COLLEGE ANNUAL ASSESSMENT REPORT

Assessed Year: 2017-2018

College: Engineering, Technology, & Computer Science

Contact: Kim McDonald, Associate Dean

Report Date: 2/27/19

Purdue University Fort Wayne

Contents

Section 1: Summary of Findings

The following undergraduate programs within the College of ETCS submitted an assessment report: Civil, Electrical, Computer and Mechanical Engineering; Computer Science; Information Systems; and Organizational Leadership. All of these reports were reviewed by the college committee. The major findings based on these reviews include the following:

1. Since most programs within the college are ABET-accredited, review processes are fairly well established and multiple stakeholders are involved in the assessment process.
2. All of the programs have clearly stated student learning outcomes.
3. This was the first year the committee reviewed First Year Engineering (FYE) reports.
4. Some of the reports are well organized and results are clearly presented. Specific suggestions were provided to some programs regarding the organization of the report or the brevity of the reporting of results. These have been noted in the memos sent to the chairs of the respective programs.
5. While some programs reported historical data, others do not. Most could include more information on how curricular and pedagogical changes have influenced student learning.
6. Some committee members wanted more details regarding the validity and reliability of the assessment measures used.
7. While multiple types of measurements are used by some programs to assess learning, some only appear to use either direct or indirect measures.
8. Most of the programs provide recommendations for improvements based on their assessment results.
9. Many programs do a good job disseminating reports to the faculty and industrial advisory boards. However, some do not explicitly state who was involved in producing the report and to whom it was disseminated.

Section 2: Recommendations for Academic Departments

Each program's plans, reports, and committee memos from previous years are on One Drive so all members of the ETCS Assessment Committee had access to this year's and prior year's work. This year each program's report within the college was reviewed by two members of the ETCS Assessment Committee. Each team (comprised of two committee members) after reviewing their assigned reports, drafted a memo that provided a summary of their feedback and recommendations. The Associate Dean, who chairs the committee, edited the memos if needed and occasionally asked a team to clarify or provide more information. All the memos submitted to the chairs and the dean are attached. Specific recommendations for academic departments are provided within the memos.

Section 3: Results of Activities Related to Prior Year Findings

This is still a work in progress. Most programs within the college can improve on their reporting of changes made and how these changes are currently being assessed. However, the following items are occurring:

1. The ETCS Assessment Committee followed the same protocol that was implemented last year. This has helped streamline the process immensely. The majority of the college committee membership changed this year, which could have been problematic. However, the committee members did a nice job learning the process and completing their work in a timely manner. Having access to prior years' reports and memos helps the members of the committee understand the tasks to be completed. The committee will meet once more this spring to review this year's activities and processes to determine what needs improved, etc.
2. During this spring meeting, the committee will also explore ways to make sure all faculty within the departments have access to their programs' feedback and the college report.
3. Many of the reports could more clearly address how they have used the college committee's feedback in their assessment processes.
4. One program (ME) improved their response rate on their alumni survey. While this has been a re-occurring problem for several programs, this is a positive change that occurred this assessment cycle.

Section 4: Conclusions and Future Directions

Overall, the college level review process went well and hopefully, the committee found reviewing other programs' plans and reports to be helpful. The committee will meet to discuss specific recommendations to improve the college level review/process and how we can further help programs improve their assessment efforts. The School of Polytechnic did not produce assessment reports this year, rather the focus was on re-writing their assessment plan(s). The college committee has not yet received this plan. The committee will review and provide feedback regarding the School's plan when it is submitted.

Attachments

1. Provide either letters to colleges describing your evaluation of their annual assessment report or the completed Appendix D Rubrics for all departments/programs in your college.
2. Attach all Departmental/Program Annual Assessment reports so that these can be published at http://www.ipfw.edu/offices/assessment/reports/reports-program.html.

Indiana University-Purdue University Fort Wayne
Department of Civil and Mechanical Engineering
Civil Engineering Program

Assessment Report
Spring 2018

Prepared by

Dr. Dong Chen
Professor of Civil Engineering

October 12, 2018

Table of Contents

Appendix A-7: Report of First-Year Engineering Assessment
Appendix A-8: Student Assessment Results
Appendix A-9: Laboratory Evaluation Results
Appendix A-10: Department Student Forum
Appendix A-11: Exit Survey Results
Appendix A-12: Internship and Co-op Survey Report
Appendix A-13: 5-Year Lab Improvement Plan of the Department
Appendix A-14: ABET EAC Final Statement
Appendix A-15: CE Course Assessment Schedule

1. Introduction

This assessment report summarizes the assessment results of the spring 2018 semester according to the guidelines of the current Civil Engineering Assessment Plan (CEAP).

2. Program Educational Objectives

The Civil Engineering (CE) program educational objectives (PEOs) describe the anticipated accomplishments of its graduates within a few years after graduation. The PEOs of the CE program are to produce graduates who:

1. *Advance professionally to roles of greater civil engineering technical responsibilities, and/or by transitioning into leadership position in business, government, and/or education.*
2. *Participate in life-long learning through the successful completion of advanced degree(s), continuing education, and/or engineering certification(s)/licensure or other professional development.*
3. *Demonstrate a commitment to community by applying technical skills and knowledge to support various service activities.*

Note: In August 2017, the ABET evaluator team suggested that the PEOs refer to accomplishments of our alumni *a few years after graduation* (instead of 3-5 years after graduation). On October 23 2017, the faculty meeting of the department approved to remove the first old PEO "Function and communicate effectively to solve technical problems", following the suggestion of ABET, since it looked like an outcome rather than an objective of professional career advancement. In the same time, "technical" was added to the new first PEO.

The IPFW Department of Engineering has had a procedure in place illustrated in Figure 1 for the periodic evaluation of the relevance and appropriateness of the PEOs since 2006. This set of PEOs was approved by the engineering department faculty at a department meeting on 27 February 2012 and subsequently posted on the engineering department webpage and in the 2013-14 IPFW Undergraduate Bulletin.

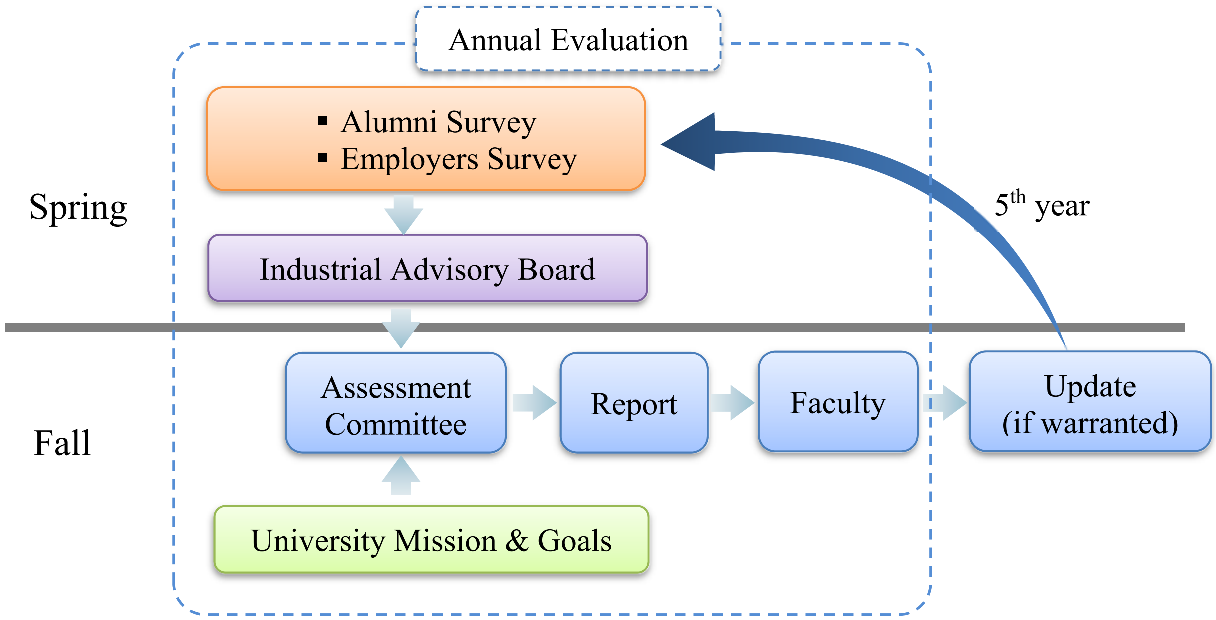


Figure 1. Process for the Annual Evaluating and Periodic Update of the Program Educational Objectives.

3. Student Learning Outcomes

Student learning outcomes (SLOs) describe what students are expected to know and be able to do by the time of graduation (2011-2012 ABET Criteria for Accrediting Engineering Programs). The SLOs of the CE program were modified during the fall 2012 semester. The rationale was that the old SLOs were a shorter version of ABET A-K outcomes. Shortening the SLOs made their alignment to ABET outcomes confusing and undermined their values. The modified SLOs are aligned one-to-one with the ABET outcomes, customized to the CE program at IPFW, and easy to follow. The following are the new SLOs of the CE program:

The graduates from the Civil Engineering Program will demonstrate that they have:

a. the understanding of basic knowledge in chemistry, mathematics, physics, engineering, and in one additional area of science such as biology, geology, or geography.
b. the ability to design and conduct experiments, interpret and analyze data, and report results in the areas of fluid mechanics, civil engineering materials, environmental engineering, geotechnical engineering, engineering design, and other related areas.
c. the ability to design a civil engineering system, component, or process that meets desired specifications and requirements including but not limited to technical functions, safety, quality control, time, and cost.
d. the ability to function on teams in assignments and projects, in engineering and science laboratories, and on multidisciplinary design projects.
e. the ability to identify, formulate, and/or solve civil engineering problems in major civil engineering areas including: construction management, environmental engineering, geomatics, geotechnical engineering, structural engineering, materials, transportation engineering, and hydraulics engineering.
f. the understanding of the professional and ethical responsibilities and the ability to explain basic concepts in management, business, public policy and leadership.

g. the ability to communicate effectively orally through presentations, classroom participation and discussion, and in writing professional emails, memos, papers, and reports.
h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context and to understand the community needs by participating in community activities, conducting research, or designing a project.
i. the recognition of the need for post graduate education/learning and professional licensure, and the ability to engage in life-long learning activities including but not limited to admittance to graduate school, taking the FE exam, getting certifications, and participating in research activities.
j. a knowledge of and exposure to contemporary issues in classroom materials and discussions, projects, papers, articles, presentations, field visits, reading news articles, attending workshops, seminars/webinars, and/or in local, national, global, and professional news briefs such as the ASCE SmartBrief.
k. the ability to use the techniques, skills, and modern engineering software tools and equipment necessary to analyze civil engineering problems and design civil engineering systems.

The ABET outcomes for engineering programs are:

(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) an ability to function on multidisciplinary 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) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

The relationship between the new SLOs of the CE program and ABET outcomes with the CE PEOs is shown in Table 1. The SLOs are designed to prepare students to attain the PEOs within a few years after graduation. Multiple SLOs contribute to a given PEO as shown in Table 1.

Table 1 Relationship between the CE PEOs and SLOs/program outcomes

PEOs	SLOs/Program Outcomes										
	a	b	c	d	e	f	g	h	i	j	k
1	√	√	√	√	√	√	√				√
2		√	√	√	√	√	√		√	√	√
3					√	√			√	√	
4								√		√	

The SLOs describe the skills, knowledge, and behaviors that students have acquired as they progress through the program (2011-2012 ABET Criteria for Accrediting Engineering Programs). The totality of the CE program at IPFW contributes to the development of the outcomes of its students. For example, for a single student outcome, multiple aspects of the program, as shown in Figure 2, may contribute.

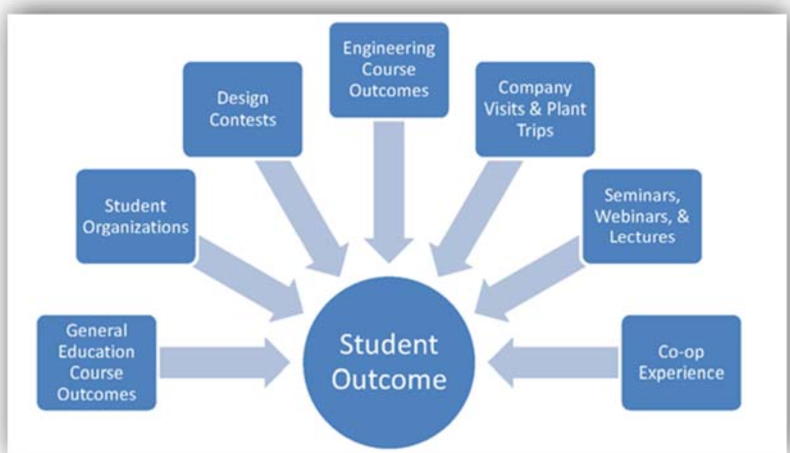


Figure 2. Multiple aspects of the program contribute to a student outcome.

4. Alignment of Program Outcomes to IPFW Baccalaureate Framework

Furthermore, as shown in Table 2 our CE program outcomes are aligned with the IPFW Baccalaureate Framework (Senate Reference No. 05-17) which was developed to ensure students who earn a baccalaureate degree at IPFW will be able to apply their knowledge to the needs of an increasingly diverse, complex, and dynamic world. The framework has six foundations which are interdependent, with each one contributing to the integrative and holistic education offered at IPFW.

Table 2 Alignment of CE program outcomes to IPFW baccalaureate framework.

Program Outcomes	IPFW Baccalaureate Framework
(a) an ability to apply knowledge of mathematics, science, and engineering *(b) an ability to design and conduct experiments, as well as to analyze and interpret data*	Acquisition of Knowledge
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	Application of Knowledge
(d) an ability to function on multidisciplinary teams	Communication
(e) an ability to identify, formulate, and solve engineering problems	Critical Thinking and Problem Solving
(f) an understanding of professional and ethical responsibility	Personal and Professional Values
(g) an ability to communicate effectively	Communication
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	Personal and Professional Values
(i) a recognition of the need for, and an ability to engage in life-long learning	Application of Knowledge
(j) a knowledge of contemporary issues	A Sense of Community
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	Acquisition of Knowledge

5. Program Assessment

5.1 Assessment Measures

Assessment is defined as one or more processes that identify, collect, and prepare the data necessary for evaluation. Evaluation is defined as one or more processes for interpreting the data acquired though the assessment processes in order to determine how well the program educational objectives and student outcomes are being attained (2011-2012 ABET Criteria for Accrediting Engineering Programs). Several direct and indirect measures are used in the assessment process. The PEOs and SLOs of the CE program at IPFW are assessed using the direct and indirect measures listed in Table 3. The direct measures are methods used to evaluate students' knowledge or skills against a measurable outcome by direct examination or observation of student performance. The indirect measures "ascertain the perceived extent or value of learning experiences. They assess opinions or thoughts about student knowledge or skills." (ABET, August 2006).

Table 3 Direct and indirect assessment measures of the PEOs and SLOs

<table>
<tr><th rowspan="2">Criterion</th><th colspan="2">Measures</th></tr>
<tr><th>Direct</th><th>Indirect</th></tr>
<tr><td>PEOs</td><td>1) Performance Appraisal by Employers (Direct Supervisor)</td><td>1) Alumni Survey
2) Admittance to Graduate School
3) Industrial Advisory Board</td></tr>
<tr><td>SLOs</td><td>1) Interim (Courses) Assessment by Faculty
2) Capstone Assessment
• Faculty Members
• External Evaluators
3) FE Exam</td><td>1) Interim Assessment by Students
• Courses Outcomes Survey
• Laboratory Evaluation
• Engineering Students' Forums
2) Exit Interview
3) Internship and Co-op Education Coordinator/supervisor Survey</td></tr>
</table>

5.2 Continuous Improvement Process

The continuous improvement process starts by data collection as scheduled in the CEAP. The collected information is first reviewed by the assessment committee and then forwarded to the committee or faculty member who is responsible for making recommendations or suggesting corrective actions. Some recommendations are presented to the entire faculty for discussion. The final action is feedback, which translates into possible changes in a single course or lab, content changes in the curriculum, or changes in the program. This process is illustrated in Figure 3. This assessment report is also shared with the Industrial Advisory Board members for their feedback.

Depending on the measures used, the feedback loop operates on different time scales. The shortest assessment period is one semester. At the end of each semester, a report is generated to summarize the assessment and evaluation activities that occurred during the semester. The recommendations provided in the report are based on the collected data since the last report and on the performance trends observed in the previous reports, using all the measurement tools. It is important to note that for some of the measurement tools, the sample sizes are small. Therefore, careful consideration of trends over several semesters is essential to provide valid input to the improvement process.

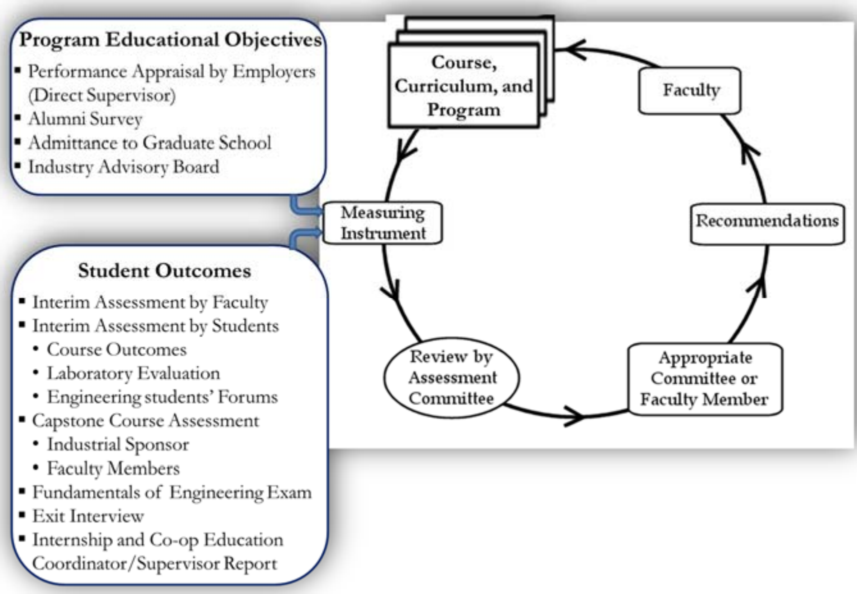


Figure 3. Continuous improvement process.

5.3 Assessment of the PEOs

The PEOs are statements that describe the expected career accomplishments and professional status of CE graduates within a few years after graduation. This CE program has established a process to continuously monitor and improve the PEOs in order to ensure that the program is on the right track to achieve its PEOs. Achievement of the PEOs is assessed annually using the four direct and indirect measurement tools listed previously in Table 3. The CE program started in 2006 and the first two graduates were in May 2009. As of December 2017, the CE program has 79 graduates.

5.3.1 Employer and Alumni Surveys

Alumni survey for the 2013-14 CE graduates was conducted in summer 2018. Eight alumni were eligible for the survey. Among them, four correct addresses were received from the Alumni and Co-op Office and four surveys were sent out. Finally, three responses were received.

Table 4 shows a summary of the CE alumni responses. Overall, the three respondents agree that the PEOs have been achieved. The detailed survey results are shown in Appendix A-1.

Table 4 Summary of alumni survey results (3 out of 4 responded)

	Responses
Current position (title)	Project Engineer (1), E.I.T. (1)
Current salary range	$41-$50K (1), $51K-$60K (2)
Job function	Analysis (1), Design (2), Engineering support (1), Field Engineering (1)
Area of work	Construction engineering/management (1), Structural engineering (1), Transportation (1)

PEO Achievements	Response/Score	Comment
I have been advanced professionally to roles of greater civil engineering technical responsibilities and/or by transitioning into leadership positions in business, government, and/or education.	Agree (3)	
I am able to participate in life-long learning through the successful completion of advanced degree(s), continuing education, and/or engineering certification(s)/licensure or other professional development.	Agree (3)	
I have demonstrated a commitment to community by applying technical skills and knowledge to support various service activities.	Agree (3)	
Overall, the CE program Education Objectives are adequate and do not require any modifications?	Yes (3)	
CE graduates will advance professionally to roles of greater civil engineering technical responsibilities by transitioning into leadership positions in business, government, and/or education.	The program does not require any changes to improve this objective (3)	
CE graduates will participate in life-long learning through the successful completion of advanced degree(s), continuing education, and/or engineering certification(s)/licensure or other professional development.	The program does not require any changes to improve this objective (3)	
CE graduates will demonstrate a commitment to community by applying technical skills and knowledge support various service activities.	The program does not require any changes to improve this objective (3)	
Additional comments/suggestions	None	

Alumni employers' surveys were conducted in the summer 2018 as well. Two CE alumni graduated in 2013-14 provided their supervisors' contact information. Two surveys were sent out and one response was received. The employer's responses are summarized in Table 5. The one respondent feels that the PEOs of CE program have been adequately achieved. The detailed survey results are shown in Appendix A-2.

