributed greatly to fixing problems in the world. |
| | 1 | Strongly Disagree |
| | 2 | Disagree |
| | 3 | Neutral |
| | 4 | Agree |
| | 5 | Strongly Agree |

- 30 An engineering degree will guarantee me a job when I graduate.
- 1 Strongly Disagree
 - 2 Disagree
 - 3 Neutral
 - 4 Agree
 - 5 Strongly Agree
- 31 My parent(s) want me to be an engineer.
- 1 Strongly Disagree
 - 2 Disagree
 - 3 Neutral
 - 4 Agree
 - 5 Strongly Agree
- 32 Engineers are creative.
- 1 Strongly Disagree
 - 2 Disagree
 - 3 Neutral
 - 4 Agree
 - 5 Strongly Agree
- 33 Engineering involves finding precise answers to problems.
- 1 Strongly Disagree
 - 2 Disagree
 - 3 Neutral
 - 4 Agree
 - 5 Strongly Agree
- 34 I am studying engineering because I enjoy figuring out how things work.
- 1 Strongly Disagree
 - 2 Disagree
 - 3 Neutral
 - 4 Agree
 - 5 Strongly Agree
- 35 Technology plays an important role in solving society's problems.
- 1 Strongly Disagree
 - 2 Disagree
 - 3 Neutral
 - 4 Agree
 - 5 Strongly Agree
- 36 For the following subjects and skills, please select the response that describes how confident you are of your abilities in the subject or skill.
- 37 Chemistry
- 1 Not Strongly Confident
 - 2 Not Confident
 - 3 Neutral
 - 4 Confident
 - 5 Strongly Confident
- 38 Physics
- 1 Not Strongly Confident
 - 2 Not Confident
 - 3 Neutral
 - 4 Confident
 - 5 Strongly Confident
- 39 Calculus
- 1 Not Strongly Confident
 - 2 Not Confident

- | | | |
|----|--|------------------------|
| | 3 | Neutral |
| | 4 | Confident |
| | 5 | Strongly Confident |
| 40 | Engineering | |
| | 1 | Not Strongly Confident |
| | 2 | Not Confident |
| | 3 | Neutral |
| | 4 | Confident |
| | 5 | Strongly Confident |
| 41 | Writing | |
| | 1 | Not Strongly Confident |
| | 2 | Not Confident |
| | 3 | Neutral |
| | 4 | Confident |
| | 5 | Strongly Confident |
| 42 | Speaking | |
| | 1 | Not Strongly Confident |
| | 2 | Not Confident |
| | 3 | Neutral |
| | 4 | Confident |
| | 5 | Strongly Confident |
| 43 | Computer Skills | |
| 44 | For the following statements about studying, working in groups and personal abilities, please select the response that best describes how strongly you disagree or agree with the statement. | |
| 45 | I feel I know what an engineer does. | |
| | 1 | Strongly Disagree |
| | 2 | Disagree |
| | 3 | Neutral |
| | 4 | Agree |
| | 5 | Strongly Agree |
| 46 | Studying in a group is better than studying by myself. | |
| | 1 | Strongly Disagree |
| | 2 | Disagree |
| | 3 | Neutral |
| | 4 | Agree |
| | 5 | Strongly Agree |
| 47 | Creative thinking is one of my strengths. | |
| | 1 | Strongly Disagree |
| | 2 | Disagree |
| | 3 | Neutral |
| | 4 | Agree |
| | 5 | Strongly Agree |
| 48 | I need to spend more time studying than I currently do. | |
| | 1 | Strongly Disagree |
| | 2 | Disagree |
| | 3 | Neutral |
| | 4 | Agree |
| | 5 | Strongly Agree |
| 49 | I have strong problem solving skills. | |
| | 1 | Strongly Disagree |
| | 2 | Disagree |
| | 3 | Neutral |
| | 4 | Agree |

- 50 5 Strongly Agree
Most of my friends that I "hang out" with are studying engineering.
- 1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 51 5 Strongly Agree
I feel confident in my ability to succeed in engineering.
- 1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 52 5 Strongly Agree
I prefer studying/working alone.
- 1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 53 5 Strongly Agree
I am good at designing things.
- 1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 54 5 Strongly Agree
In the past, I have not enjoyed working in assigned groups.
- 1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 55 5 Strongly Agree
I am confident about my current study habits or routine.
- 1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 56 5 Strongly Agree
I consider myself mechanically inclined.
- 1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 57 5 Strongly Agree
I consider myself technically inclined.
- 1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 58 5 Strongly Agree
I enjoy solving open-ended problems.
- 1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree

- 59 5 Strongly Agree
I enjoy problems that can be solved in different ways.
1 Strongly Disagree
2 Disagree
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| | 3 | Neutral |
| | 4 | Confident |
| | 5 | Strongly Confident |
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| | 4 | Agree |
| | 5 | Strongly Agree |
| 46 | Studying in a group is better than studying by myself. | |
| | 1 | Strongly Disagree |
| | 2 | Disagree |
| | 3 | Neutral |
| | 4 | Agree |
| | 5 | Strongly Agree |
| 47 | Creative thinking is one of my strengths. | |
| | 1 | Strongly Disagree |
| | 2 | Disagree |
| | 3 | Neutral |
| | 4 | Agree |
| | 5 | Strongly Agree |
| 48 | I need to spend more time studying than I currently do. | |
| | 1 | Strongly Disagree |
| | 2 | Disagree |
| | 3 | Neutral |
| | 4 | Agree |
| | 5 | Strongly Agree |
| 49 | I have strong problem solving skills. | |
| | 1 | Strongly Disagree |
| | 2 | Disagree |
| | 3 | Neutral |
| | 4 | Agree |