Table 5 Summary of employer survey results (1 out of 2 responded)

	Responses
Current position (title)	Technical Services Director
Number of IPFW CE graduates employed by your company	1
Primary function(s) of your company	Analysis (1), Design (1), Engineering management (1), Field Engineering (1), Lab and test engineering (1)

PEO Achievements	Response/Score	Comment
Overall rating of the education received by the graduates as it relates to his/her preparation.	Excellent (1)	
Compared with graduates of other universities, how well do IPFW CE graduates perform?	Same (1)	
Would you consider hiring additional IPFW CE graduates if there were openings?	Always (1)	
Overall, the CE program Education Objectives are adequate and do not require any modifications?	Yes (3)	
Please list any recommendation that you believe is necessary to improve IPFW credentials to be more attractive for the job market.		Mandatory internships with Civil Engineering companies.
IPFW CE graduates have been advancing professionally to roles of greater civil engineering technical responsibilities and/or by transitioning into leadership positions in business, government, and/or education.	Agree (1)	Only placed agree here as the majority of our IPFW CE grads are relatively new and have not had this opportunity yet, but many are showing promise in this area.
IPFW CE graduates are able to participate in life-long learning through the successful completion of advanced degree(s), continuing education, and/or engineering certification(s)/licensure or other professional development.	Strongly agree (1)	
IPFW CE graduates are able to demonstrate a commitment to community by applying technical skills and knowledge to support various service activities	Agree (1)	
The program does not require any changes to improve this objective.	Yes (1)	
Additional comments/suggestions	INDOT has had the great opportunity to work with many IPFW CE students over the past several years as summer interns. This has been a great partnership that we hope to continue as it has provided us the ability to train and eventually hire several of them permanently.	

5.3.2 Admittance to Graduate School

An indirect measure of achievement of PEO 3 is the admittance and performance in graduate schools. The department keeps track of its graduates pursuing graduate study as:

1) Student Karl Wangensten-Oeye (2017 spring graduate) was admitted in MSc Civil Engineering program at Stanford University.
2) Student Laura Loredo Silva (2017 spring graduate) was admitted in MSc Civil Engineering program at University of Texas Austin.
3) Student Gerard Guell Bartrina (2016 spring graduate) was admitted in MSc Civil Engineering program at the Swiss Federal Institute of Technology (ETH).
4) Student Jeremy Hoffman (2013 graduate) was admitted to MSE program in Civil Engineering program at Purdue University (started in fall 2015).
5) Student Michael Saadeh (2013 graduate) was admitted to MBA program at IPFW in fall 2015. He graduated with MBA degree in spring 2018.
6) Student Afrid Sarker (2013 graduate) joined the MSE in Transportation of Civil Engineering program at the University of Memphis, TN with full research assistantship scholarship starting fall 2013.
7) Student Eduardo Sztrajman (2013 graduate) joined the London School of Economics and Political Science seeking a Diploma for Graduates in Management, London, UK.
8) Student Ingrid Ballus (2011 graduate) graduated from UC Berkeley with an MSc in Civil Engineering in May 2013. In December 2014, she graduated with an MSc in City Planning from the same university, UC Berkeley.
9) Student Wayne Richardson (2009 graduate) completed his MSCE degree with a thesis and excellent GPA of 3.9/4.0 from Purdue University in December 2010. He passed the Professional Engineer (PE) exam after graduation.
10) Student Martin Duffy (2010 graduate) completed his MSE degree in Systems Engineering from IPFW on May 2012. He passed the PE exam in Fall 10.

These data reflect the quality of the graduates of the IPFW CE program.

5.3.3 Industrial Advisory Board

A joint Industrial Advisory Board (IAB) meeting of both CE and Mechanical Engineering programs was held with by the department on Friday, April 20, 2018. Three CE-IAB members representing private and government sectors in northeast Indiana attended the meeting: Matthew Wirtz, City Utilities, City of Fort Wayne; Kurt Heidenreich, Engineering Resources, Inc.; and Kurt Voigt, New Millennium Building System. The IAB members witnessed the increasing impact of CE graduates in northeast Indiana. Presentations were given by:

- Nash Younis, department chair, on an overview of the CME department and replacement of the old ABET program outcomes (a)-(k) with the new ABET program outcomes 1-7,
- Manoochehr Zoghi, dean of ETCS, on overview of ETCS,
- Professor Dong Chen on CE program curriculum, students, ABET accreditation, activities of IPFW ASCE student chapter, and achievements of CE faculty and students.
- Professor Rebecca Essig, coordinator of the First-Year Engineering Program, on the current status of the first-year engineering program.

The meeting minutes and presented materials are included in Appendix A-3.

Closing the Loop – Program Educational Objectives Assessment

- The department has established a new set of PEOs in 2012. The department has developed and implemented a new online survey tool and has begun the process of assessing the PEOs by surveying alumni and employers. According to 2018 alumni and employer surveys, overall the current PEOs are adequate and being achieved. The survey response rate this time is substantially higher than prior years though, the department should continue seeking a way to improve this rate, especially the response rate of employers, and collect the comments to provide the assessment process with more meaningful input data.
- The department should keep seeking the input of its Industrial Advisory Board as part of the continuous improvement process and the assistance of Industrial Advisory Board in the assessment of the achievement of program educational outcomes. The next Industrial Advisory Board meeting will be held in spring 2019.

5.3.4 Evidence of Achieving the PEOs

The following is a summary of the program's achievements, which provides evidences of success of the CE program in achieving its PEOs:

- The CE program has had 86 students graduated since May 2009. All of them either working full-time in private/governmental agencies or pursuing a graduate degree. Many of our graduates were promoted and advanced professionally to higher ranks especially those received their PE licenses and MS degrees **(PEO 1, PEO 2, PEO 3)**.
- Many of the former CE graduates strongly support the undergraduate students through internships/job searching and senior design projects as industrial advisors. They also strongly support the IPFW ASCE student chapter **(PEO 4)**.
- Ten CE graduates were admitted to graduate schools (including Stanford, Swiss Federal Institute of Technology, Purdue, and UC Berkley) upon graduation; four completed their graduate degrees **(PEO 3)**.
- One student took the FE exam in spring 2018 and passed. By far the FE passing rate is 81% (58/72) **(PEO 1, PEO 3)**. The FE passing rate of CE students maintained at 100% again in spring 2018 after declined for several semesters. Constructive measures had been proposed in the CE Assessment Report of Spring 2017.
- Two out of five CE alumni passed PE exam in areas of structural, and Water Resources and Environmental Engineering in the State of Indiana in spring 2018. By far twelve out of eighteen (67%) CE graduated students passed the PE exam in the State of Indiana and received their PE licenses **(PEO 3)**.

5.4 Assessment of the SLOs

5.4.1 Direct Measures

5.4.1.1 Course Assessment by Instructors

The faculty members in the Department of Civil and Mechanical Engineering (CME) use a standard Assessment Form and rubrics to evaluate their courses. The assessment form was developed by the Assessment Committee to assess course outcomes. Printed versions of these forms, along with student assessment data, are compiled in a course assessment repository maintained by the department.

The faculty use a combination of the following criteria when assessing the course outcomes:
Criterion 1: The average of students in the assessment tool is equal to or greater than (e.g., 75%)
Criterion 2: The percentage of students with grade 70 or more is at least equal to (e.g., 70%)
Criterion 3: The percentage of students passing the assessment tool is greater than (e.g., 75%)
Criterion 4: The average grade of students passing the assessment tool is at least equal to (e.g., 75%)
Criterion 5: Overall, students' participation in a team was effective
Criterion 6: Faculty observation of students' function in a team is satisfactory

Every semester, three types of courses are typically assessed: individual courses scheduled for assessment as listed in CEAP, any course taught by new faculty and as a part of the civil engineering degree plan (CEDP), and any course taught in the previous semester and did not achieve its outcomes. The instructors of these courses must fill the assessment forms of their courses and submit them to the email address of the assessment committee. All members of the assessment committee have access to these emails. The email account is also used as a depositary for all correspondences pertain to the assessment.

The faculty assessment results for spring semester 2018 are included in Appendix A-4. Table 6 summarizes the results of assessment of the ABET outcomes as well as comments presented in the faculty evaluation reports. Below is the major observation.

- The assessment forms of all six courses submitted by the instructors indicate that all the courses' learning outcomes and the ABET outcomes have been strongly or adequately achieved.

Table 6 Summary of faculty assessment of CE program outcomes in spring 2018

Courses	Course ABET Outcomes										
	a	b	c	d	e	f	g	h	i	j	k
CE 252 Strength of Materials	yes_A		yes_A		yes_A		yes_A				yes_A
CE 318 Fluid Mechanics	yes_A		yes_A		yes_S		yes_S		yes_A	yes_S	
CE 319 Fluid Mechanics Lab	yes_A	yes_S	yes_S	yes_S	yes_S	yes_S	yes_S	yes_S	yes_S		yes_S
CE 345 Transportation Engineering	yes_A		yes_A	yes_S			yes_S				yes_S
CE 465 Water and Wastewater Engineering	yes_A		yes_S		yes_S			yes_A	yes_A	yes_S	yes_S
CE 487 CE Senior Design (I)			yes_A		yes_A	yes_A	yes_A	yes_A	yes_A	yes_A	yes_A
Total Achieved	5	1	6	2	5	2	5	3	4	3	5
Total Evaluated	5	1	6	2	5	2	5	3	4	3	5
% Achieved	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

* yes_A = yes, Adequately * yes_S = yes, Strongly

5.4.1.2 Capstone Senior Design Assessment

Achievement of the capstone senior design course outcomes is assessed by the faculty advisors (see previous section), students, faculty of the Department of CME, and invited professional/alumni civil engineers. Typically, several faculty members and invited professional/alumni civil engineers attend the Capstone Senior Design presentations at the end of the semester and participate in the discussions and evaluations of course outcomes. They report their evaluations using a formal assessment form included in Appendix A-5.

In the CE 487 Senior Design I form, the faculty members are asked to evaluate the ability of senior design students to: 1) formulate a problem statement; 2) generate solutions (conceptual designs); 3) evaluate conceptual designs using well-defined criteria; 4) obtain a final design including safety, economic, ethical, and engineering standards considerations; and 5) communicate effectively. In the CE 488 Senior Design II form, the faculty members are asked to evaluate the ability of senior design students to: 1) build their design, 2) test their design, 3) evaluate their design, and 4) communicate effectively.

In CE 487 Senior Design I, the students are asked to evaluate their ability to: 1) formulate a problem statement; 2) generate solutions (conceptual designs) using brainstorming technique; 3) evaluate conceptual designs using well defined criteria; 4) obtain a final design including safety, economic, ethical, and engineering standards considerations; 5) function within a multi-disciplinary team; and 6) present work both written and orally. In the CE 488 Senior Design II form, the students are asked to evaluate their ability to: 1) identify the various parameters that need to be determined in order to evaluate the prototype with the basic design that was obtained in the first semester; 2) build, test and evaluate the basic design completed in the first semester; 3) function within a multidisciplinary team; 4) present his/her work both written and orally; 5) knowledge of contemporary issues; 6) understanding of the ethical issues that are associated with the engineering profession; 7) understanding of the societal impact of engineering; and 8) recognition of the need for life-long learning.

Two CE 487 Senior Design I projects were completed in spring 2018. The faculty and professionals' assessment results are included in Appendix A-5. The following are observations from these results:

- The instructor's evaluations of the senior design project indicate that all the outcomes are achieved adequately (see Table 6).
- As shown in Table 7, the final presentation of the design project "membrane bioreactor" has achieved the outcomes strongly or adequately according to the industrial professionals and faculty assessment. However, the assessment scores of the design project "life cycle of steel structure" were mostly below 3.0 except the outcome #5 "Understand federal/state/county/city regulations and standards", which received 3.3 out of 4.0. This was the first time for the faculty member advising a senior design project.

Table 7 The faculty/professional assessment results for the three projects of CE 487 Senior Design I (score is between 1-4, score 4 means very strong)

The Ability of Students to:	Senior Design Projects	
	MEMBRANE BIOREACTOR	LIFE CYCLE OF STEEL STRCTURE
1. Formulate a problem statement.	3.4	2.7
2. Develop multiple preliminary design solutions using brainstorming technique.	3.2	2.1
3. Evaluate alternative solutions using a well-defined criteria and produce feasible solutions.	3.2	1.9
4. Build, test and evaluate feasible solutions using modern engineering tools and select the optimum alternative.	3.0	2.0
5. Understand and the ability to use the most recent federal/state/county/city regulations and standards in the project design, if applicable.	3.2	3.3
6. Successfully develop detailed final design for the project considering safety, economical, ethical, professional, and environmental issue.	3.2	2.2
7. Present final design to technical and non-technical professionals.	3.4	2.4
8. Show knowledge of contemporary issues related to the area of the project.	3.2	2.1
9. Understand the ethical issues those are associated with the engineering profession and related to the project.	3.2	1.8

Following the inquiry from the assessment committee, the faculty advisor responded (see Appendix A-6):

"*1. This senior design project is built upon the traditional design process used by the professional practitioners widely and exclusively. Unlike, the design project in mechanical engineering, design in civil engineering (especially structure design) must followed the Standard design guideline and materials properties. The design guidelines has embedded process for alternative design consideration that leads the ultimate selection and decision. Clearly, this design process is significantly different from the practice used in Mechanical Engineering.*

2. In essence, the assessment outcome evaluated by faculty on this "civil engineering" related design project shows a contrast interpretation of the merits-Civil Engineering versus Mechanical Engineering. I believe this is attribute to my comments in 1. In addition, I do not see any elaborated comments on the assessment questions that warrants an unsatisfactory rating.

3. The questions raised (to the students) during the final project presentation were pointing and negative interpreted by students. I believe that we can do better (as professor) by orchestrating the presentation event more toward appreciation and appraisal of students efforts. Let's try not to leave an unpleasant experience before they become alumni.

4. *Understanding the huge discrepancies in recognizing and appraisal of Civil Engineering Senior Design Projects, I recommend that CE senior design project should be administered independent of ME project whereas the advising and evaluation process as well as assignment final grade (by individual advisor). The questions for the assessment would need to be revised and delivered to the students through individual project advisor. As a project advisor, I was not informed about the senior design project evaluation process until the last day.*

So, based on experience with this project, I recommend (a) CE senior design project be administered and evaluated by the faculty of Civil Engineering, (b) the assessment questions and matrix would need to be revised suited to the emphases of design concept in Civil Engineering, (c) Each senior design project should be led by individual faculty advisor, there is no need of senior design coordinator."

Closing the Loop – Course and Capstone Senior Design Assessment by Instructors

- According to the instructor of CE 487, all course outcomes have been achieved. In addition, all CE program outcomes have been achieved adequately.
- The evaluations from faculty and industrial professionals indicate the senior design project "membrane bioreactor" achieved all of the course outcomes strongly or adequately, while the other project "life cycle design of steel structure" did not.
- The faculty advisor, especially new to the capstone senior design, should take the course seriously and learn the existing guidelines before trying "non-traditional". Any faculty member new to capstone senior design should attend the class of CE 487 regularly and learn from others. In addition, the assessment methods and procedures of capstone senior design have been described in details in the CE Assessment Plan and prior Assessment Reports accessible by all faculty members of the department.

5.4.1.3 Instructors' Assessment Results of the Freshman Level Courses

The assessment of freshman engineering course outcomes (ENGR 127 and ENGR 128) is conducted by the First-Year Engineering Program Committee, which includes faculty members from both Civil and Mechanical Engineering and Electrical and Computer Engineering departments. See Appendix A-7 for the freshman engineering course outcomes assessment.

5.4.1.4 Fundamental of Engineering (FE) and Professional Engineering (PE) Examinations

The FE exam is conducted by the National Council of Examiners for Engineering and Surveying (NCEES). It is held in two four-hour sessions: the morning session tests the lower division subjects and the afternoon session tests the upper division subjects. Subjects covered by the FE exam can be mapped or correlated to several ABET program outcomes such as a, c, e, and f. Thus, the performance of the CE students on the FE exam can be used as a tool to assess the achievement of some of the SLOs and the corresponding ABET outcomes. Despite the fact that the FE exam is not required to graduate from the CE program at IPFW, students are highly encouraged and supported to take the exam during their final semester. In spring 2018, one CE student took the FE exam and passed.

Table 8 shows the result of an IPFW CE student, who passed the FE exam in spring 2018 and whose scores compared to ABET comparators. By far, 72 IPFW CE students/alumni/times took the FE exam and 58 passed, the passing rate is 81%. The FE passing rate of CE students maintained at 100% again in spring 2018 after declined for several semesters prior to fall 2017. It is important to continue implementing the constructive measures proposed in the CE Assessment Report of Spring 2017.

Table 8 IPFW CE student's scores in the FE exam in spring 2018
(Results reported for total 1 student)

NCEES
advancing licensure for engineers and surveyors

Examination: Fundamentals of Engineering (FE)
Report title: Subject Matter Report by Major and Examination
Exams administered: Jan 01—Jun 30, 2018
Examinees included: First-Time Examinees from EAC/ABET-Accredited Engineering Programs
Graduation Date: Examinees Testing within 12 months of Graduation Date

Name of Institution:	**Indiana University/Purdue University, Fort Wayne**		
Major:	**Civil**	FE Examination:	**Civil**

	Institution	ABET Comparator[2]
No. Examinees Taking [1]	1	5,855
No. Examinees Passing	1	4,086
Percent Examinees Passing	100%	70%

	Number of Exam Questions	Institution Average Performance Index [3]	ABET Comparator Average Performance Index	ABET Comparator Standard Deviation	Ratio Score [4]	Scaled Score [4] (Uncertainty Range for Scaled Score [4] ± 1.00)
Mathematics	7	10.4	9.6	2.7	1.08	0.30
Probability and Statistics	4	9.7	9.7	3.4	1.00	0.00
Computational Tools	4	7.9	10.4	3.6	0.76	-0.69
Ethics and Professional Practice	4	15.0	10.3	3.4	1.46	1.38
Engineering Economics	4	15.0	10.1	3.7	1.49	1.32
Statics	7	9.7	9.4	2.6	1.03	0.12
Dynamics	4	9.2	9.6	3.4	0.96	-0.12
Mechanics of Materials	7	9.9	9.0	2.1	1.10	0.43
Materials	4	15.0	9.9	3.4	1.52	1.50
Fluid Mechanics	4	9.7	10.1	3.6	0.96	-0.11
Hydraulics and Hydrologic Systems	8	8.6	9.4	2.4	0.91	-0.33
Structural Analysis	6	5.6	8.9	2.4	0.63	-1.38
Structural Design	6	8.5	8.8	2.5	0.97	-0.12
Geotechnical Engineering	9	9.3	9.2	2.0	1.01	0.05
Transportation Engineering	8	8.1	9.2	2.1	0.88	-0.52
Environmental Engineering	6	15.0	9.2	2.6	1.63	2.23
Construction	4	15.0	9.8	3.5	1.53	1.49
Surveying	4	9.1	8.8	3.5	1.03	0.09

1. 0 examinees have been removed from this data because they were flagged as a random guesser.
2. Comparator includes all examinees from programs accredited by the ABET commission noted.
3. Performance index is based on a 0–15 scale.
4. These scores are made available for assessment purposes. See the NCEES publication entitled Using the FE as an Outcomes Assessment Tool at http://ncees.org/licensure/educator-resources/.

In addition, five CE alumni took the PE exam and two passed. Their professional areas are geotechnical, structural, transportation engineering, and water resources and environmental engineering. One alumnus passed the PE exam in structural and water resources and environmental engineering, respectively. Table 9 shows the result of the PE exam by the IPFW alumni. Since the inception of the CE program in 2006, eighteen CE alumni have taken the PE exam and twelve have passed. The passing rate is 67%.

Table 9 IPFW CE students' scores in the PE exam in spring 2018
(Results reported for five alumni in geotechnical, structural, transportation, and water resources and environmental engineering, respectively)

NCEES
advancing licensure for engineers and surveyors

Examination:	Principles and Practice of Engineering (PE)
Report title:	Subject Matter Report by Major and Examination
Exams administered:	Jan 01—Jun 30, 2018
Examinees included:	First-Time Examinees from EAC/ABET-Accredited Engineering Programs

Name of Institution:		**Indiana University/Purdue University, Fort Wayne**	
Major:	**Civil**	PE Examination:	**Civil-Geotechnical**

	Institution	ABET Comparator [2]
No. Examinees Taking [1]	1	330
No. Examinees Passing	0	201
Percent Examinees Passing	0%	61%

	Number of Exam Questions	Institution Average Percent Correct	ABET Comparator Average Percent Correct	ABET Comparator Standard Deviation [3]
Project Planning	4	50.0	78.8	0.8
Means and Methods	3	33.3	56.8	0.8
Soil Mechanics	6	33.3	76.5	1.3
Structural Mechanics	6	50.0	55.3	1.2
Hydraulics and Hydrology	7	71.4	74.6	1.4
Geometrics	3	66.7	75.1	0.7
Materials	6	83.3	78.2	1.2
Site Development	5	60.0	60.4	1.1
Site Characterization	5	20.0	56.5	1.1
Soil Mechanics; Laboratory Testing; and Analysis	5	40.0	71.4	1.2
Field Materials Testing; Methods; and Safety	3	100.0	68.7	0.8
Earthquake Engineering and Dynamic Loads	2	0.0	61.1	0.7
Earth Structures	4	75.0	80.8	0.8
Groundwater and Seepage	3	100.0	74.9	0.8
Problematic Soil and Rock Conditions	3	0.0	57.3	0.7
Earth Retaining Structures (ASD or LRFD)	5	60.0	60.2	1.2
Shallow Foundations (ASD or LRFD)	5	60.0	69.1	1.2
Deep Foundations (ASD or LRFD)	5	20.0	63.2	1.2

1. 0 examinees have been removed from this data because they were flagged as a random guesser.
2. Comparator includes all examinees from programs accredited by the ABET commission noted.
3. The standard deviation is based on number of questions correct, not percentage of questions correct.

NCEES
advancing licensure for engineers and surveyors

Examination:	Principles and Practice of Engineering (PE)
Report title:	Subject Matter Report by Major and Examination
Exams administered:	Jan 01—Jun 30, 2018
Examinees included:	First-Time Examinees from EAC/ABET-Accredited Engineering Programs

Name of Institution:		**Indiana University/Purdue University, Fort Wayne**	
Major:	**Civil**	PE Examination:	**Civil-Structural**

	Institution	ABET Comparator [2]
No. Examinees Taking [1]	1	1,209
No. Examinees Passing	1	733
Percent Examinees Passing	100%	61%

	Number of Exam Questions	Institution Average Percent Correct	ABET Comparator Average Percent Correct	ABET Comparator Standard Deviation [3]
Project Planning	4	100.0	83.0	0.8
Means and Methods	3	100.0	67.7	0.8
Soil Mechanics	6	83.3	66.8	1.3
Structural Mechanics	6	83.3	70.5	1.2
Hydraulics and Hydrology	7	71.4	75.0	1.3
Geometrics	3	66.7	79.5	0.6
Materials	6	100.0	77.1	1.1
Site Development	5	60.0	56.6	1.1
Analysis of Structures: Loads and load applications	4	75.0	62.1	1.0
Analysis of Structures: Forces and load effects	10	50.0	67.6	1.8
Design and Details of Structures: Materials and material properties	5	100.0	57.9	1.2
Design and Details of Structures: Component design and detailing	15	53.3	56.4	2.8
Codes and Construction: Codes; standards; and guidance documents	4	100.0	59.3	1.1
Codes and Construction: Temporary structures and other topics	2	100.0	54.7	0.7

1. 0 examinees have been removed from this data because they were flagged as a random guesser.
2. Comparator includes all examinees from programs accredited by the ABET commission noted.
3. The standard deviation is based on number of questions correct, not percentage of questions correct.

NCEES
advancing licensure for engineers and surveyors

Examination:	Principles and Practice of Engineering (PE)
Report title:	Subject Matter Report by Major and Examination
Exams administered:	Jan 01—Jun 30, 2018
Examinees included:	First-Time Examinees from EAC/ABET-Accredited Engineering Programs

Name of Institution:	**Indiana University/Purdue University, Fort Wayne**		
Major:	**Civil**	PE Examination:	**Civil-Transportation**

	Institution	ABET Comparator [2]
No. Examinees Taking [1]	1	1,469
No. Examinees Passing	0	972
Percent Examinees Passing	0%	66%

	Number of Exam Questions	Institution Average Percent Correct	ABET Comparator Average Percent Correct	ABET Comparator Standard Deviation [3]
Project Planning	4	25.0	76.8	0.9
Means and Methods	3	33.3	55.4	0.8
Soil Mechanics	6	66.7	54.8	1.3
Structural Mechanics	6	33.3	46.5	1.3
Hydraulics and Hydrology	7	28.6	71.8	1.4
Geometrics	3	66.7	81.2	0.6
Materials	6	66.7	73.1	1.2
Site Development	5	60.0	59.8	1.1
Traffic Engineering (Capacity Analysis and Transportation Planning)	11	36.4	59.6	1.7
Horizontal Design	4	75.0	63.4	0.9
Vertical Design	4	25.0	66.5	1.0
Intersection Geometry	4	75.0	64.8	1.0
Roadside and Cross Section Design	4	50.0	60.5	1.0
Signal Design	3	0.0	50.9	0.9
Traffic Control Design	3	33.3	78.4	0.8
Geotechnical and Pavement	4	50.0	59.9	1.1
Drainage	2	50.0	81.4	0.6
Alternatives Analysis	1	100.0	51.1	0.5

1. 0 examinees have been removed from this data because they were flagged as a random guesser.
2. Comparator includes all examinees from programs accredited by the ABET commission noted.
3. The standard deviation is based on number of questions correct, not percentage of questions correct.

TERMS AND CONDITIONS OF DATA USE

This report contains confidential and proprietary NCEES data. The report itself may not be provided to third parties or used for any purpose other than that contemplated by NCEES and the recipient of this report. The information contained in this report however may be shared with accrediting bodies so long as the report recipient expressly informs the accrediting body that the information is confidential and proprietary and may not be used for any purpose unrelated to the accreditation review of the institution or program in question.

By using any of the information contained in this report the report recipient agrees to respect and be bound by these terms conditions and limitations regarding the use of NCEES data. Your cooperation is appreciated.

NCEES
advancing licensure for engineers and surveyors

Examination:	Principles and Practice of Engineering (PE)
Report title:	Subject Matter Report by Major and Examination
Exams administered:	Jan 01—Jun 30, 2018
Examinees included:	First-Time Examinees from EAC/ABET-Accredited Engineering Programs

Name of Institution:		**Indiana University/Purdue University, Fort Wayne**	
Major:	**Civil**	PE Examination:	**Civil-Water Resources and Environmental**

	Institution	ABET Comparator [2]
No. Examinees Taking [1]	2	1,169
No. Examinees Passing	1	836
Percent Examinees Passing	50%	72%

	Number of Exam Questions	Institution Average Percent Correct	ABET Comparator Average Percent Correct	ABET Comparator Standard Deviation [3]
Project Planning	4	75.0	77.3	0.9
Means and Methods	3	66.7	56.1	0.7
Soil Mechanics	6	41.7	56.4	1.4
Structural Mechanics	6	25.0	47.0	1.3
Hydraulics and Hydrology	7	78.6	77.6	1.3
Geometrics	3	66.7	77.5	0.6
Materials	6	66.7	72.5	1.2
Site Development	5	30.0	57.7	1.1
Analysis and Design	4	62.5	73.6	1.0
Hydraulics Closed Conduit	5	70.0	70.1	0.9
Hydraulics Open Channel	5	60.0	73.9	1.0
Hydrology	7	64.3	82.1	1.2
Groundwater and Wells	3	50.0	61.0	0.9
Wastewater Collection and Treatment	6	41.7	61.0	1.4
Water Quality	3	100.0	61.5	0.9
Drinking Water Distribution and Treatment	6	58.3	52.1	1.5
Engineering Economics Analysis	1	100.0	56.5	0.5

1. 0 examinees have been removed from this data because they were flagged as a random guesser.
2. Comparator includes all examinees from programs accredited by the ABET commission noted.
3. The standard deviation is based on number of questions correct, not percentage of questions correct.

Closing the Loop – FE Exam

After the FE passing rate of CE students and alumni declined for several semesters prior to fall 2017, it maintained at 100% (1 out of 1) again in spring 2018 (100% (4 out of 4) pass in fall 2017). It is important to continue monitoring the FE results while improving the PEOs of the CE program. The proposed constructive measures in the CE Assessment Report of Spring 2017 include **i)** covering the blank subjects of FE exam in lectures, **ii)** reviewing FE topics, and **iii)** incorporating FE topics, examples and exercises in the curriculums of the courses.

Students are encouraged to take their FE exams. They are informed of the value of being a licensed engineer when they are enrolled in the freshman engineering courses and continuously encouraged to take the FE exam as they become eligible to take it. The department is currently subsidizing 50% of the FE exam registration fee for our students. The department also provides review sessions twice a year for those who plan to take the exam. In addition, there is a discussion in the freshman engineering courses and senior design courses on how to become a competitive engineer including PE licensing.

5.4.2 Indirect Measures

5.4.2.1 Interim Assessment by Students

I) Course Outcomes

The students' assessments of the degree of achievement of the course outcomes were conducted as outlined in the CEAP during the last week of spring 2018. Table 10 shows the summary of the students' assessment results for the courses that were also assessed by the instructors as shown in Table 6 previously. The detailed assessment results from the students are available in Appendix A-8. The students state the level at which they believe that the course outcome has been achieved on a scale of 1 to 4. The desired level achievement is at least 2.8.

Table 10 Students' assessment of course outcomes (the number in parenthesis was from the last time the course was assessed)

Outcome	CE 252	CE 318	CE 319	CE 345	CE 465	CE 487
1	* (2.8)	2.9 (2.1)	3.2 (3.5)	3.4	3.9	3.8 (3.7)
2	* (2.9)	3.1 (2.4)	3.7 (3.8)	3.5	3.8	3.3 (3.6)
3	* (2.9)	2.9 (2.4)	3.7 (3.8)	3.4	3.3	3.2 (3.5)
4	* (2.9)	2.9 (2.4)	3.0 (3.8)	3.6	3.8	2.8 (3.3)
5	* (3.0)	3.0 (2.6)	3.5 (3.8)	3.2	3.9	3.7 (3.5)
6	* (2.9)	2.9 (2.6)	3.5 (3.8)	3.1	3.8	3.6 (3.3)
7	* (2.9)	2.8 (2.6)	3.5 (3.5)	3.6	3.9	3.4 (3.3)
8	* (2.7)	3.1 (2.3)	3.3 (3.5)	3.6		3.0 (3.1)
9		3.3 (2.6)	3.7 (3.8)	3.8		3.9 (3.5)
10		2.9 (2.1)	3.5 (3.8)	3.6		3.8 (3.6)
11		2.8 (2.4)	3.7 (3.8)	3.4		3.6 (3.5)
12		2.6 (2.1)	3.7 (3.5)	3.3		3.9 (3.6)
13		3.0 (2.4)	3.5 (3.8)	3.5		4.0 (3.7)
14		3.0 (2.3)	3.7 (3.5)	3.6		
15		? (2.7)	3.7 (3.8)			
Program outcomes achieved	*	a, c, e, g, i, j	a, b, c, d, e, f, g, h, i, k	a, c, d, g, k	a, c, e, h, i, j, k	a, c, e, f, g, h, i, j, k
Program outcomes not achieved	*	none	none	none	none	none

Note 1) the evaluation scores are in 1~ 4 scale. Score 4 means the outcome has been achieved strongly. The outcomes are different for each course. For more information of each numbered specific outcome, please refer to the course syllabus or the faculty assessment form.
2) Yellow color indicates the outcome scored between 2.7-2.9. Red color indicates the outcome scored below 2.7.
3) * A wrong course elevation form (using CE 250 Statics instead) was given to the CE 252 students. As a result, the evaluation result is invalid.
4) ? The questionnaire was missing in the evaluation form.

(1) Students' assessment results of the sophomore, junior, and senior level courses:

- As shown in Table 10, the students believed that all learning and program outcomes in 3 out of 6 assessed courses were achieved strongly. These courses are CE 319, CE 345, and CE 465.
- For CE 318, except the outcome #12 received 2.6, most of the course outcomes were around 3.0 marginally. However, all of the ABET outcomes were achieved adequately (above 2.8). Compared to the last assessment results of fall 2015, improvement was observed. Please note that the questionnaire #15 was missing in the evaluation form (see Appendix A-8).
- For CE 487, all outcomes were achieved adequately or strongly, except the outcome #4 "build, test, and evaluate feasible solutions using modern engineering tools and select the optimum alternative" received 2.8 out of 4.0. Since this is senior design (I) course, build

and test belong to the content of CE 488 senior design (II). The CE curriculum committee needs to revise this outcome to avoid confusions in future.

- For CE 252, a wrong course elevation form (using CE 250 Statics instead) was given to the students. As a result, the evaluation result is invalid.

(2) Students' assessment results of the freshman level courses

The assessment of freshman engineering course outcomes (ENGR 127 and ENGR 128) is independently conducted by the First-Year Engineering Program Committee, which includes faculty members from both Civil and Mechanical Engineering and Electrical and Computer Engineering departments. The annual assessment report for freshman engineering courses, which was prepared in spring 2018, is attached in Appendix A-7.

Closing the Loop – Course Assessment by Students

- CE 318: This course will be reassessed in fall 2018.
- CE 252: This course will be reassessed in spring 2019.
- CE 487: The course outcome #4 will be revised by the CE Curriculum Committee to avoid confusion. The course will be assessed whenever it is offered.

II) Laboratory Evaluations

Laboratory evaluation was carried out for CE 381, which evaluation was accidently missing in spring 2017. Students are asked to give a score of 1 to 4 for each question on the assessment form. The desired level is at least 3.0. Table 11 summarizes the results, which show positive feedback from the students regarding the lab's facilities and equipment. It is big improvement compared to the last assessment conducted in spring 2016. The detailed laboratory evaluation results are shown in Appendix A-9.

Table 11: Laboratory facilities/equipment evaluation by students (the number in parenthesis was from the last assessment in spring 2016, the laboratory evaluation was missing in spring 2017)

Questions	CE 381
1. The lab is well equipped.	3.5 (2.7)
2. The lab equipment is functional.	3.6 (2.8)
3. The lab experiments are reasonable in length.	3.4 (3.2)
4. The lab experiments are reasonable in content.	3.5 (3.3)
5. The lab manual adequately describes experiments.	3.7 (3.1)
6. The general rules of lab safety were clearly explained at the start of the semester.	3.7 (3.1)
7. Safety provisions pertaining to each experiment and/or lab activity were explained at the beginning of the associated lab session (if applicable /required/ needed)	3.6 (3.4)

Closing the Loop – Laboratory Evaluation

- Thanks to the efforts of the instructor and the department, great improvement in the laboratory evaluation of CE 381 was achieved compared to the last assessment conducted in spring 2016.
- The university provided $100,000 for the plan in 2017 prior to the ABET visit in 2017 for accreditation. The department, following the 5-year laboratory improvement plan (see Appendix A-10) prepared by the Laboratory and Safety Committee, updated/upgraded the lab equipment for CE and ME labs in 2017. In the fall 2018 semester, CE 319 lab will be assessed as these labs have some new equipment.

III) Engineering Students' Forum

A CME student forum was held on Mar 26, 2018. The department chair presented the slide show of the department and educational programs followed by questions and answers session. The summary of the meeting is provided in Appendix A-11.

5.4.2.2 Exit Survey

All graduating students are required to complete an exit survey at the end of their last semester. The survey requests feedback on five areas: I) curriculum, II) faculty, III) facilities, IV) IPFW, and V) ABET outcomes. This survey is a very good indirect measurement tool as to whether or not student outcomes have been achieved as it captures the entire, unique experience of students graduating from the CE program. The exit survey results from 5 CE students graduated in spring 2018 are included in Appendix A-12. Table 12 shows the summary of the exit survey results of the last four semesters. Table 13 lists the comments received in the exit survey.

Table 12 Summary of the exit survey results of the last four semesters
(5 responses in spring 2018)

Question	Agreement			
I) Curriculum	Fall 2016	Spring 2017	Fall 2017	Spring 2018
1. Background provided in the basic science and mathematics is sufficient	3.5	3.1	3.0	3.8
2. Content and amount of GenEd courses are useful	2.0	2.7	3.0	2.6
3. Frequency of courses offering in your major is satisfactory	3.5	2.7	3.0	2.6
4. There were enough technical electives	3.0	2.4	3.0	1.6
II) Faculty				
1. Faculty are proficient in their field of expertise	4.0	3.2	3.0	3.4
2. Faculty are well prepared for the lectures	3.0	2.9	3.0	3.0
3. Faculty provide good academic advising	4.0	3.0	3.0	2.8
4. Amount and adequacy of office hours	4.0	3.3	3.0	3.6
5. Faculty are helpful inside and outside the classrooms	3.5	3.1	3.0	3.4
6. Faculty show concern toward students	3.5	3.1	3.0	2.8
7. Faculty are enthusiastic about what they teach	3.5	3.0	3.0	3.2
III) Facilities				
1-a) Sophomore laboratories facilities (other than computer labs) adequacy	3.5	2.8	2.5	3.4

1-b) Junior and above laboratories facilities (other than computer labs) adequacy	3.5	2.9	2.5	3.4
2-a) Computer laboratories adequacy: Hardware	2.0	2.6	3.0	3.4
2-b) Computer laboratories adequacy: Software	4.0	2.6	2.5	3.2
IV) IPFW				
1. Adequacy of the services of the library facilities	2.5	3.4	3.5	3.8
2. Adequacy of the admission Office's services	3.5	3.1	3.5	3.3
3. Adequacy of the Registrar Office's services	3.5	3.1	3.5	3.2
4. Adequacy of the International Students Office services	N/A	2.8	3.0	3.5
5. Adequacy of the campus-wide computer facilities	3.0	2.8	3.0	3.2
V) ABET Outcomes: The IPFW CE program has:				
1. Adequately prepared you to apply the knowledge of mathematics, science, and engineering	3.0	3.2	3.0	3.8
2. Adequately prepared you to design and conduct experiments, as well as to analyze and interpret data	3.5	3.3	3.0	3.6
3. Adequately prepared you to design systems, components, or processes to meet desired needs	3.5	3.2	3.0	3.2
4. Cultivated in you an ability to function in a group or on multi-disciplinary teams	4.0	3.4	3.0	3.4
5. Enabled you to identify, formulate, and solve engineering problems	3.5	3.2	3.0	3.8
6. Adequately familiarized you with an understanding of professional and ethical responsibility	3.5	3.3	3.0	3.6
7. Provided you the means by which to communicate technical information effectively	4.0	3.2	3.0	3.6
8. Given you the broad education necessary to understand the impact of engineering solutions in a global and societal context	3.0	3.3	3.0	3.0
9. Familiarized you with the recognition of the need for, and an ability to engage in life-long learning	3.5	3.3	3.0	3.0
10. Familiarized you with the knowledge of contemporary issues	3.5	3.2	3.0	2.6
11. Enabled you to use the techniques, skills, and modern engineering tools necessary for engineering practice	4.0	3.2	3.0	3.6

* Note that the evaluation scores are in 1~ 4 scale. Score 4 means strong agreement.

Table 13 Summary of the comments received in the exit survey
(5 responses in spring 2018)

<table>
<tr><th>Area</th><th>Questionnaire</th><th>Comments Received</th></tr>
<tr><td rowspan="2">Curriculum</td><td>What topics would you recommend to be given more emphasis or to be introduced in the curriculum?</td><td>• Engineering economics
• Structural engineering
• Less geotechnical and more environmental
• More available technical electives, not enough staff to teach elective courses
• Structural courses</td></tr>
<tr><td>Please add additional comments about the curriculum.</td><td>• Civil and Mechanical Departments need to be split
• Curriculum is solid, but technical electives are not offered in great volume
• Joint CE ME classes are usually ME dominated to the detriment of CE topics</td></tr>
<tr><td>Faculty</td><td>Please add any additional comments about the faculty.</td><td>• The school needs to find more professors with experience in structures and transportation.
• Faculty members are all great, but department doesn't have enough help to provide a large variety of electives.</td></tr>
<tr><td>Facilities</td><td>Please add any additional comments about the facilities.</td><td>• Always need more areas to study.
• Some minor computer program inconsistencies, highly occupied labs typically have needed programs, and vice versa.</td></tr>
<tr><td>IPFW</td><td>Please add any additional comments about the services or facilities.</td><td>• Just inconsistencies with some computer labs only having certain programs, others which are readily available having very little in terms of programs.</td></tr>
<tr><td>ABET Outcomes</td><td>Additional comments.</td><td>• Offer more specific courses for structural and transportation concentrations.
• Civil Program needs more resources.</td></tr>
</table>

The student provided positive feedback with a degree of agreement/satisfaction equal or above 3 (out of 4) regarding the adequacy and level of services of all categories in two out of five areas: Facilities and IPFW. The main library was reopened in Jan 2017 after renovation. It provides extra computing and study spaces for the students, which received positive feedback from the students. Regarding the Curriculum, Faculty, and ABET Outcomes of the CE program, the students strong dissatisfy 2) content and amount of useful Gen Ed, 3) frequency of courses offering in your major, and 4) variety of technical electives in Curriculum, and 10) familiarized you with the knowledge of contemporary issues in ABET Outcomes. In the comments from the students, they suggest CE should have more faculty and resources to offer more courses to meet their educational needs in different sub-areas of CE.

Closing the loop

Faculty: A new CE faculty Dr. Promothes Saha (in Transportation Engineering) was hired in summer 2018 through nationwide search. However, the current amount of CE faculty and technical areas were near the minimum capacity to be eligible for ABET accreditation.

Curriculum: (1) The department still offered a technical elective CE 450 Urban Transportation Planning in fall 2018, although the enrollment was 5 only. (2) With an increase in the student enrollment and growing of CE program, more CE required and elective courses should be offered more frequently with greater variety and coverage. The CE program also needs more resources like faculty and facilities.

5.4.2.3 Internship and Co-op Education Coordinator/Supervisor Survey

The department encourages students to participate in the University's Cooperative Education Program (co-op). Employment with private industry or government agencies is arranged by the University's Cooperative Education Program Office. Students are paid by the employers. Participating students must maintain a 2.5 GPA average, but credits earned for co-op work cannot be used to satisfy the requirements for a major. In spring and summer 2018, 3 CE students were participating in the co-op program. Table 14 shows the student level and the sponsoring companies (i.e. NUCOR and Indiana Department of Transportation (INDOT)), along with the student's self-rating and supervisor's rating. In all cases, all the ratings are from Average to Outstanding.