- 50 5 Strongly Agree
Most of my friends that I "hang out" with are studying engineering.
 1 Strongly Disagree
 2 Disagree
 3 Neutral
 4 Agree
 5 Strongly Agree
- 51 5 Strongly Agree
I feel confident in my ability to succeed in engineering.
 1 Strongly Disagree
 2 Disagree
 3 Neutral
 4 Agree
 5 Strongly Agree
- 52 5 Strongly Agree
I prefer studying/working alone.
 1 Strongly Disagree
 2 Disagree
 3 Neutral
 4 Agree
 5 Strongly Agree
- 53 5 Strongly Agree
I am good at designing things.
 1 Strongly Disagree
 2 Disagree
 3 Neutral
 4 Agree
 5 Strongly Agree
- 54 5 Strongly Agree
In the past, I have not enjoyed working in assigned groups.
 1 Strongly Disagree
 2 Disagree
 3 Neutral
 4 Agree
 5 Strongly Agree
- 55 5 Strongly Agree
I am confident about my current study habits or routine.
 1 Strongly Disagree
 2 Disagree
 3 Neutral
 4 Agree
 5 Strongly Agree
- 56 5 Strongly Agree
I consider myself mechanically inclined.
 1 Strongly Disagree
 2 Disagree
 3 Neutral
 4 Agree
 5 Strongly Agree
- 57 5 Strongly Agree
I consider myself technically inclined.
 1 Strongly Disagree
 2 Disagree
 3 Neutral
 4 Agree
 5 Strongly Agree
- 58 5 Strongly Agree
I enjoy solving open-ended problems.
 1 Strongly Disagree
 2 Disagree
 3 Neutral
 4 Agree

- 5 Strongly Agree
- 59 I enjoy problems that can be solved in different ways.
- 1 Strongly Disagree
- 2 Disagree
- 3 Neutral
- 4 Agree
- 5 Strongly Agree
- 60 For the following knowledge and skill areas, indicate your level of confidence. For example, if you have little or no confidence in your ability to use mathematics to solve engineering problems, mark poor. If you are extremely confident of your ability, mark excellent.
- 61 Using my knowledge of mathematics to solve relevant engineering problems
- 1 Poor
- 2 Fair
- 3 Good
- 4 Very Good
- 5 Excellent
- 62 Using my knowledge of chemistry to solve relevant engineering problems
- 1 Poor
- 2 Fair
- 3 Good
- 4 Very Good
- 5 Excellent
- 63 Using my knowledge of physics to solve relevant engineering problems
- 1 Poor
- 2 Fair
- 3 Good
- 4 Very Good
- 5 Excellent
- 64 Using my knowledge of engineering to solve relevant problems
- 1 Poor
- 2 Fair
- 3 Good
- 4 Very Good
- 5 Excellent
- 65 Designing and conducting an experiment to obtain measurements or gain additional knowledge about a process
- 1 Poor
- 2 Fair
- 3 Good
- 4 Very Good
- 5 Excellent
- 66 Analyzing and interpreting a set of data to find underlying meaning(s)
- 1 Poor
- 2 Fair
- 3 Good
- 4 Very Good
- 5 Excellent
- 67 Designing a device or process to satisfy a given set of specifications
- 1 Poor
- 2 Fair
- 3 Good
- 4 Very Good
- 5 Excellent
- 68 Functioning as a technically contributing member of an engineering team

	1	Poor
	2	Fair
	3	Good
	4	Very Good
	5	Excellent
69		Functioning as an accountable member of an engineering team
	1	Poor
	2	Fair
	3	Good
	4	Very Good
	5	Excellent
70		Formulating unstructured engineering problems
	1	Poor
	2	Fair
	3	Good
	4	Very Good
	5	Excellent
71		Using appropriate engineering techniques to include software or lab equipment for problem solving
	1	Poor
	2	Fair
	3	Good
	4	Very Good
	5	Excellent
72		Understanding the professional responsibilities of an engineer
	1	Poor
	2	Fair
	3	Good
	4	Very Good
	5	Excellent
73		Understanding the ethical responsibilities as an engineer
	1	Poor
	2	Fair
	3	Good
	4	Very Good
	5	Excellent
74		Writing effectively
	1	Poor
	2	Fair
	3	Good
	4	Very Good
	5	Excellent
75		Making professional presentations
	1	Poor
	2	Fair
	3	Good
	4	Very Good
	5	Excellent
76		Effectively expressing engineering-related ideas to others
	1	Poor
	2	Fair
	3	Good
	4	Very Good
	5	Excellent

- 77 Listening to and impartially interpreting different viewpoints
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 78 Understanding the potential risks and impacts that an engineering solution or design may have to the public
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 79 Applying knowledge about current issues (economic, environmental, political, societal, etc.) to engineering-related problems
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 80 Recognizing the limitations of my engineering knowledge and abilities and knowing when to seek additional information
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 81 Please provide any additional comments concerning your education. We are particularly interested in ways to improve the program.