Table 14 Employer (supervisor) and student's rating of co-op performance.

Student (class)	Employer	Student's rate of the overall performance	Employer's rate of the overall performance
1. Colton Amstutz (So)	NUCOR	Very Good	Very Good
2. Stas Kosnik (So)	INDOT	Outstanding	Outstanding
3. Taylor Hartman (Sr)	INDOT	Very Good	Very Good

Table 15 indicates performance factors (1-5 scale) and areas of competence the students can achieve through the co-op experience. The items below can be mapped to the CE program outcomes. The number indicates the student's level of performance in these areas during the current work term as reported by the supervisors. As can be seen in the table, most scores are either 1 (outstanding) or 2 (very good), with a couple of 3 (average) only. There is no score of marginal or unsatisfactory. The complete report by the co-op coordinator can be found in the appendix A-13 of the assessment materials.

Table 15 Employer (supervisor) rating of co-op performance.
1 = Outstanding, 2 = Very Good, 3 = Average, 4 = Marginal, 5 = Unsatisfactory, – = Not Applicable

Measurements Related to the Program Outcomes. Student:	***#1***	***#2***	***#3***
Ability to integrate theory (academic learning) and practice (co-op experience).	2	1	2
Academically prepared for this job (course preparation).	2	2	2

Communicates clearly in written form.	2	1	2
Communicates clearly verbally.	2	1	1
Demonstrates ability to use decision making skills.	2	1	2
Demonstrates analytical problem solving skills.	2	1	2
Demonstrates necessary technical skills.	3	2	2
Demonstrates ability to apply technical knowledge/skills.	3	2	2
Demonstrates the necessary computer skills.	2	2	1
Demonstrates ability to design.	-	-	2
Demonstrates to work under pressure	-	-	2
Exercise judgement	-	-	2

5.5 ABET Evaluation of the CE Program

In fall 2017, the Engineering Accreditation Commission (EAC) of ABET visited the IPFW campus and evaluated the CE program for accreditation. In its Final Statement (August 28, 2018), the EAC has concluded that the current CE program has no Deficiency, Weakness, Concern, or Observation and granted the CE program reaccreditation to September 30, 2024. The ABET EAC's Final Statement for the CE program is included in Appendix A-14.

6. Summary and Recommendations

1. This assessment report has adopted the SLOs of the CE program modified in 2012. The modified SLOs are aligned one-to-one with the ABET outcomes, customized to the CE program at IPFW, and easy to follow.
2. ABET has granted reaccreditation to the CE program in their Final Statement for 2017-2018 engineering program evaluations, with no areas for improvement.
3. There are strong evidences that the CE program is on the right track to achieving its PEOs. The program has graduated a total of 79 students: 10 admitted to graduate schools (5 graduated) and the rest working in private and government agencies, 81% passing rate (58/72) for the FE exam, and twelve out of eighteen (67%) passed the PE exams.
4. In spring 2018, one CE student took the FE exam and passed. The FE passing rate of CE students maintained at a high level again after declined for several semesters. It is important to continue monitoring the FE results while improving the PEOs of the CE program. The proposed constructive measures in the CE Assessment Report of Spring 2017 include **i)** covering the blank subjects of FE exam in lectures, **ii)** reviewing FE topics, and **iii)** incorporating FE topics, examples and exercises in the curriculums of the courses.
5. In spring 2018, six courses and one lab's facilities/equipment were assessed. The results of the various direct and indirect measures of assessing the achievement of the SLOs provide evidences that the course outcomes and the corresponding CE program outcomes of all the seven courses (CE 252, CE 318, CE 319, CE 345, CE 465, and CE 487) were strongly or adequately achieved.
6. The instructors' assessment of all six courses indicate that all the courses' learning outcomes and the CE program outcomes have been strongly or adequately achieved.
7. Based on the students' evaluations,
   1) they satisfied all of the course outcomes in 3 out of 6 assessed courses, which were CE 319, CE 345, and CE 465;

2) for CE 318, except the outcome #12 received 2.6, most of the course outcomes were around 3.0 marginally. However, all of the ABET outcomes were achieved adequately (above 2.8). Compared to the last assessment results of fall 2015, improvement was observed;
3) for CE 487, all outcomes were achieved adequately or strongly, except the outcome #4 "build, test, and evaluate feasible solutions using modern engineering tools and select the optimum alternative" received 2.8 out of 4.0. Since this is senior design (I) course, build and test belong to the content of CE 488 senior design (II). The CE curriculum committee needs to revise this outcome to avoid confusions in future;
4) for CE 252, a wrong course elevation form (using CE 250 Statics instead) was given to the students. As a result, the evaluation result is invalid.

8. CE 318 and CE 252 will be assessed again in fall 2018 and spring 2019, respectively. CE 487 will be assessed whenever it is offered.
9. For lab's facilities/equipment evaluation, CE 381 received positive feedback from the students, after solving the concerns of lab equipment issue in spring 2016. The department, following the 5-year laboratory improvement plan, prepared by the Laboratory and Safety Committee, updated/upgraded the lab equipment for CE and ME labs in 2017.
10. A CME student forum was held on March 26, 2018.
11. In exit survey, the student provided positive feedback in two out of five areas: Facilities and IPFW. Regarding the Curriculum, Faculty, and ABET Outcomes of the CE program, the students strong dissatisfy 2) content and amount of useful Gen Ed, 3) frequency of courses offering in your major, 4) variety of technical electives in Curriculum, and 10) familiarized you with the knowledge of contemporary issues in ABET Outcomes. In the comments from the students, they suggest CE should have more faculty and resources to offer more courses to meet their educational needs in different sub technical areas of CE.
12. For internship and Co-op education, three CE students participated in the program in spring and summer 2018. All of them received from very good to outstanding feedback for most survey inquiries from their employers.
13. This assessment reports have been circulated among the CE faculty members for their feedback and discussed at the faculty meetings. Then the assessment reports are sent to ETCS assessment committee for feedback and questions.
14. The CE assessment reports have been shared with the Industrial Advisory Board members for their input.
15. The department should keep offering a CME assessment orientation at the beginning of every fall semester. All faculty, LTLs, and GTAs are invited. All new faculty, LTLs and GTAs are expected to attend.
16. The ABET team visited in fall 2017 for accreditation was fully satisfied with the current CE program assessment plan and reports.
17. The department should keep encouraging our students to take the FE exam.
18. All labs of the department are safety-certified by the university. This certification is to be renewed every year.
19. For the continuous improvement process to be effective, any shortcomings exposed by any assessment measure must be addressed accordingly.

Based on the results of the assessment process described in this report, the courses and laboratories shown in Table 16 are scheduled for assessment at the end of fall 2018. For each course the instructor will assess the course and ABET outcomes and the students will assess the course outcomes. The CE course Assessment Schedule is available in Appendix A-15.

Table 16 Courses and laboratories to be assessed in fall 2018

Courses	CE Courses	CE 318, CE 375, CE 418, CE 450, CE 475
	Capstone Senior Design Courses	CE 488
Laboratories	Course Outcome	CE 319
	Facilities/Equipment	CE 319

7. Acknowledgment

I would like to thank the department chair Dr. Nash Younis and administrative staff member Rita Reed for her efforts in collecting and dissemination of the assessment data. My sincere appreciation is due to Drs. Bongsu Kang, Fawad Niazi, Max Yen, and as well as all LTLs and CME faculty who contributed and participated in the assessment effort. Finally, my sincere gratitude and appreciation go to our alumni, students and their intern employers for participating in this assessment process.

Appendix A-1: CE Alumni Survey Results

Alumni Results

CE Alumni Survey

Alumni eligible for survey: 8

Correct addresses received from Alumni and Co-op Office: 4

Surveys sent: 4

Surveys received: 3

Current Position (title)

Current Position (title)
Project Engineer
E.I.T.

Current salary (range)

#	Answer	%	Count
1	$0k - $40k	0.00%	0
2	$41k - $50k	33.00%	1
3	$51k - $60k	67.00%	2
4	$61k - $70k	0.00%	0
5	$71k - $80k	0.00%	0
6	$81k - $90k	0.00%	0
7	$91k - 100k	0.00%	0
8	$100k or more	0.00%	0
9	No response	0.00%	0
	Total	100%	3

In your current position, your primary job function is (select all that apply)

#	Answer	%	Count
1	Analysis	16.67%	1
2	Design	33.32%	2
3	Engineering support (drafting, field support, etc.)	16.67%	1
4	Engineering management	0.00%	0
5	Education	0.00%	0
6	Field Engineering	16.67%	1
7	Consultant	16.67%	1
8	Lab and Test Engineering	0.00%	0
9	Non-engineering (sales, business, etc.)	0.00%	0
10	Other:	0.00%	0
11	No Response	0.00%	0
	Total	100%	6

Current area of work in Civil Engineering (select all that apply)

#	Answer	%	Count
1	Construction Engineering and/or Management	33.34%	1
2	Environmental Engineering	0.00%	0
3	Geotechnical Engineering	0.00%	0
4	Hydraulic and Water Resources Engineering	0.00%	0
5	Structural Engineering	33.33%	1
6	Surveying and Land Development:	0.00%	0
7	Transportation	33.33%	1
8	Non-Engineering (Education, Sales, Procurment, etc.)	0.00%	0
9	Other, please list:	0.00%	0
10	No Response	0.00%	0
	Total	100%	3

Other, please list:

The following are the set of education objectives for the CE program at IPFW. Please rate how well undergraduate education at the IPFW CE program met the following objectives:

#	Question	Strongly Disagree		Disagree		Agree		Total
1	I have been advanced professionally to roles of greater civil engineering technical responsibilities and/or by transitioning into leadership positions in business, government, and/or education.	0.00%	0	0.00%	0	100.00%	3	3
2	I am able to participate in life-long learning through the successful completion of advanced degree(s), continuing education, and/or engineering certification(s)/licensure or other professional development.	0.00%	0	0.00%	0	100.00%	3	3
3	I have demonstrated a commitment to community by applying technical skills and knowledge to support various service activities.	0.00%	0	0.00%	0	100.00%	3	3

Overall, the CE program Education Objectives are adequate and do not require any modifications?

#	Answer	%	Count
1	Yes	100.00%	3
2	No	0.00%	0
	Total	100%	3

If you answered No to the above question, please list all the changes that you recommend.

CE graduates will advance professionally to roles of greater civil engineering technical responsibilities by transitioning into leadership positions in business, government, and/or education.

#	Answer	%	Count
1	The program does not require any changes to improve this objective.	100.00%	3
2	I recommend the following measures to prepare graduates better to meet this objective:	0.00%	0
	Total	100%	3

I recommend the following measures to prepare graduates better to meet this:

CE graduates will participate in life-long learning through the successful completion of advanced degree(s), continuing education, and/or engineering certification(s)/licensure or other professional development.

#	Answer	%	Count
1	The program does not require any changes to improve this objective.	100.00%	3
2	I recommend the following measures to prepare graduates better to meet this objective:	0.00%	0
	Total	100%	3

I recommend the following measures to prepare graduates better to meet this:

CE graduates will demonstrate a commitment to community by applying technical skills and knowledge support various service activities.

#	Answer	%	Count
1	The program does not require any changes to improve this objective.	100.00%	3
2	I recommend the following measures to prepare graduates better to meet this objective:	0.00%	0
	Total	100%	3

I recommend the following measures to prepare graduates better to meet this:

Please provide any additional comments or suggestions:

Appendix A-2: CE Alumni Employers' Survey Results

Results

CE Alumni Employer Survey

Alumni provided supervisor's contact information: 2

Surveys sent: 2

Surveys received: 1

Current Position (title)

Current Position (title)
Technical Services Director

Number of IPFW Engineering graduates employed by your company - Civil

#	Answer	%	Count
1	8	100.00	1
	Total	100%	1

Number of IPFW Engineering graduates employed by your company - Computer

#	Answer	%	Count
1	No answer	100.00	1
	Total	100%	1

Number of IPFW Engineering graduates employed by your company - Electrical

#	Answer	%	Count
1	No answer	100.00	1

	Total	100%	1

Number of IPFW Engineering graduates employed by your company - Mechanical

#	Answer	%	Count
1	No answer	100.00	1
	Total	100%	1

Primary function(s) of your company (select all that apply)

#	Answer	%	Count
1	Analysis	20%	1
2	Design	20%	1
3	Engineering management	20%	1
4	Field Engineering	20%	1
5	Lab and Test Engineering	20%	1
	Total	100%	5

Overall rating of the education received by the graduates as it relates to his/her preparation.

#	Answer	%	Count
1	Excellent	100%	1
	Total	100%	1

Please list any recommendation that you believe is necessary to improve IPFW CE graduates' education to better prepare them for the job market:

No answer

Compared with graduates of other universities, how well do IPFW CE graduates perform:

#	Answer	%	Count
1	Same	100%	1
	Total	100%	1

Please list any recommendation that you believe is necessary to improve IPFW CE graduates' performance to better prepare them for the job market:

No answer

Would you consider hiring additional IPFW CE graduates if there were openings:

#	Answer	%	Count
1	Always	100%	1
	Total	100%	1

Please list any recommendation that you believe is necessary to improve IPFW credentials to be more attractive for the job market:

Mandatory internships with Civil Engineering companies.

IPFW CE graduates have been advancing professionally to roles of greater civil engineering technical responsibilities and/or by transitioning into leadership positions in business, government, and/or education:

#	Answer	%	Count
1	Agree	100%	1
	Total	100%	1

IPFW CE graduates are able to participate in life-long learning through the successful completion of advanced degree(s), continuing education, and/or engineering certification(s)/licensure or other professional development:

#	Answer	%	Count
1	Strongly Agree	100%	1
	Total	100%	1

IPFW CE graduates are able to demonstrate a commitment to community by applying technical skills and knowledge to support various service activities:

#	Answer	%	Count
1	Agree	100%	1
	Total	100%	1

Overall, the above listed Program Education Objectives are adequate and do not require any modifications or changes.

#	Answer	%	Count
1	Yes	100%	1
	Total	100%	1

IPFW CE graduates have been advancing professionally to roles of greater civil engineering technical responsibilities and/or by transitioning into leadership positions in business, government, and/or education.

#	Answer	%	Count
1	I recommend the following measures to prepare graduates better to meet this objective:	100%	1
	Total	100%	1

I recommend the following measures to prepare graduates better to meet this...

Only placed agree here as the majority of our IPFW CE grads are relatively new and have not had this opportunity yet, but many are showing promise in this area.

IPFW CE graduates are able to participate in life-long learning through the successful completion of advanced degree(s), continuing education, and/or engineering certification(s)/licensure or other professional development.

#	Answer	%	Count
1	The program does not require any changes to improve this objective.	100%	1
	Total	100%	1

IPFW CE graduates demonstrate a commitment to community by applying technical skills and knowledge to support various service activities.

#	Answer	%	Count
1	The program does not require any changes to improve this objective.	100%	1
	Total	100%	1

Please provide any additional comments or suggestions:

Please provide any additional comments or suggestions:
INDOT has had the great opportunity to work with many IPFW CE students over the past several years as summer interns. This has been a great partnership that we hope to continue as it has provided us the ability to train and eventually hire several of them permanently.

Appendix A-3: The Minutes and Presented Materials in Industrial Advisory Board Meeting

Department of Civil and Mechanical Engineering
COLLEGE OF ENGINEERING, TECHNOLOGY, AND COMPUTER SCIENCE

Industry Advisory Board Meeting

Friday, April 20, 2018

The Steel Dynamics Keith E. Busse IPFW Alumni Center

IAB Members in attendance: Kurt Heidenreich, Engineering Resources, Inc.; Kurt Voigt, New Millennium Building System; Said Gomma, DepuySynthes, Patrick McCammon, SkySight Technologies LLC, Carl Huber, Water Furnace International, Matthew Wirtz, City Utilities Engineering, Matt Williams, PHD, Inc. Susan Zogbi, ZimmerBiomet, Inc.

Faculty/Staff in attendance: Nash Younis, Chair the Department of Civil & Mechanical Engineering, Don Mueller, Hosni Abu-Mulaweh, Dong Chen, Rebecca Essig, Zhuming Bi, Bongsu Kang, Devin Allen, Jason Moyer, Judy Baker

On Friday, April 20, from 8:00 a.m.—10:00 a.m. the Department of Civil and Mechanical Engineering held its Industry Advisory Board Meeting at the Steel Dynamics Keith E. Busse IPFW Alumni Center.

Nash Younis, chair of the Department of Civil and Mechanical Engineering, gave a presentation providing an overview of the CME department. A copy of his presentation is included in the appendices of these minutes.

A discussion about replacing the old ABET program outcomes a-k with the new ABET program outcomes 1-7 took place. Both the civil engineering and mechanical engineering programs are in the process of transitioning from the old outcomes to the new outcomes.

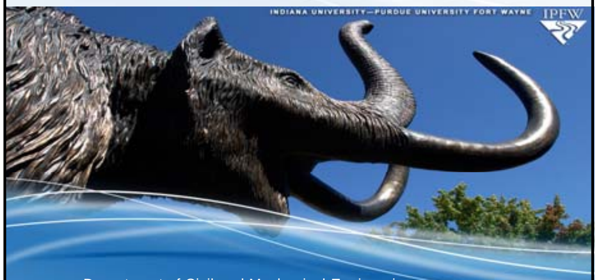
Manoochehr Zoghi, dean of the College of Engineering, Technology, and Computer Science, gave a welcome and provided an overview of the college.

Don Mueller gave a presentation describing various industry-university engagement opportunities. A copy of his presentation is included in the appendices of these minutes.

Dong Chen (Civil Engineering) and Don Mueller (Mechanical Engineering) gave an overview of the civil engineering and mechanical engineering programs. Copies of their presentations are appended to these minutes.

Finally, Rebecca Essig, coordinator of the First-Year Engineering Program, gave a presentation describing the current status of the first-year engineering program. A copy of her presentation is included in the appendices of these minutes.

After the meeting, a Manufacturing Engineering Conference was held from 10:30—1:30.



Department of Civil and Mechanical Engineering
2018 Advisory Board Meeting
Presented by: Nash Younis
Date: April 20, 2018

IPFW
INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

CME Mission

Our mission is to support the needs of Northeast Indiana through education, scholarship and service. We are committed to providing quality educational opportunities to both traditional and non-traditional students and seek to equip our students with the knowledge, skills and experience to pursue productive engineering careers. Our faculty is also dedicated to excellence in scholarship and service to the community and the profession.

IPFW
INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

Program Objectives

As a framework for the continuous improvement policy, the Civil Engineering program has adopted a set of program educational objectives that describe the anticipated accomplishments of our graduates **within a few years of graduation**.

The Civil Engineering program educational objectives are to produce graduates who:

- Advance professionally to roles of greater Civil Engineering technical responsibilities, and/or by transitioning into leadership position in business, government, and/or education.
- Participate in life-long learning through the successful completion of advanced degree(s), continuing education, and/or engineering certification(s)/licensure or other professional development.
- Demonstrate a commitment to community by applying technical skills and knowledge to support various service activities.

Each program has slightly different Program Educational Objectives

IPFW
INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

Old Program (student) Outcomes

The graduates from the Mechanical Engineering Program will demonstrate that they have:

a. an ability to apply knowledge of mathematics, science, and engineering.
b. an ability to design and conduct experiments, as well as to analyze and interpret data.
c. an ability to design both thermal and mechanical systems, components, or processes to meet desired needs within realistic constraints such as economic, environmental, social, ethical, safety, manufacturability, and sustainability.
d. an ability to function on engineering and science laboratory and project teams as well as multi-disciplinary teams.
e. an ability to identify, formulate, and solve mechanical engineering problems.
f. an understanding of professional and ethical responsibility.
g. an ability to communicate effectively in both verbal and written forms.
h. the broad education necessary to understand the impact of engineering solutions in a global and societal context.
i. a recognition of the need for, and an ability to engage in life-long learning.
j. a knowledge of and exposure to contemporary issues.
k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice, including analysis and design.

Each program had slightly different Program Outcomes

IPFW
INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

New Program (student) Outcomes

The graduates from the Civil/Mechanical Engineering Program will demonstrate that they have:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

3. An ability to communicate effectively with a range of audiences

4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

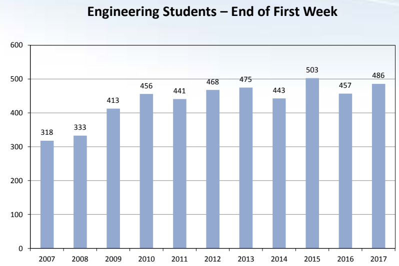
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

IPFW
INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

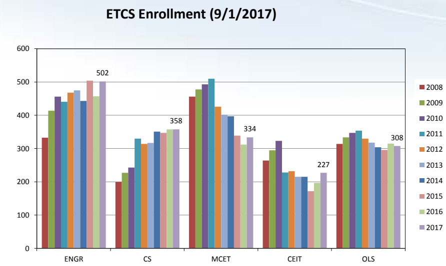
IPFW
INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

Engineering (CE+ME+EE+CmpE)Statistics



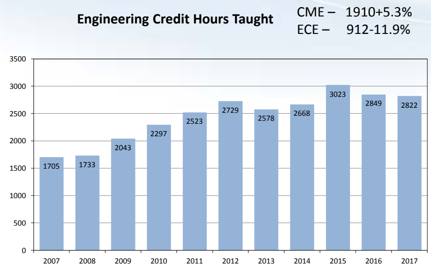
INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

ETCS Statistics



INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

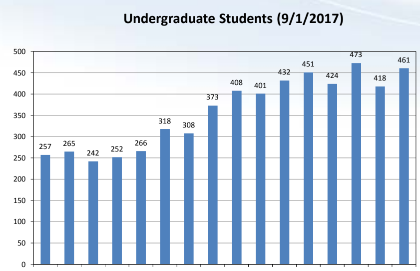
Engineering Statistics



CME – 1910+5.3%
ECE – 912-11.9%

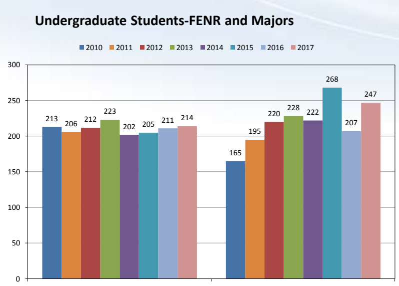
INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

Engineering Statistics



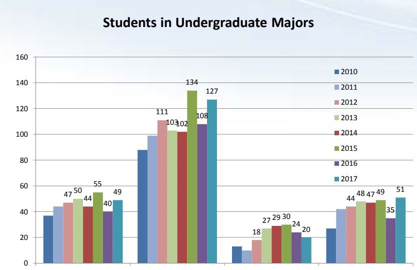
INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

Engineering Statistics



INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

Engineering Statistics



INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

Department Statistics – UG

	CME Department				ECE Department			
	CE	ME	UND	total	EE	CmpE	UND	total
major	51	127	—	178	49	20	—	69
first-year	24	86	6	116	46	44	8	98
total	75	213	6	294	95	64	8	167

Department Statistics – UG

	CME 2016				CME 2017			
	CE	ME	UND	total	CE	ME	UND	total
major	35	108	—	143	51	127	—	178
first-year	41	69	13	123	24	86	6	116
total	76	177	13	266	75	213	6	294

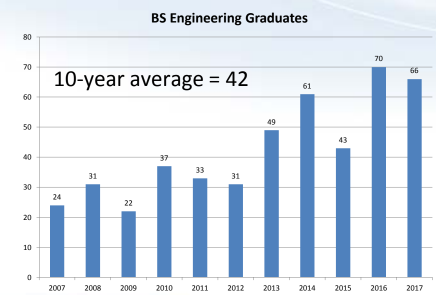
IPFW INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

Department Statistics – GR

Program	2015	2016	2017
ME	3	6	13
CmpE	2	3	
EE	8	16	25
SE	13	11	
non-degree	4	5	3
total	30	41	41

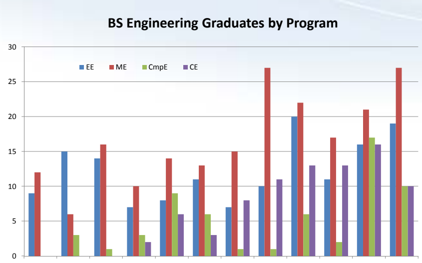
IPFW INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

Department Statistics



IPFW INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

Department Statistics



IPFW INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

Faculty

Hosni Abu-Mulaweh	Professor of Mechanical Engineering
	Director of the Graduate Program
Zhuming Bi, P.E.	**Professor** of Mechanical Engineering
Dong Chen, P.E.	**Professor** of Civil Engineering
Rebecca Essig	Assistant Professor of Engineering
	Coordinator of the Freshman Engineering Program
Bonsgu Kang	Professor of Mechanical Engineering
Donald Mueller, P.E.	Associate Professor of Mechanical Engineering
Fawad Niazi	Assistant Professor of Civil Engineering
Josué Njock Libii	Associate Professor of Mechanical Engineering
Shing-Chung Max Yen	Steel Dynamics Distinguished Professor of Engineering
Nashwan Younis	Professor of Mechanical Engineering
	Chair, Department of Civil and Mechanical Engineering

IPFW INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

New Faculty

Arif Sadri Assistant Professor of Civil Engineering

Staff

Devin Allen	Civil Engineering Lab Technician
Jason Moyer	Mechanical Engineering Lab Technician
Rita Reed	Administrative Assistant

IPFW INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

Items for Input

Program Group Discussion

IPFW INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

ABET Reaccreditation

Step	Date
Readiness	May 2016
Submit Request for Evaluation	January 2017
Submit Self-Study Report	June 2017
On-Site Visit	Fall 2017 (October) Many thanks for meeting with the ABET team
Due Process and the Accreditation Decision	1 Week After the Visit August 2018

IPFW INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

Donald W. Mueller Jr. - Associate Professor of Mechanical Engineering - Excellence in Engagement

IPFW INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

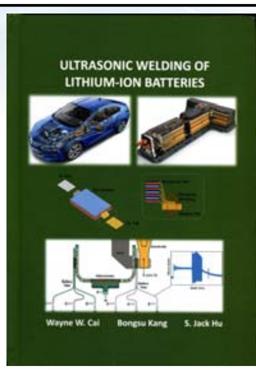
Zhuming Bi - Associate Professor of Mechanical Engineering - Excellence in Research

IPFW INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

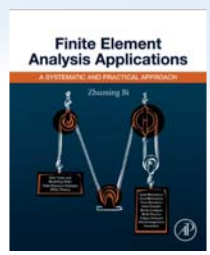
Josué Njock Libii (PI), Don Mueller, Peter Ng and Max Yen - National Science Foundation, "*Building a Sustainable Institutional Structure to Support STEM Scholars at IPFW* - **$649,998**

Fawad Niazi, assistant professor of civil engineering, received a grant of **$60,394** as part of a $325,686 grant from the Indiana Department of Transportation (INDOT).

Dong Chen, Associate Professor of Civil Engineering, "Enzymatic Treatment of Alginate to Reduce Membrane Fouling for Water or Wastewater Purification", **US patent #9352284, 2016.**



Dr. Kang has expertise in dynamics and vibrations



Dr Zhuming Bi's Expertise in manufacturing processes, robotics and automation, and finite element analysis and he just published a new book on finite element analysis.

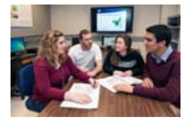
Engagement Opportunities

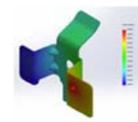
Don Mueller, Ph.D., P.E.
Associate Professor of Mechanical Engineering
Civil and Mechanical Engineering Department
don.mueller@ipfw.edu

Outline

- Background
- Projects
  - Engineering Senior Design
  - Technical Assistance Program
  - IN-MaC
- Conferences/Symposia
- Concluding Remarks

industry → project; student → project; faculty → project





Engagement Office

The IPFW Office of Engagement matches the expertise and intellectual property of IPFW, Purdue, and Indiana Universities to the regional needs of northeast Indiana to enhance economic development and quality of life improvements.

Sean Ryan
Director

Jean Eisaman
Project Manager

- Research Capabilities
- Intellectual Property
- Technical Assistance and Faculty Expertise
- Seminars, Conferences and Networking Opportunities
- Continuing Education and Corporate Training
- Internships and Co-operative Education Programs
- University Outreach Programs

Undergraduate Research

Design Project

Graduate Program

Technical Electives

Engineering Applications

Engineering Science
Courses and Labs

Foundation Courses
Math, Science, Communications, Gen Ed, and Engineering Fundamentals

Engineering Senior Design Projects

Objective: To develop the abilities of students to solve real-life engineering problems. Students apply knowledge from previous course work to accomplish the complete engineering design cycle from requirement generation to prototype evaluation.

Hosni Abu-Mulaweh
Coordinator

industry → project; student team → project; advisor → project

Projects span two semesters and most are sponsored by industry.

Senior Design Project

Team → Apply for Project

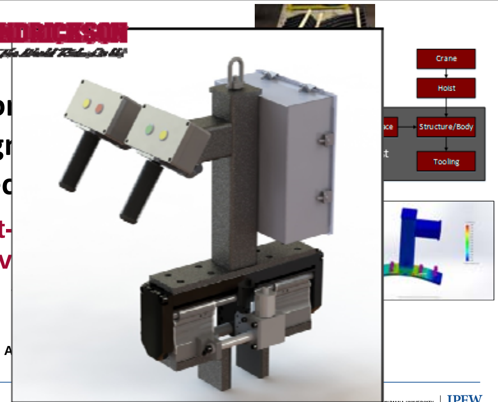
FIRST SEMESTER: Apply for Project → Develop Requirements → Generate Concepts (Solutions) → Evaluate Solutions → Develop Detailed Design → Present Design

SECOND SEMESTER: Devise Test Plan → Build → Verify Requirements → Present Project

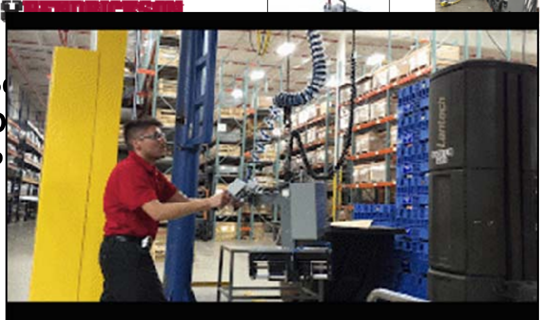
PROJECT SPONSORS

Senio
Desig
Projec

Lift-
Dev



S
D
P



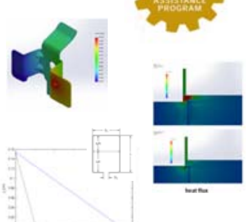
Advisor: Don Mueller, Ph.D., P.E.

TAP Projects

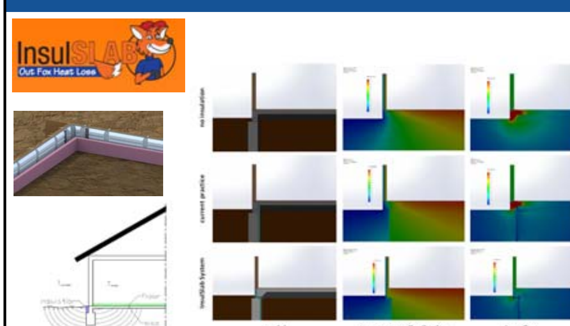
The Purdue University Technical Assistance Program (TAP) provides high-value solutions to increase profitability for manufacturing, healthcare, and service industries, and to improve the productivity of the state and local government.

Projects involved literature review, feasibility studies, and modeling and simulation studies of engineering problems.

Projects are scoped at a maximum of 40 hours of faculty time. Indiana companies are eligible for one project each year. Funding for these projects comes from a variety of sources.



H. Abu-Mulaweh, Z. Bi, Chen, B. Kang, D. Mueller



IN-MaC Projects

IN-MaC INDIANA NEXT GENERATION MANUFACTURING COMPETITIVENESS CENTER

Collaboration between Indiana, Industry, and Educational Institutions

Within Technology Adoption & Transfer there are three areas:
- *Digital Engineering* (FEA and CFD)
- *Product Lifecyle Management*
- *Production Systems and Modeling*

Recent CME projects have been in the area of digital engineering for product or process design (FEA and CFD).

Projects typically last for 3-6 months and are valued at up to $60,000. Purdue will invest $20,000 to $40,000 that can be used to compensate faculty or students working on the project. Companies will invest at least half the Purdue contribution through an in-kind contribution (employee compensation, equipment/computer upgrade, software investment, etc.) that goes to the project.

IN-MaC Projects

IN-MaC INDIANA NEXT GENERATION MANUFACTURING COMPETITIVENESS CENTER

Collaboration between Indiana, Industry, and Educational Institutions

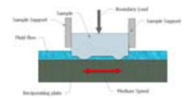
Projects typically last for 3-6 months and are valued at up to $60,000.

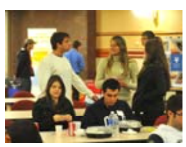
Purdue will invest $20,000 to $40,000. Companies will invest through an in-kind contribution, i.e., employee compensation, equipment/computer upgrade, or software investment.

Modeling and Simulating complex, multi-scale, engineering problems
- conjugate heat transfer
- mixed lubrication

alfe HEAT TREATING

TRELLEBORG





Engineering Research & Design Conference

Research & Design	spring 2012
Wireless & Systems	spring 2013
Energy Systems	fall 2013
Modeling & Simulation	spring 2016

IPFW INDIANA UNIVERSITY–PURDUE UNIVERSITY FORT WAYNE

CIVIL & MECHANICAL ENGINEERING

Engineering Research & Design Conference

Manufacturing: The Future

INDIANA UNIVERSITY-PURDUE UNIVERSITY FORT WAYNE
20 April 2018
10:30 am to 1:30 pm
Busse Alumni Center on IPFW campus
Contact Don Mueller (don.mueller@ipfw.edu) for more information
Registration required at http://engr.ipfw.edu/manufacturing_symposium_reg.html

10:15 - 10:30	**Refreshments – Welcome – Opening Remarks**		
Manufacturing in Academia			
10:30 - 10:50	Advances in Manufacturing System Design	David Cochran, Director Professor of Systems Engineering	Center of Excellence in Systems Engineering – PFW
10:50 - 11:10	Indiana Automotive Council Case Competition	Evan Lunceford, John Rosswurm, David Ruiz, Nguyen Vo	Purdue University Fort Wayne
11:10 - 11:30	Manufacturing Brave New Futures	Darrel L. Kesler Professor and Dean	Ivy Tech Community College Fort Wayne
Manufacturing in Industry			
11:00 - 11:20	Disaster Recovery	Carlton Bradtmiller Technical Sales Engineer	Wall Control Services, Inc.
11:20 - 11:40	Not your grandfather's plant: discussing technology and how manufacturing is advancing	Kyle Tew Process Engineer	Steel Dynamics, Inc.
11:40 - 12:00	Manufacturing at GM	Brett Stillwell Engineering Manager	General Motors Fort Wayne Assembly
12:00 - 1:00	**Lunch – Advanced Manufacturing in ME**	**Don Mueller and Zhuming Bi**	**Purdue University Fort Wayne**
Manufacturing in Academia			
1:00 - 1:15	Advanced Manufacturing in the PFW Curriculum	Jason Moyer, Technician Mechanical Engineering	Purdue University Fort Wayne

IPFW

Civil and Mechanical Engineering

CIVIL ENGINEERING

Civil Engineering Program
2018 Advisory Board Meeting

Presented by: Dong Chen, Ph.D., P.E.
Date: April 20 2018

Civil Engineering Program

- Faculty
- New CE Lab
- Students' Accomplishments and Activities
- CE Capstone Senior Designs

Civil Engineering Faculty

Shing-Chung Max Yen, Ph.D.
Steel Dynamics Distinguished Professor of Engineering

Fabrication and Design of Composite Materials and Structures, Experimental Mechanics, Durability of Materials, Cyber-Physical Systems, Nano-engineering and Nano-systems

Dong Chen, Ph.D., P.E.
Professor of Civil Engineering (Environmental Engineering)

Water filtration membrane processes, aqueous chemistry, water and wastewater treatment, sonochemistry, photooxidation, corrosion science

Civil Engineering Faculty

Rebecca Essig, Ph.D.
Assistant Professor of Engineering (Hydraulics and Hydrology)

Engineering Education, Fluid Mechanics, Water Quality, Environmental Fluid Mechanics,

Fawad Niazi, Ph.D.
Assistant Professor of Civil Engineering (Geotechnical Engineering)

Geotechnical in-situ testing and site characterization, geotechnical analysis and design of deep foundations, geophysical testing, geosynthetic interface tests, natural geohazards

New Faculty Search
Assistant Professor of Civil Engineering (Transportation Engineering)

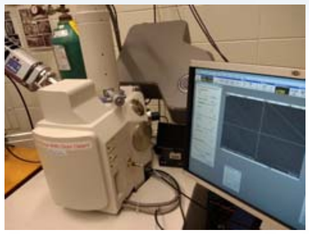
Additional Faculty Achievements

ASCE Excellence in Civil Engineering Education (ExCEEd) Fellowship

Selected Fellows: Drs. **Essig** and **Niazi**

New CE Imaging and Analytical Lab

- Scanning Electron Microscopy (SEM)
- X-ray Diffraction
- X-ray Fluorescence
- Optical Microscopy



Civil Engineering Program

- Faculty
- New CE Lab
- **Students' Accomplishments and Activities**
- CE Capstone Senior Designs

2018 ASCE Indiana Section Outstanding Student Awards

- **Justin Allred**
- **Logan Kitchen**

ASCE INDIANA SECTION

CE Student has been selected to the Canadian Junior Women's National Softball Team

Maria Palmegiani (sophomore, civil engineering)

IPFW ASCE Student Organization

2017 IPFW Outstanding Student Organization Award

Congratulations!

ASCE IPFW Chapter

- Meetings are held on the second Monday of every month school is in session.
- There has been four speaker presentations on engineering topics at our meetings.
- We have volunteered in different events through the year.
- Regularly participate annual ASCE Great Lakes Student Conferences.

SPEAKERS

November
- TJ Short, P.E.
  - City of Fort Wayne Utilities - Senior Program Manager
  - Topic: Tunnel Works Project

February
- Paula Reed
  - IPFW Cooperative Education
  - Topic: IPFW Co-Op program

March
- Reese Martin
  - Certified Safety Professional
  - Topic: Worksite Safety and Working with Your Safety Professional

April
- Patrick W. Zaharako, P.E., BCEE
  - City of Fort Wayne - Assistant City Engineer
  - Topic: Dupont Road Improvements – Lima to Coldwater

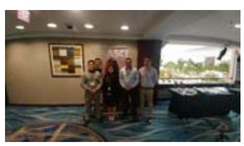
Trips

IPFW
INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

Leadership Conference

- In this January, the officers traveled to Buffalo, NY for the annual ASCE Multi-Region Leadership Conference.





IPFW
INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

ASCE Student Competitions

Each year we design and build several projects to compete with at the **ASCE Great Lakes Student Conference**.

Projects
- Concrete Canoe
- Steel Bridge
- Wooden Bridge
- Concrete Frisbee
- Concrete Cornhole
- Geotechnical – Floodwall model
- Environmental – Water runoff drainage and retention soil design
- Surveying

The conference this year is held in Chicago, Illinois April 19th-21st, 2018

IPFW
INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

ASCE Great Lakes Student Conferences



IPFW
INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

If you have any questions, or would like to give our chapter a presentation at one of our meetings please contact:

AJ Mirra

ASCE.IPFW@Gmail.com

(845) 699-3453

ASCE
STUDENT CHAPTER
Indiana University-Purdue University Fort Wayne

IPFW
INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

Civil Engineering Program

- Faculty
- New CE Lab
- Students' Accomplishments and Activities
- **CE Capstone Senior Designs**

IPFW
INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

CE Capstone Senior Design Presentations

CE 487 Senior Design presentations between **7-8 pm** on **April 23 (Monday)** in **KT G46**.

- "**Life cycle design of steel structure**" (at 7 pm)
  Team members: Corey Smith, Alexandra Birdwell, Clay Corsbie, Abby Laudenschlager, and Emily Renfrow
  Advisor: Dr. M Yen
- **"Design of a membrane bioreactor system for wastewater treatment"** (at 7:30 pm)
  Team members: Austyn Smedberg, Priya Jinwala, Matthew Lieshout, Nicholas Veeley, and Alexandra Vodde
  Advisor: Dr. D. Chen

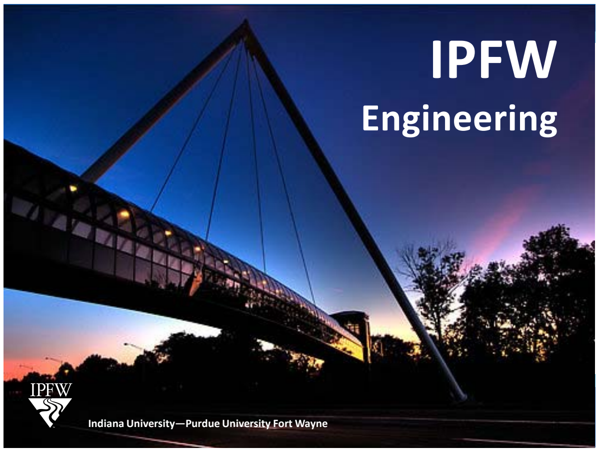
Pizza and soft drink will be provided.