SOPHOMORE ENGINEERING LEARNING AND CURRICULUM EVALUATION INSTRUMENT

1 We are interested in how your engineering knowledge and skills have improved during your freshman year. When answering each item, please take time to reflect on your second year as an engineering student and where you are now. Remember that these should be your own views. There are no right or wrong answers. Your responses will remain confidential.

2 Major

- 1 Aerospace
- 2 Bioengineering
- 3 Chemical
- 4 Civil
- 5 Computer
- 6 Computer Science
- 7 Electrical
- 8 Engineering Physics
- 9 Industrial
- 10 Materials
- 11 Mechanical
- 12 Metallurgical
- 13 Other

3 Ethnicity

- 1 African American
- 2 Asian Pacific
- 3 Hispanic
- 4 Native American
- 5 White Caucasian
- 6 Other

4 Gender

- 1 Male
- 2 Female

5 Did you complete your previous year of coursework at the University of Pittsburgh?

- 1 Yes
- 2 No

6 Where did you spend your previous academic year?

- 1 University of Pittsburgh School of Engineering
- 2 University of Pittsburgh CAS / CGS
- 3 University of Pittsburgh Regional Campus
- 4 Community Campus
- 5 Another College or University
- 6 Other

7 General Freshman Year - Please indicate the number that corresponds to how strongly you disagree or agree with each statement.

8 My freshman year prepared me for my sophomore year.

- 1 Strongly Disagree
- 2 Disagree
- 3 Neutral
- 4 Agree
- 5 Strongly Agree

9 My freshman year helped me decide that I want to remain in engineering.

- 1 Strongly Disagree
- 2 Disagree

- 3 Neutral
4 Agree
5 Strongly Agree
- 10 I am confident that I have chosen the right major.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 11 I had enough information when I chose my major.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 12 My academic advisers were helpful.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 13 I understand what the practicing engineers do.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 14 I was able to discuss academic issues with my professors.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 15 My freshman year informed me about the different engineering fields.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 16 I worked on "real-world" engineering problems in my courses.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 17 I had 'hands-on' engineering experiences(s) during my freshman year.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 18 I had a mentor or advisor who provided guidance.
1 Strongly Disagree
2 Disagree

- 3 Neutral
4 Agree
5 Strongly Agree
- 19 Preparedness in Knowledge and Skill Areas - Please fill in the number that corresponds to how strongly you disagree or agree with each statement
- 20 As a result of my freshman year I was prepared for my sophomore year in terms of my:
- 21 Ability to apply math concepts to solve engineering problems.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 22 Ability to apply chemistry concepts to solve engineering problems.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 23 Ability to apply physics concepts to solve engineering problems.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 24 Ability to solve unstructured engineering problems.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 25 Ability to analyze engineering data.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 26 Ability to design a device or process.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 27 Ability to use proper laboratory procedures.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 28 Computer programming skills.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree

- 29 5 Strongly Agree
 Ability to use software packages to solve engineering problems.
 1 Strongly Disagree
 2 Disagree
 3 Neutral
 4 Agree
 5 Strongly Agree
- 30 5 Strongly Agree
 Ability to use CAD software.
 1 Strongly Disagree
 2 Disagree
 3 Neutral
 4 Agree
 5 Strongly Agree
- 31 5 Strongly Agree
 Technical writing ability; i.e., prepare engineering reports and papers.
 1 Strongly Disagree
 2 Disagree
 3 Neutral
 4 Agree
 5 Strongly Agree
- 32 5 Strongly Agree
 Oral communication skills.
 1 Strongly Disagree
 2 Disagree
 3 Neutral
 4 Agree
 5 Strongly Agree
- 33 5 Strongly Agree
 Ability to function effectively in different team roles.
 1 Strongly Disagree
 2 Disagree
 3 Neutral
 4 Agree
 5 Strongly Agree
- 34 5 Strongly Agree
 Ability to set goals and achieve them on time.
 1 Strongly Disagree
 2 Disagree
 3 Neutral
 4 Agree
 5 Strongly Agree
- 35 5 Strongly Agree
 Ability to learn new things on my own.
 1 Strongly Disagree
 2 Disagree
 3 Neutral
 4 Agree
 5 Strongly Agree
- 36 5 Strongly Agree
 Have you had an engineering job (internship, summer, part-time, etc.), participated in cooperative education (CO-OP), or conducted undergraduate research since you began your engineering studies?
 1 Strongly Disagree
 2 Disagree
 3 Neutral
 4 Agree
 5 Strongly Agree
- 37 5 Strongly Agree
 Attitudes About Engineering - Please fill in the number on the answer sheet corresponding to how strongly you disagree or agree with the statement.
 1 Strongly Disagree

- 2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 38 I expect that engineering will be a rewarding career.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 39 I don't care for this career.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 40 I have no desire to change to another major (ex. Biology, English, chemistry, art, history, etc.).
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 41 From what I know, engineering is boring.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 42 I enjoy the subjects of science and mathematics the most of all my subjects.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 43 Engineering is an exact science.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 44 Engineering is an occupation that is respected by other people.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 45 I like the professionalism that goes with being an engineer.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 46 Engineers have contributed greatly to solving society's problems.
1 Strongly Disagree

- 2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 47 I feel I know what an engineer does.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 48 Creative thinking is one of my strengths.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 49 I feel confident in my ability to succeed in engineering.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 50 I prefer studying/working alone.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 51 I am good at designing things.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 52 I consider myself technically inclined.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 53 I enjoy solving open-ended problems.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 54 Confidence in Engineering Outcomes - In an earlier section we asked you to reflect on how prepared you felt you were in a number of areas. In this section we are interested in how confident you currently are in these areas. For the following knowledge and skill areas indicate your current level of confidence
- 55 Current Confidence Level
- 56 Using mathematical concepts to solve engineering problems
1 Poor

- | | | |
|----|---|-----------|
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |
| 57 | Using chemistry concepts to solve engineering problems | |
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |
| 58 | Using physics concepts to solve relevant engineering problems | |
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |
| 59 | Using engineering concepts to solve relevant problems | |
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |
| 60 | Designing an experiment to obtain measurements or gain additional knowledge about a process | |
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |
| 61 | Analyzing a set of data to find underlying meaning(s) | |
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |
| 62 | Designing a device or process when given a set of specifications | |
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |
| 63 | Functioning as an accountable member of an engineering team | |
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |
| 64 | Formulating unstructured engineering problems | |
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |
| 65 | Using appropriate engineering techniques and tools including software and/or lab equipment for problem solving. | |

- | | | |
|----|--|-----------|
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |
| 66 | Understanding the professional and ethical responsibilities of an engineer | |
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |
| 67 | Writing effectively | |
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |
| 68 | Making professional presentations | |
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |
| 69 | Effectively communicating engineering-related ideas to others | |
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |
| 70 | Listening to and impartially interpreting different viewpoints | |
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |
| 71 | Understanding the potential risks (to the public) and impacts that an engineering solution or design may have | |
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |
| 72 | Applying knowledge about current issues (economic, environmental, political, societal, etc.) to engineering-related problems | |
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |
| 73 | Recognizing the limitations of my engineering knowledge and abilities and knowing when to seek additional information. | |
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |

- 4 Very Good
- 5 Excellent

74 Please provide any additional comments concerning your education. We are particularly interested in ways to improve the program.

JUNIOR ENGINEERING LEARNING AND CURRICULUM EVALUATION INSTRUMENT

1 We are interested in how your engineering knowledge and skills have improved during your sophomore year. When answering each item, please take time to reflect on your second year as an engineering student and where you are now. Remember that these should be your own views. There are no right or wrong answers. Your responses will remain confidential.

2 Major

- 1 Aerospace
- 2 Bioengineering
- 3 Chemical
- 4 Civil
- 5 Computer
- 6 Computer Science
- 7 Electrical
- 8 Engineering Physics
- 9 Industrial
- 10 Materials
- 11 Mechanical
- 13 Other

3 Ethnicity

- 1 African American
- 2 Asian Pacific
- 3 Hispanic
- 4 Native American
- 5 White Caucasian
- 6 Other

4 Gender

- 1 Male
- 2 Female

5 Did you complete your previous year of coursework at the University of Pittsburgh?

- 1 Yes
- 2 No

6 Where did you spend your previous academic year?

- 1 University of Pittsburgh School of Engineering
- 2 University of Pittsburgh CAS / CGS
- 3 University of Pittsburgh Regional Campus
- 4 Community Campus
- 5 Another College or University
- 6 Other

7 General Sophomore Year - Please indicate the number that corresponds to how strongly you disagree or agree with each statement.

8 My sophomore year prepared me for my junior year.

- 1 Strongly Disagree
- 2 Disagree
- 3 Neutral
- 4 Agree
- 5 Strongly Agree

9 My sophomore year helped me decide that I want to remain in engineering.

- 1 Strongly Disagree
- 2 Disagree
- 3 Neutral

- 4 Agree
5 Strongly Agree
- 10 I am confident that I have chosen the right major.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 11 I had enough information when I chose my major.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 12 My academic advisers were helpful.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 13 I was able to discuss academic issues with my professors.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 14 I worked on "real-world" engineering problems in my courses.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 15 I had "hands-on" engineering experiences(s) during my sophomore year.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 16 I had a mentor or advisor who provided guidance.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 17 Preparedness in Knowledge and Skill Areas - Please fill in the number that corresponds to how strongly you disagree or agree with each statement
- 18 As a result of my sophomore year I was prepared for my junior year in terms of my:
- 19 Ability to apply math concepts to solve engineering problems.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree

- 20 Ability to apply chemistry concepts to solve engineering problems.
- 1 Strongly Disagree
 - 2 Disagree
 - 3 Neutral
 - 4 Agree
 - 5 Strongly Agree
- 21 Ability to apply physics concepts to help solve engineering problems
- 1 Strongly Disagree
 - 2 Disagree
 - 3 Neutral
 - 4 Agree
 - 5 Strongly Agree
- 22 Ability to solve unstructured engineering problems.
- 1 Strongly Disagree
 - 2 Disagree
 - 3 Neutral
 - 4 Agree
 - 5 Strongly Agree
- 23 Ability to analyze engineering data.
- 1 Strongly Disagree
 - 2 Disagree
 - 3 Neutral
 - 4 Agree
 - 5 Strongly Agree
- 24 Ability to design a device or process.
- 1 Strongly Disagree
 - 2 Disagree
 - 3 Neutral
 - 4 Agree
 - 5 Strongly Agree
- 25 Ability to use proper laboratory procedures.
- 1 Strongly Disagree
 - 2 Disagree
 - 3 Neutral
 - 4 Agree
 - 5 Strongly Agree
- 26 Computer programming skills.
- 1 Strongly Disagree
 - 2 Disagree
 - 3 Neutral
 - 4 Agree
 - 5 Strongly Agree
- 27 Ability to use software packages to solve engineering problems.
- 1 Strongly Disagree
 - 2 Disagree
 - 3 Neutral
 - 4 Agree
 - 5 Strongly Agree
- 28 Ability to use CAD software.
- 1 Strongly Disagree
 - 2 Disagree
 - 3 Neutral
 - 4 Agree
 - 5 Strongly Agree