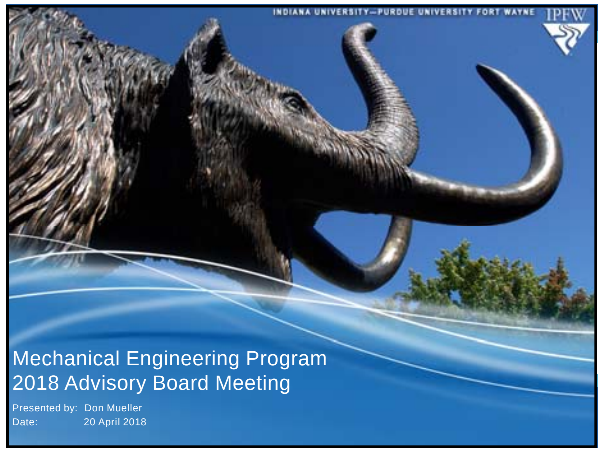
IPFW
INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE

IPFW
INDIANA UNIVERSIT

Questions

IPFW
INDIANA UNIVERSITY—PURDUE UNIVERSITY FORT WAYNE





Faculty

Hosni Abu-Mulaweh, Ph.D.
Professor of Mechanical Engineering

Convective heat and mass transfer, turbulent heat transfer, laminar mixed and natural convection

Zhuming Bi, Ph.D.
Professor of Mechanical Engineering

Design and manufacturing, machine design, solid mechanics, robotics and automation, reconfigurable manufacturing, modeling and simulation, and mechatronics

Bongsu Kang, Ph.D.
Professor of Mechanical Engineering

Applied mechanics, dynamics, linear and non-linear vibration, and elastic wave propagation

Faculty

Don Mueller, Ph.D., P.E.
Associate Professor of Mechanical Engineering

Heat transfer, thermal sciences, energy systems, machine design, numerical methods

Josué Njock Libii, Ph.D.
Associate Professor of Mechanical Engineering

Fluid dynamics and wave phenomena, stratified flow and vibration of continuous systems

Nashwan Younis, Ph.D.
Professor of Mechanical Engineering

Solid mechanics, experimental stress analysis, experimental fracture mechanics

Mission

Our mission is to support the needs of Northeast Indiana through education, scholarship and service. We are committed to providing quality educational opportunities to both traditional and non-traditional students and seek to equip our students with the knowledge, skills and experience to pursue productive engineering careers. Our faculty is also dedicated to excellence in scholarship and service to the community and the profession.

Program Educational Objectives

As a framework for the continuous improvement policy, the mechanical engineering program has adopted a set of PEOs that describe the anticipated accomplishments of our graduates 3-5 years after graduation.

The mechanical engineering program's educational objectives are to produce graduates who:

- Function and communicate effectively both as individuals and in multidisciplinary teams to solve technical and societal problems.
- Advance professionally through positions of increasing mechanical engineering responsibility or by transitioning into other careers in business, government, and/or education.
- Participate in life-long learning through the successful completion of advanced degree(s), professional development, and/or engineering certification(s)/licensure.
- Demonstrate a commitment to community by applying technical skills and knowledge to support various service activities.

Program Outcomes

The graduates from the Mechanical Engineering Program will demonstrate that they have:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. An ability to communicate effectively with a range of audiences
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Items for Discussion – IAB 2018


- **Certificate Program**
  - **Advanced Manufacturing**
  - **Biomechanical Engineering**
- **Graduate Program**
  - **New, updated focus**
  - **BSME/MSE**
- **Computer Experience**
- **Project Management**
- **“Proactive Probation”**
- **Student Accomplishments**

Advanced Manufacturing Engineering Certificate

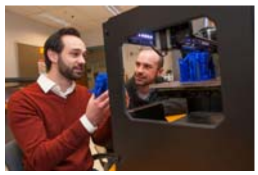
in Mechanical Engineering


Required courses include:
- IET 20400 – Techniques of Maintaining Quality
- ME 43200 – Manufacturing Processes
- ME 48000 – Finite Element Analysis
- MET 33500 – Basic Machining

and two of the following elective courses
- IET 47800 – Lean Manufacturing and Design
- TECH 57400 – Advanced Quality Engineering Methods
- ME 54600 – CAD/CAM Theory and Advanced Applications
- SE 55000 – Advanced Manufacturing Systems and Processes
- STAT 51100 – Statistical Methods

Bio-Mechanical Engineering Certificate

in Mechanical Engineering

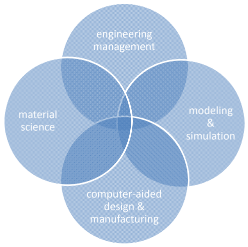


Specific course requirements include:
- BIOL 20300 – Human Anatomy and Physiology
- BIOL 20400 – Human Anatomy and Physiology
- ME 44500 – Bio-materials
- ME 48000 – Finite Element Analysis
- ME 49800 – Research – Bio-mechanical Project

Students must also select one elective course from the following:
- ME 54400 – Modeling and Simulation of Mechanical Engineering Systems
- ME 54500 – Finite Element Analysis: Advanced Theory & Applications
- ME 55000 – Advanced Stress Analysis
- ME 47100 – Vibrations or
  ME 56300 – Mechanical Vibrations

Master of Science in Engineering (MSE)
AoS: Mechanical Engineering

Our MSE program is relevant and flexible:
- Our graduate program is designed for working engineers taking one or two courses each semester.
- However, full-time students can also be accommodated, as they can take additional classes in systems engineering, and math & statistics.
- All students are encouraged to conduct research and write a thesis.
- A non-thesis MSE option is also available.



Master of Science in Engineering
AoS: Mechanical Engineering

Primary Curriculum
- ME 50500 Intermediate Heat Transfer
- ME 54400 Modeling & Simulation of Mechanical Engineering Systems
- ME 54500 Finite Element Analysis: Advanced Theory & Applications
- ME 54600 CAD/CAM Theory and Advanced Applications
- ME 54700 Mechatronics, Robotics, and Automation
- ME 55000 Advanced Stress Analysis
- ME 56300 Mechanical Vibrations

Additional courses are designed to appeal to mechanical engineers working in wide-variety of industries.
- SE 52000 Engineering Economics
- SE 53000 Systems Engineering Management
- SE 54000 System Architecture
- SE 55000 Advanced Manufacturing Systems and Processes

or Organizational Leadership and Supervision (OLS), e.g.
- OLS 51000 Foundations of Behavior and Leadership in Organizations
- OLS 52000 Foundations of Organizational Context
- OLS 53000 System Change and Organization Development

or Math (MA) and Statistics (STAT), e.g.
- STAT 51100 Statistical Methods
- STAT 51400 Design of Experiments
- MA 51100 Linear Algebra

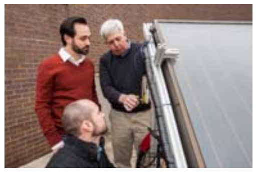
and with courses offered via distance-learning through Purdue WL such as
- ME 55300 Product and Process Design
- ME 55700 Design for Manufacturability

Master of Science in Engineering (MSE)
AoS: Mechanical Engineering

Degree requirements for the MSE-mechanical concentration are:

- Four 500-level, graduate mechanical (or closely related) engineering courses
- Two additional 500-level, engineering courses
- Two thesis research courses (ENGR 698) or two approved elective courses (graduate level)
- Two math (or closely related) approved courses

The total credits on the plan of study are 30.

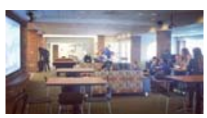


Master of Science in Engineering (MSE)
AoS: Mechanical Engineering

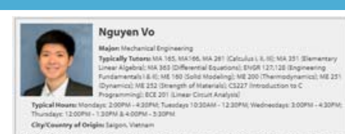
Combined BSME/MSE Program

- The proposed combined five-year BSME/MSE Program is an integrated five-year degree program in which qualified students can receive a Bachelor of Science degree in Mechanical Engineering and Master of Science in Engineering (MSE) degree with area of specialization in Mechanical Engineering.
- Students enrolled in this program can take up to nine (9) credits (three 500-level or higher graduate courses) from the graduate courses approved as BSME Technical Electives in five-year BSME/MSE Program. These courses will also be counted towards the MSE program, thereby reducing the overall time required for the MSE degree completion.

ASME Events

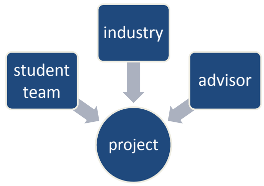


Top 50 Student



Engineering Senior Design Projects

Objective: To develop the abilities of students to solve real-life engineering problems. Students apply knowledge from previous course work to accomplish the complete engineering design cycle from requirement generation to prototype evaluation.



Projects span two semesters and most are sponsored by industry.

Hosni Abu-Mulaweh
Coordinator

Mechanical Engineering Program

INDIANA UNIVERSITY PURDUE UNIVERSITY FORT WAYNE IPFW

PROJECT SPONSORS

HENDRICKSON, ZIMMER BIOMET, EATON, Parker, WaterFurnace, ITT, CooperStandard, Raytheon, Steel Dynamics, Riverside, DePuySynthes, EPCO, DANA, TRELLEBORG, FORT WAYNE METALS, NAVISTAR, JB TOOL, DIE & ENGINEERING, INC., City of Fort Wayne, Quality Tool Company, Inc., ASHRAE, WAYNE Combustion Systems

Senior Design I
Critical Design Review Presentations Schedule
Mechanical Engineering Program
Spring 2018

Monday, April 23, 2018
Room: SB 185

Time	Title	Sponsor	Faculty Advisor	Team Members
6:00 pm	Plastic Extrusion Die Heating Element Analysis and design	Trelleborg	Dr. Abu-Mulaweh (ME) Dr. Oloomi (ECE)	1. Emily Wise (ME) 2. Joshua Ragon (ME) 3. Bret Unger (ME) 4. Armando Lopez (ECE) 5. Kurt Unger (ECE)

Mechanical Engineering Program

INDIANA UNIVERSITY PURDUE UNIVERSITY FORT WAYNE IPFW

Senior Design I
Critical Design Review Presentations Schedule
Mechanical Engineering Program
Spring 2018

Wednesday, April 25, 2018
Room: SB 185

Time	Title	Sponsor	Faculty Advisor	Team Members
12:00 pm	"Tierod" to "Tierod Nut" Assembly Machine	PHD	Dr. Younis	1. Lane Harrison 2. Leanne Temple 3. Josh Topel
12:30 pm	Billet Cutting Saw Automation	Trelleborg	Dr. Kang	1. Luis Felipe 2. Alex Dayton 3. Thiahgo Lopes Amaral
1:00 pm	Design and Build Experimental Apparatus for Internal Flow Measurements	CME Department	Dr. Abu-Mulaweh Dr. Mueller	1. Sergio Espino 2. Musa Shehu

Mechanical Engineering Program

INDIANA UNIVERSITY PURDUE UNIVERSITY FORT WAYNE IPFW

Senior Design II
System Verification Review Presentations Schedule
Mechanical Engineering Program
Spring 2018

Thursday, April 26, 2018
Room: SB 185

Time	Project Title	Sponsor	Advisor	Team Members
6 pm	Drive to 95 Direct Run Rate (DRR) Improvement Utilizing 3D Printing	GM	Dr. Bi	1. Christian Guadique 2. Spencer Roof 3. John Rosswurm 4. David Ruiz 5. Joel Thompson
6:35 pm	3 Rivers Festival Race Raft	City of Fort Wayne	Dr. Mueller	1. Josh Cripe 2. Seth Fiechter 3. Evan Lunceford 4. Andrew Speck 5. Mitchell Sullivan
7:10 pm	Flow Control "Needle" Assembly Machine	PHD	Dr. Bi	1. Matthew Bracken 2. Brian Fleckenstein 3. Jackson Jaworski 4. Brody Lynn 5. Jordan Muzzillo

Mechanical Engineering Program

INDIANA UNIVERSITY PURDUE UNIVERSITY FORT WAYNE IPFW

INDIANA UNIVERSITY • PURDUE UNIVERSITY • FORT WAYNE™
IPFW

One university.
Two great names.

On the web at: www.ipfw.edu

First Year Engineering Program Overview - Spring 2018

First-Year Engineering Committee
Becca Essig - FYE Coordinator for CME
Scott Moor – FYE Coordinator for ECE
Don Mueller – CME Faculty
Carlos Pomalaza-Ráez – ECE Faculty
Yanfei Liu – ECE Faculty

Pre-Fall 2014 Curriculum			Post-Fall 2014 Curriculum		
Number	Title	Credit Hours	Number	Title	Credit Hours
ENGR 101	Introduction to Engineering	1	ENGR 127	Engineering Fundamentals I	4
ENGR 120	Graphical Communication and Spatial Analysis	2			
ENGR 121	Computer Tools for Engineers	2	ENGR 128	Engineering Fundamentals II	4
ENGR 199	Introduction to Engineering Design	3			

ENGR 127 and ENGR 128

- Two course sequence required for all engineering students:
  - ENGR 127 – Fall (CME Examples)
  - ENGR 128 – Spring (ECE Examples)

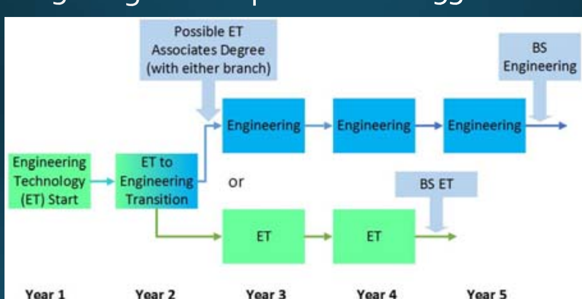
- Goals of Courses:
  - Math readiness
  - Physics understanding
  - Preparation for 200 level courses
  - Problem-solving, teamwork, communication, study habits, professional development

How we compare (ish) to other programs:

IPFW			Purdue West Lafayette		
Number	Title	Credit Hours	Number	Title	Credit Hours
ENGR 127	Engineering Fundamentals I	4	ENGR 131	Transforming Ideas to Innovation I	2
ENGR 128	Engineering Fundamentals II	4	ENGR 132	Transforming Ideas to Innovation II	2
			CS 159 or CHEM 116	FYE Science Elective	3 or 4
			CGT 163 or 164	Graphics	2
Total FYE Credits		8			9 or 10

University of Cincinnati			Wright State University		
Number	Title	Credit Hours	Number	Title	Credit Hours
ENED 1090	Engineering Models I	2	EGR 101	Intro to Mathematics for Engineering Application	4
ENED 1091	Engineering Models II	2	ME 104	Engineering Design and Solid Modeling**	3
ENED 120	Engineering Foundations	2	ME 102	Engineering Programming with Matlab	3
CM 1001 or MECH 1072C	Engineering Design Graphics	3 or 4			
Total FYE Credits		9 or 10			10

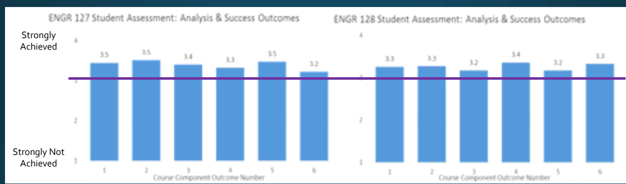
2+3 Program Sequence- MA 153 Level



FYE Program Assessment

- Faculty Course Assessment
- Student Course Assessment
- FYE Program Exit Surveys
- Graduating Exit Surveys
- Student Progress Tracking – Sophomore Classes & Retention

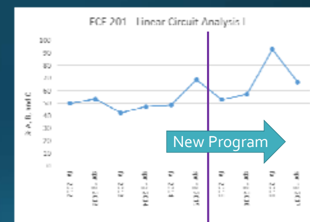
2017 Student Course Assessment



formulate and solve engineering problems using
1. linear and quadratic equations
2. trigonometry in planar systems
3. using descriptive statistics
4. problems using derivatives
5. using systems of equations (matrix solutions)
6. … apply appropriate study & success strategies …

formulate and solve engineering problems using
1. complex numbers
2. sign waves & frequency
3. integration
4. Boolean Logic
5. log graphing and transformations
6. using simple differential equations

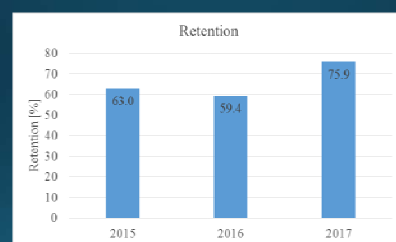
2017 Sophomore Course Tracking



New Activities to Increase Retention

- Time Management
- Course Help Resources on Campus
- Campus Organization Participation

FYE Retention



Campus Recruitment

- Fall Campus Visit Day
- Spring Campus Visit Day
- Don Days
- Summit Scholars Competition
- Chancellor's Commitment Day

Outreach Recruitment Efforts

- Introduce a Girl Scout to Engineering Day (SWE)
- Sci-Tech Academy (ETCS Outreach)
- *First Lego League* Competition (ETCS Outreach)
- Future City Competition (ETCS Outreach)

Questions? Want to get involved?

Becca Essig

ET 321B
essigr@pfw.edu

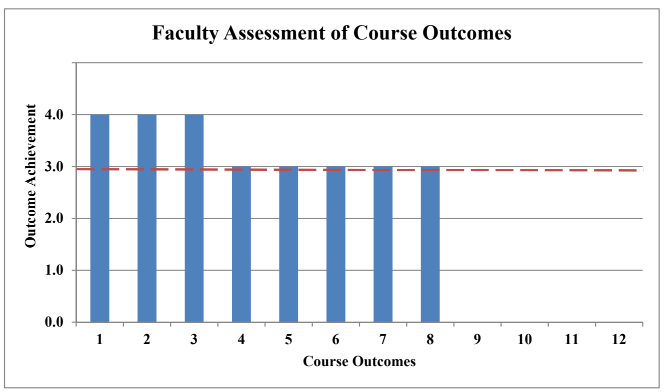
Appendix A-4: Faculty Assessment Results

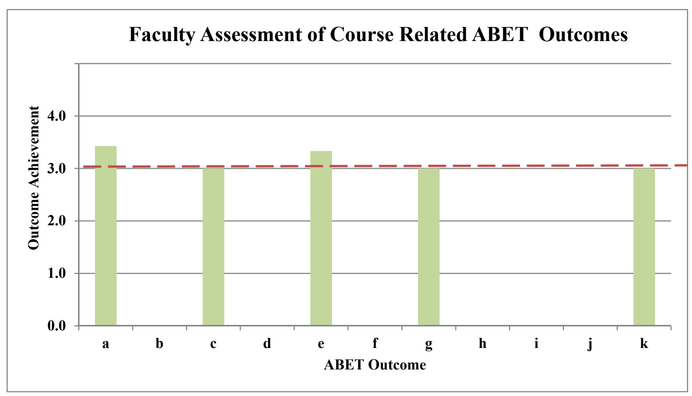
Faculty Assessment of Course - SPRING 2018

Course: CE 25200 Strength of Materials
Instructor: NJOCKLIBII
Semester: SPRING 2018
Section: 1
Number of Students: 4

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	Understand the concepts of stress and strain at a point as well as the stress-strain relationships for homogenous, isotropic materials. **(e)**	a	Quizzes	Midterm(s)	Final Exam	Yes, strongly	criterion 3	**75%**	
2)	Calculate the stresses and strains in axially-loaded members, circular torsion members, and members subject to flexural loadings. **(a, e)**	a,e	Quizzes	Midterm(s)	Final Exam	Yes, strongly	criterion 3	**75%**	
3)	Calculate the stresses and strains associated with thin-wall	a,e				Yes, strongly			
4)	Determine the stresses and strains in members subjected to combined loading and apply the theories of failure for static loading. **(a, e)**	a,e	Homework	Midterm(s)	Final Exam	Yes, adequately	criterion 3	**75%**	
5)	Determine and illustrate principal stresses, maximum shearing stress, and the stresses acting on a structural member. **(a, e)**	a,e	Quizzes	Midterm(s)	Final Exam	Yes, adequately	criterion 3	**75%**	
6)	Determine the deflections and rotations produced by the three fundamental types of loads: axial, torsional, and flexural. **(a, e)**	a,e	Quizzes	Final Exam	Project(s)	Yes, adequately	criterion 3	**75%**	
7)	Analyze slender, long columns subjected to axial loads. **(a, e)**	a,e	Quizzes	Project(s)	Final Exam	Yes, adequately	criterion 3	**75%**	
8)	Design simple bars, beams, and circular shafts for allowable stresses and loads. **(c, g, k)**	c,g,k	Homework			Yes, adequately	criterion 3	**75%**	

criterion 1: The average of students in the assessment tool is equal to or greater than	**75%**
criterion 2: The percentage of students with grade 70 or more is at least equal to	**70%**
criterion 3: The percentage of students passing the assessment tool is greater than	**75%**
criterion 4: The average grade of students passing the assessment tool is at least equal to	**75%**
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

None

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

None

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

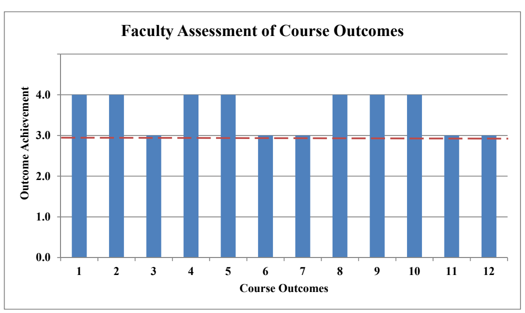
None

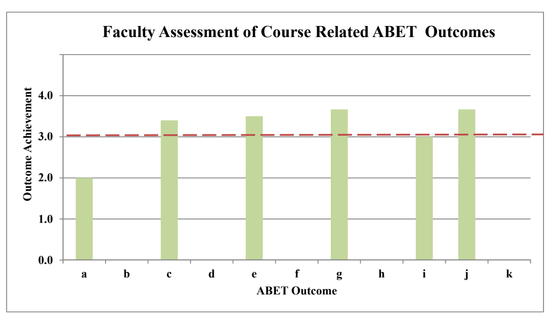
Faculty Assessment of Course - SPRING 2018

Course: CE 31800 Fluid Mechanics
Semester: SPRING 2018
Section: 1
Instructor: NJOCKLIBII
Number of Students: 12

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	Know the definitions of fundamental concepts of fluid mechanics including: continuum, velocity field; viscosity, surface tension and pressure (absolute and gage); flow visualization using timelines, pathlines, streaklines, and streamlines; flow regimes: laminar, turbulent and transitional flows; compressibility and incompressibility; viscous and inviscid. (a, e)	a,e	Homework	Midterm(s)		Yes, strongly	criterion 3	**75%**	
2)	Apply the basic equation of fluid statics to determine forces on planar and curved surfaces that are submerged in a static fluid; to manometers; to the determination of buoyancy and stability; and to fluids in rigid-body motion. (a, e)	a,e	Homework	Midterm(s)		Yes, strongly	criterion 3	**75%**	
3)	Use of conservation laws in integral form and apply them to determine forces and moments on surfaces of various shapes and simple machines. (a, e)	a,e	Homework	Midterm(s)	Final Exam	Yes, adequately	criterion 3	**75%**	
4)	Use of conservation laws in differential forms and apply them to determine velocities, pressures and acceleration in a moving fluid. Understand the kinematics of fluid particles, including the concepts of substantive derivatives, local and convective accelerations, vorticity and circulation. (a, e)	a,e	Homework	Midterm(s)	Final Exam	Yes, strongly	criterion 3	**75%**	
5)	Use Euler's and Bernoulli's equations and the conservation of mass to determine velocities, pressures, and accelerations for incompressible and inviscid fluids. (a, e)	a,e	Homework	Quizzes	Final Exam	Yes, strongly	criterion 3	**75%**	
6)	Understand the concepts of rotational vs. irrotational flows; stream functions, velocity potentials. Laplace equation and its relation to elementary plane flows of inviscid fluids: sinks, sources, vortex flows, and superposition of these flows. (a, e)	a,e	Homework	Quizzes		Yes, adequately	criterion 3	**75%**	
7)	Understand the concepts of static, thermodynamic, stagnation, total, and dynamic pressures and how they are used in instrumentation. (a, c, e, g, j)	a,c,e,g,j	Homework	Final Exam		Yes, adequately	criterion 3	**75%**	
8)	Apply principles of dimensional analysis and similitude to simple problems and use dimensionless parameters. (a, c, e, g, j)	a,c,e,g,j	Homework	Final Exam	Final Exam	Yes, strongly	criterion 3	**75%**	
9)	Determine flow rates, pressure changes, minor and major head losses for viscous flows through pipes, ducts, simple networks and the effects of pumps, fans, and blowers in such systems. (a, e)	a,e	Homework	Quizzes	Final Exam	Yes, strongly	criterion 3	**75%**	
10)	Design simple pipe systems to deliver fluids under specified conditions. (a, c, e, g)	a,c,e,g,j	Project(s)			Yes, strongly	criterion 3	**75%**	
11)	Understand principles of flow measurements such as direct methods, flow-restriction methods, linear methods, traversing methods, open-channel flow meters. (a, e)	a,e	Homework			Yes, adequately	criterion 3	**75%**	
12)	Understand the concepts of viscous boundary layers and the momentum integral and use them to determine integral thicknesses, wall shear stresses, and skin friction coefficients. (a, e)	a,e	Homework	Final Exam		Yes, adequately	criterion 3	**75%**	
13)	Understand the mechanics of viscous flow about immersed boundaries, as it relates to flow separation, wakes, profile drag, drag coefficients and the determination of drag forces exerted on such bodies. (a, c, e)	a,c,e	Homework	Quizzes	Final Exam	Yes, adequately	criterion 3	**75%**	
14)	Apply principles of fluid mechanics to the operation, design, and selection of fluid machinery such as pumps, blowers, fans, compressors, and turbines. (a, c, e, i)	a,c,e,i	Homework	Final Exam		Yes, adequately	criterion 3	**75%**	

criterion 1: The average of students in the assessment tool is equal to or greater than	**75%**
criterion 2: The percentage of students with grade 70 or more is at least equal to	**70%**
criterion 3: The percentage of students passing the assessment tool is greater than	**75%**
criterion 4: The average grade of students passing the assessment tool is at least equal to	**75%**
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

None

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

None

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

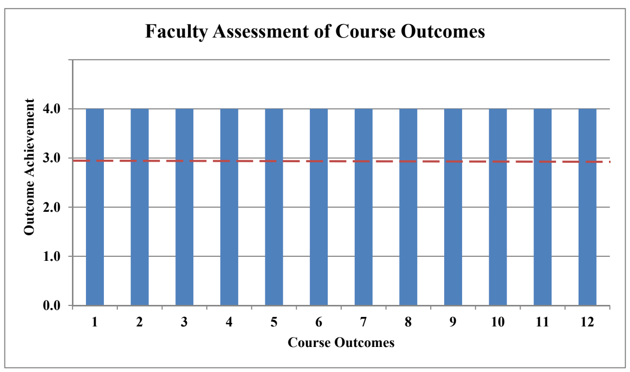
None

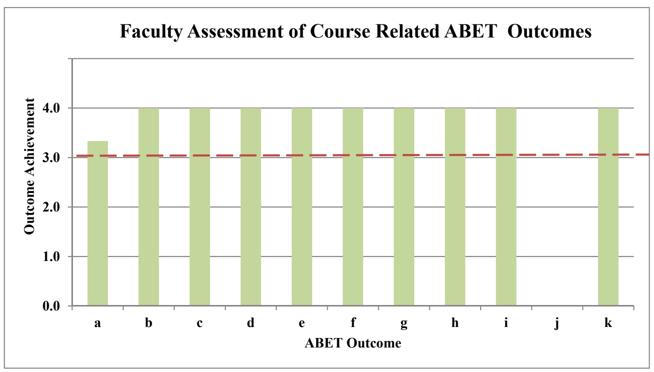
Faculty Assessment of Course - SPRING 2018

Course: CE 31900 Fluids Mecchanics Lab
Semester: SPRING 2018
Section: 1
Instructor: AKOHWARIEN
Number of Students: 6

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	Identify, name, and characterize flow patterns and regimes. (a, 1)	a	HOMEWORK			Yes, strongly	criterion 1	75%	90%
2)	Understand basic units of measurement, convert units, and appreciate their magnitudes. (a, 1)	a	HOMEWORK			Yes, strongly	criterion 1	75%	90%
3)	Utilize basic measurement techniques of fluid mechanics. (a,1)	a	HOMEWORK			Yes, strongly	criterion 1	75%	90%
4)	Discuss the differences among measurement techniques, their relevance and applications. (h, i, 9)	h,i	HOMEWORK			Yes, strongly	criterion 1	75%	85%
5)	Measure fluid pressure and relate it to flow velocity. (k, 6)	k	Lab Report(s)			Yes, strongly	criterion 1	75%	80%
6)	Demonstrate practical understanding of the various equations of Bernoulli. (k, 6)	k	Lab Report(s)			Yes, strongly	criterion 1	75%	80%
7)	Demonstrate practical understanding of friction losses in internal flows. (k, 6)	k	Lab Report(s)			Yes, strongly	criterion 1	75%	80%
8)	Demonstrate practical understanding of boundary layers, separation, drag, and lift. (k, 6)	k	Lab Report(s)			Yes, strongly	criterion 1	75%	80%
9)	Demonstrate the ability to write clear lab reports. (g, 8)	g	Lab Report(s)			Yes, strongly	criterion 1	75%	85%
10)	Use word processors, graphics packages, and computational software in writing. (g, i, 8, 9)	g,i	Lab Report(s)			Yes, strongly	criterion 1	75%	80%
11)	Prove good understanding of concepts and their applications in the laboratory. (a , g, 1, 8)	a,g	Lab Report(s)			Yes, strongly	criterion 1	75%	85%
12)	Compare the results of analytical models introduced in lecture to the actual behavior of real fluid flows and draw correct and sustainable conclusions. (a, k, 1, 6)	a,k	Lab Report(s)			Yes, strongly	criterion 1	75%	85%
13)	Demonstrate the ability to work in groups on small design projects that are appropriate to the course. (d, g, 5, 8)	d,g	Class Participation	project(s)	others	Yes, strongly	criterion 5		80%
14)	Demonstrate the ability to produce a working model through hands-on experience in fluid mechanics design and explain its operation in terms of what was learned in the course. (a, b, c, e, g, 1, 3, 4, 2, 8)	a,b,c,e,g	Project(s)	presentation(s)	Lab Report(s)	Yes, strongly	criterion 1	75%	85%
15)	Understand ethical issues associated with decision making and professional conduct. (f)	f	Lab Report(s)			Yes, strongly	criterion 1	75%	85%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

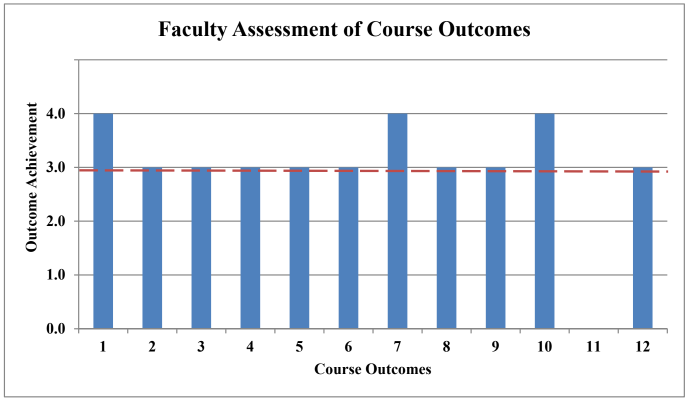
Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

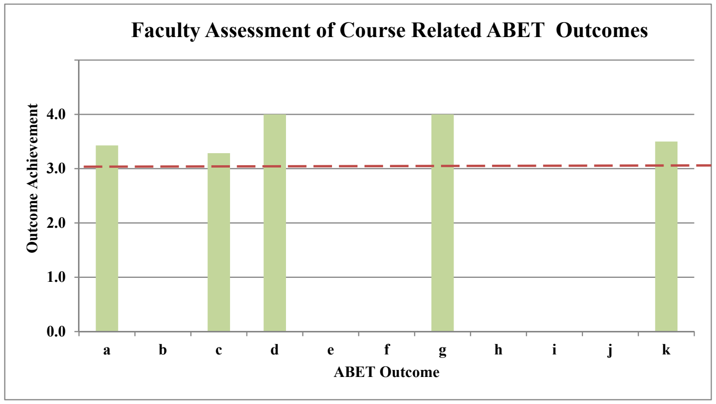
Faculty Assessment of Course - SPRING 2018

Course: CE 34500 Transportation Engineering
Semester: SPRING 2018
Section: 1
Instructor: DEVINE
Number of Students: 23

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	Understand the factors influencing road vehicle performance characteristics and design. [a]	a	Homework			Yes, strongly	criterion 1	75%	
2)	Apply basic science principles in estimating stopping and passing sight distance requirements. [a]	a	Homework	Final Exam		Yes, adequately	criterion 2	70%	
3)	Understand basic traffic stream parameters and models, traffic flow models, and queuing theory. [a]	a	Homework	Midterm(s)		Yes, adequately	criterion 2	70%	
4)	Perform level of service analysis to determine LOS for selected highway segments. [a, c]	a,c	Homework	Midterm(s)	Final Exam	Yes, adequately	criterion 2	70%	
5)	Use Highway Capacity Software (HCS) for finding LOS. [k]	k	Presentation(s)			Yes, adequately	criterion 2	70%	
6)	Design basic traffic signal phasing and timing plan. [c]	c	Homework			Yes, adequately	criterion 2	70%	
7)	Be familiar of the four stages of the transport planning and prediction models. [a, c]	a,c	Homework	Midterm(s)	Final Exam	Yes, strongly	criterion 1	75%	
8)	Design basic horizontal alignment of the highway. [c]	c	Homework	Final Exam	Project(s)	Yes, adequately	criterion 2	70%	
9)	Design basic vertical alignment of the highway. [c]	c	Homework	Final Exam	Project(s)	Yes, adequately	criterion 2	70%	
10)	Understand and use AASHTO method for soil classification. [a]	a	Midterm(s)			Yes, strongly	criterion 1	75%	
11)	Design of flexible pavement layers. [c]	c	Presentation(s)			Yes, adequately	criterion 2	70%	
12)	Calculate the stresses and deflections in pavements. [a]	a	Presentation(s)			Yes, adequately	criterion 2	70%	
13)	Use EXCEL tools for design of vertical and horizontal curves. [k]	k	Homework	Project(s)		Yes, strongly	criterion 1	75%	
14)	Design transportation related project in a team of two or three students and submits a final report. [c, d (5), g]	c,d,g	Project(s)			Yes, strongly	criterion 1	75%	

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Course description is for a multi-modal transportation engineering course although outcomes are all based on highway engineering. A multi-modal course makes more sense to me (Dave Devine) than just a course on highway engineering, particularly for a first transportation engineering related class. Some outcomes for multi-modal transportation are appropriate or a change in the course desicription is warranted.

Highway Capacity Software is not available on campus. Synchro is available and was used for class atlhough it is almost a trivial coverage based on the large number of topics covered in class, no topic gets more than basic coverage. AASHTO flexible pavement software is difficult - takes a lot of time

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Most sudents have very little to no knowledge of vertical or horizontal curves from surveying much less even the concept of stationing.
Students were permitted to use one study - reference sheet on exams.

The first effort to complete this assessment form, done just after the final exams were taken did not result in a correct submission of the form. As of September 2018 that form has not been found. This assessment form is completed on 9th September 2018 several months afterwards.
Coverage of the warrant process may be good to consider in future.

14 outcomes for one class seems excessive.

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

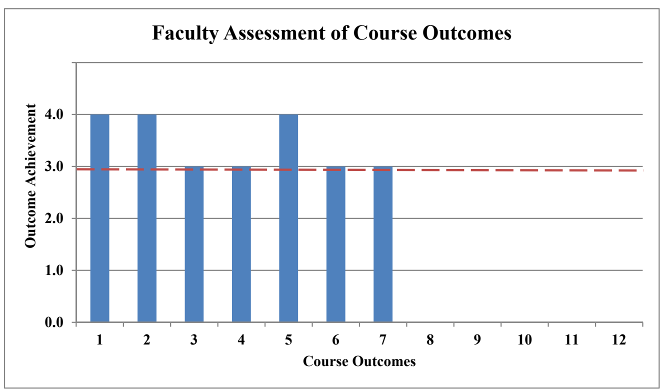
More assignments could be given, particularly with more options/differences between problems such as I/delta, or radius defined horizontal curves, trip generation and distribution, signal timing

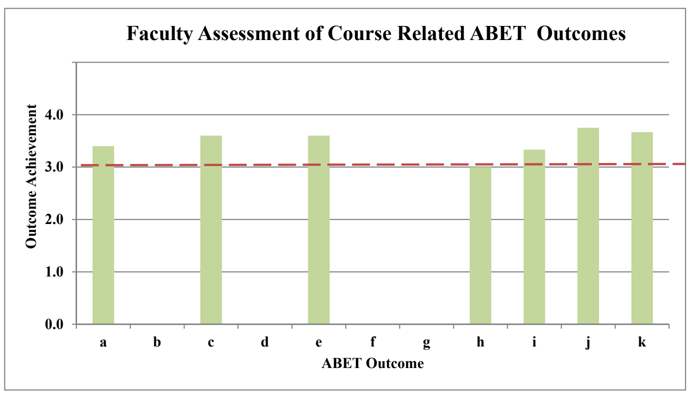
Faculty Assessment of Course - SPRING 2018

Course: CE 46500 Water and Wastewater Engineering
Semester: SPRING 2018
Section: 1
Instructor: FRUCHEY
Number of Students: 11

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	Select or construct appropriate treatment schemes to remove certain pollutants present in water or wastewater. [a,c,e,j]	a,c,e,j	Homework	Midterm(s)	Final Exam	Yes, strongly	criterion 4	75%	90%
2)	Design a water or wastewater treatment component. [c, e, j, k]	c,e,j,k	Midterm(s)	Final Exam		Yes, strongly	criterion 4	75%	90%
3)	Balance chemical reactions and use balanced reactions to determine the distribution of species at equilibrium. [a]	a	Homework			Yes, adequately	criterion 3	75%	92%
4)	Develop a mass balance expression for contaminants under different case scenarios and design a simple system to meet desired needs. [a, c , e]	a,c,e	Homework			Yes, adequately	criterion 3	75%	92%
5)	Learn how to characterize source water, and the best available technologies (BAT) for physical and chemical treatment of drinking water. [a, c, e, i, j, k]	a,c,e,I,j,k	Homework	Midterm(s)	Final Exam	Yes, strongly	criterion 4	75%	90%
6)	Learn how to characterize wastewater, and the BAT for physical, chemical and microbiological treatment of wastewater. [a, c, e, i, j, k]	a,c,e,I,j,k	Homework			Yes, adequately	criterion 3	75%	92%
7)	Understand selected contemporary global water and wastewater issues such as water shortage, wastewater reuse and emerging contaminants. [h, j]	h,j	Homework			Yes, adequately	criterion 3	75%	92%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

None.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Students did great on both their water filtration plant design project (Mid-term) and wasterwater treatment plant design project (Final Exam). Their homework was very thorough and exhibited a solid conceptual understanding of plant operations.

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

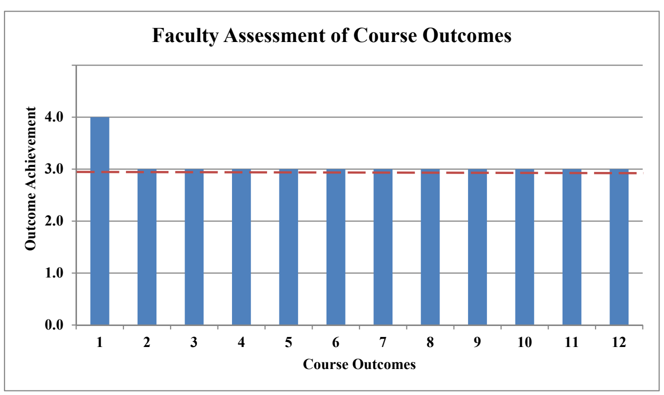
I would recommend oral presentations of their plant design projects. I believe that being able to communicate their design verbally as well as in written form would demonstrate a deeper understanding of the material and will advance a skill that they will need as future professional engineers.

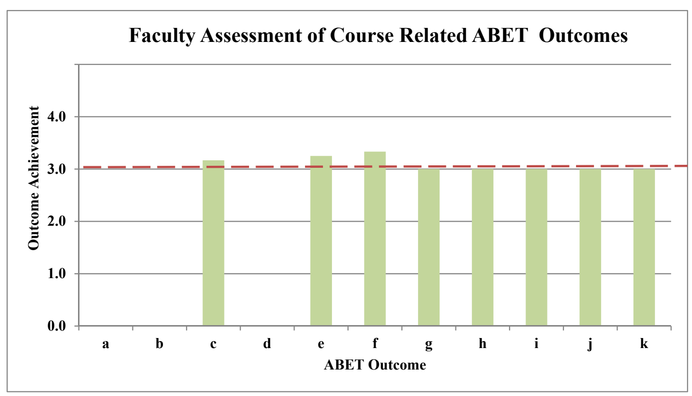
Faculty Assessment of Course - SPRING 2018

Course: CE 48700 CE Design Project I
Semester: SPRING 2018
Section: 1
Instructor: CHEN
Number of Students: 10

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	Formulate a problem statement. [a, c, e]	a,c,e	S. Design Present	S. Design Report	Presentation(s)	Yes, strongly	criterion 1	75%	
2)	Develop multiple preliminary design solutions using brainstorming techniques. [a, c]	a,c	S. Design Present	S. Design Report	Presentation(s)	Yes, adequately	criterion 2	70%	
3)	Evaluate alternative solutions using a well-defined criteria and produce feasible solutions. [a, c, e, k]	a,c,e,k	S. Design Present	S. Design Report	Class Participation	Yes, adequately	criterion 2	70%	
4)	Build, test and evaluate feasible solutions using modern engineering tools and select the optimum alternative [c]	c	S. Design Present	S. Design Report	Class Participation	Yes, adequately	criterion 2	70%	
5)	Understand and use the most recent federal/state regulations and standards in the project design. [f, h, i, j]	f,h,I,j	Presentation(s)	S. Design Report	Class Participation	Yes, adequately	criterion 2	70%	
6)	Successfully develop detailed final design for the project considering safety, economical, ethical, professional, and environmental issues. [a, c, e, f, h]	a,c,e,g,k	Presentation(s)	S. Design Report	Class Participation	Yes, adequately	criterion 2	70%	
7)	Develop technical drawings and specifications if needed for the project. [c, e, f, g, k]	c,e,f,g,k	Presentation(s)	S. Design Report	Class Participation	Yes, adequately	criterion 2	70%	
8)	Develop cost estimate and schedule for project activities, if needed. [a, g, k]	a,g,k	Presentation(s)	S. Design Report	Class Participation	Yes, adequately	criterion 2	70%	
9)	Write clear and concise technical reports. [g]	g	Presentation(s)	S. Design Report	Class Participation	Yes, adequately	criterion 2	70%	
10)	Present the final design to both technical professionals and public. [g]	g	Presentation(s)	S. Design Report	Class Participation	Yes, adequately	criterion 2	70%	
11)	Knowledge of contemporary issues related to the area of the project [j]	j	Presentation(s)	S. Design Report	Class Participation	Yes, adequately	criterion 2	70%	
12)	Understand the impact of civil engineering on society. [h]	h	S. Design Present	S. Design Report	Class Participation	Yes, adequately	criterion 2	70%	
13)	Recognition of the need for life-long learning. [f]	f	S. Design Present	S. Design Report	Class Participation	Yes, strongly	criterion 2	70%	

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

There were two senior design teams in spring 2018. One team of "wastewater treatment and reuse" did pretty well and adequately or strongly achieved all the learning outcomes of CE 487. However, the other team of "steel structure" was advised by a faculty member for the first time, who tired a "non-traditional" approach in senior design, which seemed having brought doubts and confusions in in-class presentations, final design presentation, and project report.