- 29 Technical writing ability; i.e., prepare engineering reports and papers.
- 1 Strongly Disagree
 - 2 Disagree
 - 3 Neutral
 - 4 Agree
 - 5 Strongly Agree
- 30 Oral communication skills.
- 1 Strongly Disagree
 - 2 Disagree
 - 3 Neutral
 - 4 Agree
 - 5 Strongly Agree
- 31 Ability to function effectively in different team roles.
- 1 Strongly Disagree
 - 2 Disagree
 - 3 Neutral
 - 4 Agree
 - 5 Strongly Agree
- 32 Ability to set goals and achieve them on time.
- 1 Strongly Disagree
 - 2 Disagree
 - 3 Neutral
 - 4 Agree
 - 5 Strongly Agree
- 33 Ability to learn new things on my own.
- 1 Strongly Disagree
 - 2 Disagree
 - 3 Neutral
 - 4 Agree
 - 5 Strongly Agree
- 34 Work Experiences
- 35 Do you have any engineering-related work experience (i.e. engineering internship or summer job, cooperative education, undergraduate research)?
- 1 Yes
 - 2 No
- 36 Please check all relevant work experiences
- 1 Engineering Internship or Summer Job
 - 2 Cooperative Education (CO-OP)
 - 3 Undergraduate Research
- 37 For each of the following statements, reflect on the engineering-related work experiences that you have had since you have been in school. Fill in the number that corresponds to how strongly you disagree or agree with each item.
- 38 Increased my ability to succeed in my engineering classes.
- 1 Strongly Disagree
 - 2 Disagree
 - 3 Neutral
 - 4 Agree
 - 5 Strongly Agree
- 39 Were related to my specific field of engineering.
- 1 Strongly Disagree
 - 2 Disagree
 - 3 Neutral
 - 4 Agree

- 40 5 Strongly Agree
 Provided me with the opportunity to pursue learning on my own.
 1 Strongly Disagree
 2 Disagree
 3 Neutral
 4 Agree
 5 Strongly Agree
- 41 1 Strongly Disagree
 Allowed me to improve my computer skills.
 2 Disagree
 3 Neutral
 4 Agree
 5 Strongly Agree
- 42 1 Strongly Disagree
 Provided me with the opportunity to work in a team environment.
 2 Disagree
 3 Neutral
 4 Agree
 5 Strongly Agree
- 43 1 Strongly Disagree
 Allowed me to work on ""real world"" engineering problems.
 2 Disagree
 3 Neutral
 4 Agree
 5 Strongly Agree
- 44 1 Strongly Disagree
 Allowed me to be a more creative problem solver.
 2 Disagree
 3 Neutral
 4 Agree
 5 Strongly Agree
- 45 1 Strongly Disagree
 Allowed me to work in a laboratory environment.
 2 Disagree
 3 Neutral
 4 Agree
 5 Strongly Agree
- 46 1 Strongly Disagree
 Helped me to better understand what engineers do.
 2 Disagree
 3 Neutral
 4 Agree
 5 Strongly Agree
- 47 1 Strongly Disagree
 Helped me to develop my written communication skills.
 2 Disagree
 3 Neutral
 4 Agree
 5 Strongly Agree
- 48 1 Strongly Disagree
 Helped me to develop my oral communication skills.
 2 Disagree
 3 Neutral
 4 Agree

- 5 Strongly Agree
- 49 Attitudes About Engineering - Please fill in the number on the answer sheet corresponding to how strongly you disagree or agree with the statement.
- 1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 50 I expect that engineering will be a rewarding career.
- 1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 51 I don't care for this career.
- 1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 52 I have no desire to change to another major (ex. Biology, English, chemistry, art, history, etc.).
- 1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 53 From what I know, engineering is boring.
- 1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 54 I enjoy the subjects of science and mathematics the most of all my subjects.
- 1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 55 Engineering is an exact science.
- 1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 56 Engineering is an occupation that is respected by other people.
- 1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 57 I like the professionalism that goes with being an engineer.
- 1 Strongly Disagree
2 Disagree
3 Neutral

- 4 Agree
5 Strongly Agree
- 58 Engineers have contributed greatly to solving society's problems.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 59 I feel I know what an engineer does.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 60 Creative thinking is one of my strengths.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 61 I feel confident in my ability to succeed in engineering.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 62 I prefer studying/working alone.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 63 I am good at designing things.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 64 I consider myself technically inclined.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 65 I enjoy solving open-ended problems.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 66 Confidence in Engineering Outcomes - In an earlier section we asked you to reflect on how prepared you felt you were in a number of areas. In this section we are interested in how confident you currently are in these areas. For the following knowledge and skill areas indicate your current level of confidence

- 67 Current Confidence Level
- 68 Using mathematical concepts to solve engineering problems
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 69 Using chemistry concepts to solve engineering problems
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 70 Using physics concepts to solve relevant engineering problems
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 71 Using engineering concepts to solve relevant problems
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 72 Designing an experiment to obtain measurements or gain additional knowledge about a process
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 73 Analyzing a set of data to find underlying meaning(s)
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 74 Designing a device or process when given a set of specifications
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 75 Functioning as an accountable member of an engineering team
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 76 Formulating unstructured engineering problems
- 1 Poor
 - 2 Fair
 - 3 Good

- | | | |
|----|--|-----------|
| | 4 | Very Good |
| | 5 | Excellent |
| 77 | Using appropriate engineering techniques and tools including software and/or lab equipment for problem solving. | |
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |
| 78 | Understanding the professional and ethical responsibilities of an engineer | |
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |
| 79 | Writing effectively | |
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |
| 80 | Making professional presentations | |
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |
| 81 | Effectively communicating engineering-related ideas to others | |
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |
| 82 | Listening to and impartially interpreting different viewpoints | |
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |
| 83 | Understanding the potential risks (to the public) and impacts that an engineering solution or design may have | |
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |
| 84 | Applying knowledge about current issues (economic, environmental, political, societal, etc.) to engineering-related problems | |
| | 1 | Poor |
| | 2 | Fair |
| | 3 | Good |
| | 4 | Very Good |
| | 5 | Excellent |

85 Recognizing the limitations of my engineering knowledge and abilities and knowing when to seek additional information.

1 Poor

2 Fair

3 Good

4 Very Good

5 Excellent

86 Please provide any additional comments concerning your education. We are particularly interested in ways to improve the program.

SENIOR EXIT SURVEY

1 The purpose of this questionnaire is to improve the School of Engineering's educational programs. To do this, we ask you to seriously reflect on your educational experiences and to provide us with insight into your future educational plans. Responses will be used to for statistical purposes only and will be held strictly confidential. No students will be identified. Thank you for your support.

2 Major

- 1 Aerospace
- 2 Bioengineering
- 3 Chemical
- 4 Civil
- 5 Computer
- 6 Computer Science
- 7 Electrical
- 8 Industrial
- 9 Materials
- 10 Mechanical
- 11 Metallurgical
- 12 Other
- 13 Engineering Physics

3 Ethnicity

- 1 African American
- 2 Asian Pacific
- 3 Hispanic
- 4 Native American
- 5 White Caucasian
- 6 Other

4 Gender

- 1 Male
- 2 Female

5 Section I. Engineering Education Knowledge - Please rate both your current level of confidence in the following knowledge and skill areas and the degree to which you have gained confidence in that area while you were in the School of Engineering. For example, if you have little or no confidence in your ability to use mathematics to solve engineering problems then mark poor. If you are extremely confident of your ability then mark excellent.

6 My ability to use my knowledge of mathematics to solve relevant engineering problems.

- 1 Poor
- 2 Fair
- 3 Good
- 4 Very Good
- 5 Excellent

7 My ability to use my knowledge of chemistry to solve relevant engineering problems.

- 1 Poor
- 2 Fair
- 3 Good
- 4 Very Good
- 5 Excellent

8 My ability to use my knowledge of physics to solve relevant engineering problems.

- 1 Poor
- 2 Fair
- 3 Good
- 4 Very Good
- 5 Excellent

- 9 My ability to use my knowledge of engineering to solve relevant problems.
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 10 My ability to design and conduct an experiment to obtain measurements or gain additional knowledge.
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 11 My ability to analyze and interpret a set of data to find underlying meaning.
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 12 My ability to design a device or process to satisfy a given set of specifications.
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 13 My ability to function effectively in different team roles.
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 14 My ability to formulate unstructured engineering problems.
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 15 My ability to use the appropriate engineering techniques including software or lab equipment for problem solving.
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 16 My understanding of the professional and ethical responsibilities of an engineer.
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 17 My ability to write effectively.
- 1 Poor
 - 2 Fair
 - 3 Good

- 4 Very Good
5 Excellent
- 18 My ability to make effective presentation.
- 1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 19 My ability to effectively express engineering-related ideas to others.
- 1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 20 My ability to listen to and impartially interpret different viewpoints.
- 1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 21 My understanding of the potential risks and impact to the public of a proposed engineering solution.
- 1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 22 My ability to apply knowledge about current issues (economics, environmental, political, social, etc.) to engineering-related problems.
- 1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 23 My commitment to life-long learning.
- 1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 24 My ability to recognize the limitations of my engineering knowledge and skills and to know when to seek additional information.
- 1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 25 Section II. Pre Professional Experience
- 26 1. Pre-professional experience:
- 27 Do you have any engineering-related work experience (i.e. engineering internship or summer job, cooperative education, undergraduate research, study abroad)?
- 1 Yes
2 No

- 28 2. To what extent did these experiences impact your ability to:
- 29 Solve engineering problems.
- 1 Not At All
 - 2 Very Little
 - 3 Some
 - 4 A Lot
 - 5 A Great Deal
- 30 Apply knowledge and skills learned in courses.
- 1 Not At All
 - 2 Very Little
 - 3 Some
 - 4 A Lot
 - 5 A Great Deal
- 31 Improve communications skills.
- 1 Not At All
 - 2 Very Little
 - 3 Some
 - 4 A Lot
 - 5 A Great Deal
- 32 Improve time management skills.
- 1 Not At All
 - 2 Very Little
 - 3 Some
 - 4 A Lot
 - 5 A Great Deal
- 33 Make contacts with professional engineers.
- 1 Not At All
 - 2 Very Little
 - 3 Some
 - 4 A Lot
 - 5 A Great Deal
- 34 Understand engineering profession.
- 1 Not At All
 - 2 Very Little
 - 3 Some
 - 4 A Lot
 - 5 A Great Deal
- 35 Obtain permanent position.
- 1 Not At All
 - 2 Very Little
 - 3 Some
 - 4 A Lot
 - 5 A Great Deal
- 36 Did you have Engineering Internship experience?
- 1 Yes
 - 2 No
- 37 Did you participate in a research project under faculty supervision?
- 1 Yes
 - 2 No
- 38 Did you have an opportunity to study abroad?
- 1 Yes
 - 2 No
- 39 When did you study abroad?

- 1 Freshman
 - 2 Sophomore
 - 3 Junior
 - 4 Senior
- 40 Did you participate in community service or volunteer work?
- 41 Did you participate in a learning community or formal program where groups of students take two or more classes together?
- 1 Yes
 - 2 No
- 42 Do you have Co-op experience?
- 1 Yes
 - 2 No
- 43 3. Please evaluate the impact that your Co-op position had on your development in the following areas:
- 44 Using my knowledge of mathematics to solve relevant engineering problems.
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 45 Using my knowledge of chemistry to solve relevant engineering problems.
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 46 Using my knowledge of physics to solve relevant engineering problems.
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 47 Using my knowledge of engineering to solve relevant problems.
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 48 Designing and conducting an experiment to obtain measurements or gain additional knowledge.
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 49 Analyzing and interpreting a set of data to find underlying meaning.
- 1 Poor
 - 2 Fair
 - 3 Good
 - 4 Very Good
 - 5 Excellent
- 50 Designing a device or process to satisfy a given set of specifications.
- 1 Poor
 - 2 Fair

- | | | | |
|----|--|---|-----------|
| | | 3 | Good |
| | | 4 | Very Good |
| | | 5 | Excellent |
| 51 | Functioning as an effective member of an engineering team. | | |
| | | 1 | Poor |
| | | 2 | Fair |
| | | 3 | Good |
| | | 4 | Very Good |
| | | 5 | Excellent |
| 52 | Formulating unstructured engineering problems. | | |
| | | 1 | Poor |
| | | 2 | Fair |
| | | 3 | Good |
| | | 4 | Very Good |
| | | 5 | Excellent |
| 53 | Using appropriate engineering techniques including software or lab equipment for problem solving. | | |
| | | 1 | Poor |
| | | 2 | Fair |
| | | 3 | Good |
| | | 4 | Very Good |
| | | 5 | Excellent |
| 54 | Understanding of the professional and ethical responsibilities of an engineer. | | |
| | | 1 | Poor |
| | | 2 | Fair |
| | | 3 | Good |
| | | 4 | Very Good |
| | | 5 | Excellent |
| 55 | Writing effectively. | | |
| | | 1 | Poor |
| | | 2 | Fair |
| | | 3 | Good |
| | | 4 | Very Good |
| | | 5 | Excellent |
| 56 | Making professional presentations. | | |
| | | 1 | Poor |
| | | 2 | Fair |
| | | 3 | Good |
| | | 4 | Very Good |
| | | 5 | Excellent |
| 57 | Effectively expressing engineering-related ideas to others. | | |
| | | 1 | Poor |
| | | 2 | Fair |
| | | 3 | Good |
| | | 4 | Very Good |
| | | 5 | Excellent |
| 58 | Listening to and impartially interpreting different viewpoints. | | |
| | | 1 | Poor |
| | | 2 | Fair |
| | | 3 | Good |
| | | 4 | Very Good |
| | | 5 | Excellent |
| 59 | Understanding the potential risks and impacts that an engineering solution or design may have to the public. | | |

- 1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 60 Applying knowledge about current issues (economics, environmental, political, social, etc.) to engineering-related problems.
1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 61 Recognizing the limitations of my engineering knowledge and abilities and knowing when to seek additional information.
1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 62 4. Plan for next year:
- 63 After graduation I plan to work.
1 Yes
2 No
- 64 I plan to work as an engineer.
1 Yes
2 No
- 65 I have received job offers.
1 Yes
2 No
- 66 I have received a job offer from my co-op employer.
1 Yes
2 No
3 N/A
- 67 I have accepted a permanent job offer.
1 Yes
2 No
- 68 How helpful have each of the following aspects of your engineering education been in securing your first permanent position.
1 Not At All
2 Very Little
3 Some
4 A Lot
5 A Great Deal
- 69 Coursework in department/program.
1 Not At All
2 Very Little
3 Some
4 A Lot
5 A Great Deal
- 70 Coursework outside of department/program.
1 Not At All
2 Very Little
3 Some

- 4 A Lot
5 A Great Deal
- 71 Participation in research project.
1 Not At All
2 Very Little
3 Some
4 A Lot
5 A Great Deal
6 Not Appropriate
- 72 Internship or co-op experience.
1 Not At All
2 Very Little
3 Some
4 A Lot
5 A Great Deal
6 Not Appropriate
- 73 International experience/study abroad.
1 Not At All
2 Very Little
3 Some
4 A Lot
5 A Great Deal
6 Not Appropriate
- 74 Involvement in extracurricular activities.
1 Not At All
2 Very Little
3 Some
4 A Lot
5 A Great Deal
6 Not Appropriate
- 75 After graduation I plan to go to graduate school.
1 Yes
2 No
- 76 When do you plan to attend?
1 Within one year of graduation
2 Within five years of graduation
3 More than five years after graduation
- 77 I plan to attend school.
1 Full Time
2 Part Time
- 78 I plan to attend:
1 Graduate school of engineering
2 Law school
3 Medical school
4 Business
5 Education
6 Other
- 79 Section III. Overall Satisfaction with Program/Department and School
80 Please indicate your level of agreement with the following statements.
81 My undergraduate education has provided a solid background for my career.
1 Strongly Disagree
2 Disagree
3 Neutral

- 4 Agree
5 Strongly Agree
- 82 Courses outside of my major are important.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 83 The importance of global perspectives was emphasized in courses.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 84 The need for life long learning was emphasized in my program.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 85 My programs faculty prepared me for engineering work.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 86 My program's faculty prepared me for graduate school.
1 Strongly Disagree
2 Disagree
3 Neutral
4 Agree
5 Strongly Agree
- 87 How would you evaluate your overall educational experience at the University of Pittsburgh?
1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 88 If you were to select an undergraduate school again, would you choose the University of Pittsburgh?
1 Definitely No
2 Probably No
3 Not Sure
4 Probably Yes
5 Definitely Yes
- 89 I would recommend the Engineering School to a friend.
1 Yes
2 No
- 90 For each of the following questions, please select the choice that best represents the quality of your relationships with people at the University of Pittsburgh.
- 91 Students
1 Poor
2 Fair

- 3 Good
4 Very Good
5 Excellent
- 92 Faculty
1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 93 Administrative personnel
1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 94 Based on your experiences at the University of Pittsburgh, how would you rate each of the following?
- 95 Quality of instruction
1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 96 Variety of courses
1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 97 Availability of courses
1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 98 Safety on campus
1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 99 Racial climate
1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 100 Based on your experiences at the University of Pittsburgh, select a choice to rate each of the following.
- 101 Academic advising
1 Poor
2 Fair
3 Good

- 4 Very Good
5 Excellent
- 102 Financial Aid Office (located in Alumni Hall)
1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 103 Student Financial Services - billing and payments (located in Thackeray Hall)
1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 104 Career Services (located in William Pitt Union)
1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 105 Student Health Service
1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 106 Academic support services (e.g., tutoring, Academic Support Center, Math Assistance Center, Writing Center)
1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 107 Housing
1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 108 Food services
1 Poor
2 Fair
3 Good
4 Very Good
5 Excellent
- 109 Section IV. Education and Employment Information
- 110 Throughout my undergraduate educational career, my primary enrollment status is best described as:
1 Full-time student
2 Part-time student
3 Sometime full-time and sometime part-time
- 111 Did you transfer into School of Engineering?
1 Yes

- 2 No
- 112 Estimate the average number of hours per week you spent working on campus.
- 1 0-10 hrs.
2 11-20 hrs.
3 21-30 hrs.
4 31-40 hrs.
5 Over 40 hrs.
- 113 Estimate the average number of hours per week you spent working off campus.
- 1 0-10 hrs.
2 11-20 hrs.
3 21-30 hrs.
4 31-40 hrs.
5 Over 40 hrs.
- 114 Estimate the average number of hours per week you spent participating in organized extracurricular activities.
- 1 0-10 hrs.
2 11-20 hrs.
3 21-30 hrs.
4 31-40 hrs.
5 Over 40 hrs.
- 115 Estimate the average number of hours per week you spent preparing for class (e.g., studying, reading, writing, doing homework or lab work, analyzing data, rehearsing, or other academic activities)
- 1 0-10 hrs.
2 11-20 hrs.
3 21-30 hrs.
4 31-40 hrs.
5 Over 40 hrs.
- 116 Estimate the average number of hours per week you spent relaxing and socializing (e.g., watching TV, partying, exercising)
- 1 0-10 hrs.
2 11-20 hrs.
3 21-30 hrs.
4 31-40 hrs.
5 Over 40 hrs.
- 117 In how many student organizations have you been involved while at the University of Pittsburgh?
- 118 How many officer positions did you hold in these organizations?
- 119 What is the highest degree you ultimately plan to earn?
- 1 BS in engineering
2 MBA
3 MD (or comparable)
4 MS in engineering
5 LL.B. or J.D.
6 Ph.D.
7 Other
- 120 What do you like least about the University of Pittsburgh?
- 121 What do you like most about the University of Pittsburgh?
- 122 What is your best idea to improve the University of Pittsburgh? (For example, consider academic programs, quality of instruction, class size and availability, student activities and residence halls)
- 123 What was most hindering to your success at Pitt?
- 124 What most contributed to your success at Pitt?

125 Please provide any additional comments concerning your education. We are particularly interested in ways to improve the program.