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

The faculty advisor, especially new to the capstone senior design, should take the course seriously and learn the existing guidelines before trying "non-tradtional".

Appendix A-5: Results of Capstone Senior Design Assessment

Indiana University -Purdue University Fort Wayne
Department of Civil and Mechanical Engineering

Faculty/Professional Assessment of Course Outcomes (CE Senior Design I)

Course Code and Number: CE 487 Senior Design

Term/Year: Spring 2018

Name:

Signature: ____

Title: Design a membrane bioreactor system for wastewater treatment

Team Members: Matthew Lieshout, Priya Jinwala, Austyn Smedberg, Alexandra Vodde, and Nicholas Veeley

Advisor: Dr. D. Chen

For each of the outcomes listed below, please check the appropriate box that corresponds to the extent that you feel the course has achieved the outcome

Outcome – Total: 5 Participants (If you need more space for comments please use the back of the form)	*Very Low* ⟷ *Very High* 1 2 3 4
1. The ability to formulate a problem statement. *Comments:*	4 – 4 answered 1 – 1 answered Average: 3.4
2. The ability to develop multiple preliminary design solutions using brainstorming technique *Comments: None!.*	4 – 3 answered 3 – 1 answered 1 – 1 answered Average: 3.2
3. The ability to evaluate alternative solutions using a well-defined criteria and produce feasible solutions. *Comments: None*	4 – 3 answered 3 – 1 answered 1 – 1 answered Average: 3.2
4. The ability to build, test and evaluate feasible solutions using modern engineering tools and select the optimum alternative. *Comments: None*	4 – 2 answered 3 – 2 answered 1 – 1 answered Average: 3

Outcome (If you need more space for comments please use the back of the form)	*Very Low* ← → *Very High* 1 2 3 4
5. Understand and the ability to use the most recent federal/state/county/city regulations and standards in the project design, if applicable. *Comments:* *None*	4 – 3 answered 3 – 1 answered 1 – 1 answered Average: 3.2
6. The ability to successfully develop detailed final design for the project considering safety, economical, ethical, professional, and environmental issue, *Comments:*	4 – 3 answered 3 – 1 answered 1 – 1 answered Average: 3.2
7. The ability to present final design to technical and non-technical professionals *Comments:*	4 – 4 answered 2 – 1 answered Average: 3.4
8. Knowledge of contemporary issues related to the area of the project *Comments:* *None*	4 – 3 answered 3 – 1 answered 1 – 1 answered Average: 3.2
9. Understanding of the ethical issues those are associated with the engineering profession and related to the project. *Comments:* *NONE*	4 – 3 answered 3 – 1 answered 1 – 1 answered Average: 3.2

Overall Comments: Very good design with great efforts. Good presentation.

Indiana University -Purdue University Fort Wayne Department of Civil and Mechanical Engineering

Faculty/Professional Assessment of Course Outcomes (CE Senior Design I)

Course Code and Number: CE 487 Senior Design Term/Year: Spring 2018

Title: Life cycle design of steel structure.

Team Members: Corey Smith, Alexandra Birdwell, Clay Corsbie, Abby Laudenschlager, and Emily Renfrow.

Advisor: Dr. M.Yen

For each of the outcomes listed below, please check the appropriate box that corresponds to the extent that you feel the course has achieved the outcome

Outcome – Total: 5 Participants (If you need more space for comments please use the back of the form)	*Very Low* ↔ *Very High* 1 2 3 4
1. The ability to formulate a problem statement. *Comments: Logical*	4 – 1 answered 3 – 2 answered 2.5 – 1 answered 1 – 1 answered Average: 2.7
2. The ability to develop multiple preliminary design solutions using brainstorming technique *Comments: LRFD us ASD; None*	4 – 1 answered 3 – 1 answered 2.5 – 1 answered 1 – 1 answered 0 – 1 answering Average: 2.1
3. The ability to evaluate alternative solutions using a well-defined criteria and produce feasible solutions. *Comments: LRFD us ASD; None*	4 – 1 answered 2.5 – 1 answered 2 – 1 answered 1 – 1 answered 0 – 1 answering Average: 1.9
4. The ability to build, test and evaluate feasible solutions using modern engineering tools and select the optimum alternative. *Comments: 2 people didn't answer. None; NA*	4 – 1 answered 2.5 – 1 answered 1 – 1 answered Average: 2

Outcome (If you need more space for comments please use the back of the form)	Very Low ↔ Very High 1 2 3 4
5. Understand and the ability to use the most recent federal/state/county/city regulations and standards in the project design, if applicable. *Comments: 3 did not answer question. None; N/. Yes, use AISC and ASTM data base.*	4 – 1 answered 2.5 – 1 answered Average: 3.25
6. The ability to successfully develop detailed final design for the project considering safety, economical, ethical, professional, and environmental issue, *Comments: Appears in the design Example;*	4 – 1 answered 2 – 3 answered 1 – 1 answered Average: 2.2
7. The ability to present final design to technical and non-technical professionals *Comments: Design for Safety and economics,*	4 – 1 answered 2 – 4 answered Average: 2.4
8. Knowledge of contemporary issues related to the area of the project *Comments: Not developed lab data pertinent to design. Understand the Matl. Comm have. None.*	4 – 1 answered 3 – 1 answered 1.5 – 1 answered 1 – 1 answered 0 – 1 answered Average: 2.1
9. Understanding of the ethical issues those are associated with the engineering profession and related to the project. *Comments: One person did not answer.*	3 – 2 answered 1 – 1 answered 0 – 1 answered Average: 1.75

Overall Comments: This is the first open-ended Senior Design project that emphasizes on improving the efficiency of Design process, i.e. address the life-span and real-live loading. Traditional Design does not predict the life-span of a steel structure, thereby, over Design. This Design Project is a "non-traditional" compared to what has been done in CME Department.

Reading from cards – should not be allowed.

This team of students did not prepare the project and the presentation well.

The team proposed a process, not a design.

Appendix A-6: Instructors' Responses to the Course Evaluations

Dong Chen

From: Department of Civil and Mechanical Engineering Assessment
Sent: Thursday, September 20, 2018 2:55 PM
To: Max Yen
Cc: Department of Civil and Mechanical Engineering Assessment; Nashwan Younis
Subject: Re: Faculty/Professional evaluations of CE 487 final presentation
Attachments: CE 487 Senior Design Life Cycle Design Faculty Professional.docx

Dear Dr. Yen,

This is the second and also the last courtesy reminder. The Assessment Committee did not receive your response yet. Please email your feedback to the assessment account by Monday (Sept 24th).

Thanks

Dong Chen, Ph.D., P.E.,
Professor of Civil Engineering
Member of the Department Assessment Committee

From: Department of Civil and Mechanical Engineering Assessment
Sent: Thursday, September 13, 2018 10:14 AM
To: Max Yen <yens@pfw.edu>
Cc: Department of Civil and Mechanical Engineering Assessment <cme_assessment@pfw.edu>
Subject: Re: Faculty/Professional evaluations of CE 487 final presentation

Dear Dr. Yen,

This is a courtesy reminder. The Assessment Committee did not receive your response yet. Please email your feedback to the assessment account by coming Monday (Sept 17th).

Thanks

Dong Chen, Ph.D., P.E.,
Professor of Civil Engineering
Member of the Department Assessment Committee

From: Dong Chen
Sent: Saturday, September 8, 2018 8:00 PM
To: Max Yen <yens@pfw.edu>
Cc: Department of Civil and Mechanical Engineering Assessment <cme_assessment@pfw.edu>
Subject: Faculty/Professional evaluations of CE 487 final presentation

Dear Dr. Yen,

Please find the attachment of Faculty/Professional Assessment of CE 487 Senior Design Final Presentation at the end of spring semester 2018. Most of the outcomes, except outcome #5, are below 3.0, indicating the outcomes have not been achieved adequately. As a part of the assessment plan, the committee would like to know your constructive comments/suggestions about the results. Please email your feedback directly to the assessment account by next Wednesday (Sept 12th).

Thanks

Dong Chen, Ph.D., P.E.,
Professor of Civil Engineering
Member of the Department Assessment Committee

The following is the response from Dr. Max Yen, the faculty advisor of the senior design project "Life cycle design of steel structure", to the inquiry from the department assessment committee.

1. This senior design project is built upon the traditional design process used by the professional practitioners widely and exclusively. Unlike, the design project in mechanical engineering, design in civil engineering (especially structure design) must followed the Standard design guideline and materials properties. The design guidelines has embedded process for alternative design consideration that leads the ultimate selection and decision. Clearly, this design process is significantly different from the practice used in Mechanical Engineering.
2. In essence, the assessment outcome evaluated by faculty on this "civil engineering" related design project shows a contrast interpretation of the merits-Civil Engineering versus Mechanical Engineering. I believe this is attribute to my comments in 1. In addition, I do not see any elaborated comments on the assessment questions that warrants an unsatisfactory rating.
3. The questions raised (to the students) during the final project presentation were pointing and negative interpreted by students. I believe that we can do better (as professor) by orchestrating the presentation event more toward appreciation and appraisal of students efforts. Let's try not to leave an unpleasant experience before they become alumni.
4. Understanding the huge discrepancies in recognizing and appraisal of Civil Engineering Senior Design Projects, I recommend that CE senior design project should be administered independent of ME project whereas the advising and evaluation process as well as assignment final grade (by individual advisor). The questions for the assessment would need to be revised and delivered to the students through individual project advisor. As a project advisor, I was not informed about the senior design project evaluation process until the last day.

So, based on experience with this project, I recommend (a) CE senior design project be administered and evaluated by the faculty of Civil Engineering, (b) the assessment questions and matrix would need to be revised suited to the emphases of design concept in Civil Engineering, (c) Each senior design project should be led by individual faculty advisor, there is no need of senior design coordinator.

Appendix A-7: Report of First-Year Engineering Assessment

Purdue University Fort Wayne

Assessment Report

First-Year Engineering Program

Fall 2017 – Spring 2018

Contents

Note: This report was circulated to the first-year engineering committee via email and was approved by the committee on 31 August 2018.

First-Year Engineering Assessment Report

Introduction

The first-year engineering (FYE) program is jointly managed by the Civil and Mechanical Engineering (CME) department and the Electrical and Computer Engineering (ECE) department. The FYE program seeks to provide an innovative and supportive environment to enhance the success of all incoming engineering students in their first-year and beyond. The program is responsible for developing and implementing curriculum, pedagogy, advising, facilities, and student support for all first-year engineering students. FYE faculty are also involved in recruiting and K12 outreach. In the classroom, the first-year faculty seek to develop and use a range of innovative pedagogies, particularly active and cooperative approaches.

Each department has a first-year engineering faculty member, i.e. FYE coordinator, who is responsible for providing leadership and representing the first-year engineering program. The coordinators and department chairs are listed in Table 1. The FYE committee, comprised of faculty members from both the ECE and CME departments, assists the coordinators in managing, overseeing, and assessing the FYE program. Faculty members from both the ECE and CME departments teach courses and advise students in the FYE program.

Table 1. Leadership of FYE program during the 2017-2018 school year

Department	**Chair**	**FYE Coordinator**
CME	Nash Younis	Rebecca Essig
ECE	Abdullah Eroglu	S. Scott Moor

As a result of its assessment-based, continuous improvement process, the engineering programs at Purdue Fort Wayne began offering a newly designed first-year engineering (FYE) curriculum in the fall 2014 semester. The overarching motivation behind the curriculum change was the desire to expose students to important mathematical techniques through engineering applications and to develop the students' problem-solving abilities. The curriculum change involved replacing four courses with two courses, as shown in Table 2.

Table 2. FYE curriculum

<table>
<tr><th colspan="3">Pre-Fall 2014 Curriculum</th><th colspan="3">Post-Fall 2014 Curriculum</th></tr>
<tr><td>Number</td><td>Title</td><td>Credit Hours</td><td>Number</td><td>Title</td><td>Credit Hours</td></tr>
<tr><td>ENGR 101</td><td>Introduction to Engineering</td><td>1</td><td rowspan="2">ENGR 12700</td><td rowspan="2">Engineering Fundamentals I</td><td rowspan="2">4</td></tr>
<tr><td>ENGR 120</td><td>Graphical Communication and Spatial Analysis</td><td>2</td></tr>
<tr><td>ENGR 121</td><td>Computer Tools for Engineers</td><td>2</td><td rowspan="2">ENGR 12800</td><td rowspan="2">Engineering Fundamentals II</td><td rowspan="2">4</td></tr>
<tr><td>ENGR 199</td><td>Introduction to Engineering Design</td><td>3</td></tr>
</table>

The CME department is primarily responsible for the scheduling and staffing of ENGR 12700 and the ECE department is primarily responsible for the scheduling and staffing of ENGR 12800. This structure is to facilitate the administration of the course, but the continued goal is to have a unified curriculum that addresses the needs of all engineering students. This is reflected in the outcomes for each course which are designed to benefit students in any program.

Although the new curriculum consists of only two courses, each course has a lecture component, a studio component, and a computer lab component. The lecture component meets twice a week for 50 minutes. The studio and computer lab components each meet for 2.25 hours once a week.

Mission

The purpose of the first-year engineering program is to prepare incoming students for a successful college career in engineering or another major. Particularly to:

- Prepare students to be successful college students, introducing them to the skills, habits, and attitudes that led to success;
- Help students select or confirm their major;
- Increase their motivation to learn and work hard in the major they choose;
- Better prepare engineering students for sophomore courses, addressing varying weaknesses in preparation for incoming students of varying background, working to give all students a common starting point;
- Begin to prepare students for the teamwork required for success in all professions particularly engineering including communication skills, mutual accountability, and respect/understanding for individuals with varying backgrounds, approaches, & skills.
- Develop needed introductory computer skills (e.g., computer calculations, Computer Aided Design - CAD, introductory programming).

Program Outcomes

In the fall 2016 semester, the first-year engineering program committee revised the program and course outcomes for the first-year engineering program in order to create more clarity for students and instructors. The clarifications were approved by both engineering departments.

The first-year engineering program has three overall (two-semester) outcomes. A student who successfully completes the first-year engineering program (ENGR 12700 and 12800) will be able to:[1]

1. solve and document the solution of problems involving different elements or configurations not previously encountered (e.g. a new geometric arrangement, a new term to include in an analysis, a new type of starting condition) (a)
2. solve problems using multiple approaches including (e.g., equations including varied analytic approaches, diagrams, formal solution steps or simple computer programs) (a)

[1] The letters in parentheses correspond to ABET program outcomes. ABET outcomes are listed in the Appendix A. Note: ABET outcomes changed in the spring of 2018, and these changes will be reflected in the 2018-2019 report.

3. describe the broad nature of various engineering majors and the engineering profession and use this information to make appropriate career choices (f)

The three overall FYE program outcomes cover ABET outcomes (a) and (f).

The FYE program outcomes are also closely aligned with the foundations of Purdue Fort Wayne's baccalaureate framework, especially *Application of Knowledge*, *Personal and Professional Values*, *and Critical Thinking and Problem Solving.*

Course Outcomes

A student who successfully completes ENGR 12700: Engineering Fundamentals I will be able to:[2]

Analysis & Success Outcomes

A.1. formulate and solve engineering problems using linear and quadratic equations (a)
A.2. formulate and solve engineering problems using trigonometry in planar systems (a)
A.3. formulate and solve engineering problems using descriptive statistics (a)
A.4. formulate and solve engineering problems using derivatives (a)
A.5. formulate and solve engineering problems using systems of equations (a)
A.6. explain and apply appropriate study and success strategies, concepts & habits to be successful in an engineering major and exhibit the work ethic necessary to succeed in engineering (i)

Project Outcomes

B.1. plan and carry out a disciplined experimental study following a systematic project process of project planning and management (b)
B.2. utilize appropriate analytical and computer tools in project work (b)
B.3. communicate effectively using simple memos, properly formatted tables and properly formatted figures following an engineering format and style guideline (g)
B.4. identify and demonstrate the behaviors of an effective team member and/or leader, prepare a project schedule (d)
B.5. explain and apply the concepts of professional and ethical responsibility, evaluate ethical issues in engineering practice in terms of a Code of Ethics and apply to ethics as an engineering student (f)

Computer Outcomes

C.1. represent a physical object in single-view and multi-view orthographic projections (k)
C.2. dimension parts according to convention (k)
C.3. create pictorial (isometric) representations of a physical object (k)
C.4. create and use drawings and diagrams to solve a problem and to document its solution (k)
C.5. set up and use a spreadsheet to carry out repetitive calculations using formula (k)
C.6. explain and use appropriate spreadsheet functions in solving engineering problems (k)
C.7. calculate and use descriptive statistics and plot histograms (k)
C.8. produce and use clear and effective computer graphs (k)
C.9. clearly format a spreadsheet calculation to communicate a problem solution (k)

ENGR 127 covers ABET outcomes (a), (b), (d), (f), (i), and (k).

[2] The letters in parentheses correspond to ABET program outcomes. ABET outcomes are listed in the Appendix A. Note: ABET outcomes changed in the spring of 2018, and these changes will be reflected in the 2018-2019 report.

A student who successfully completes ENGR 12800: Engineering Fundamentals II will be able to:[3]

Analysis & Success Outcomes

A.1. formulate and solve engineering problems using complex numbers (a)
A.2. formulate and solve engineering problems using sign waves & frequency (a)
A.3. formulate and solve engineering problems using integration (a)
A.4. formulate and solve engineering problems using Boolean Logic (a)
A.5. formulate and solve engineering problems using log graphing and transformations (a)
A.6. formulate and solve engineering problems using simple differential equations (a)

Project Outcomes

B.1. plan and carry out a disciplined design project following a systematic design process (c)
B.2. utilize appropriate analytical and computer tools in project work (k)
B.3. write a precise and effective Technical Report Memo. Write clear Abstract, Methodology, Recommendations, and Conclusions sections (g)
B.4. prepare and deliver an effective oral technical presentation (g)
B.5. organize an effective team including setting ground rules, project planning, and task management; explain and utilize effective group processes (d)

Computer Outcomes

C.1. solve engineering problems using computer tools (k)
C.2. apply arrays and array manipulations (k)
C.3. use and explain text variables and ASCII text files (k)
C.4. write a function with multiple inputs and outputs at the command line (k)
C.5. write a function that results in a non-numerical output (k)
C.6. write programs using logical expressions and conditional statements (k)
C.7. write programs using loop structures (k)
C.8. fit data that follows linear, exponential or power law forms (k)
C.9. properly communicate a solution based on computer calculation or program (g)

ENGR 128 covers ABET outcomes (a), (c), (d), (g), and (k).

[3] The letters in parentheses correspond to ABET program outcomes. ABET outcomes are listed in the Appendix A. Note: ABET outcomes changed in the spring of 2018, and these changes will be reflected in the 2018-2019 report.

Table 3 summarizes the relationship between the course outcomes and the ABET program outcomes. Each outcome is mapped to the FYE program courses based on the degree to which the outcome is addressed using a scale of Low (L), Medium (M), or High (H).

Table 3. Mapping of course outcomes to ABET outcomes

Course	ABET Outcomes										
	a	b	c	d	e	f	g	h	i	j	k
ENGR 12700 Engineering Fundamentals I	H	M		H	L	H	M		L		H
ENGR 12800 Engineering Fundamentals II	H		M	H	L	L	H				H

During the spring 2018 semester, the FYE Committee revised the mapping of ABET Outcomes to program and course outcomes in order to reflect the new ABET Outcomes 1-7. These changes will be incorporated starting in the fall 2018 semester.

Assessment Measures and Evaluation

According to the FYE Assessment Plan, the FYE program outcomes and course learning outcomes are to be assessed using the following direct and indirect measures:

- **Direct Measures**
  1. Faculty assessment of course outcomes
  2. Student performance in subsequent courses
     - ECE 20100
     - CE 25000
     - ME 25000
- **Indirect Measures**
  1. Student assessment of course outcomes
  2. FYE program exit interview – given to students at the end of ENGR 12800 to assess classrooms, equipment, computer, software, and overall program outcomes
  3. Engineering program exit survey

In the next two sections, the assessment results for the fall 2017 and spring 2018 semesters are summarized and discussed.

In addition, on an ongoing basis, the first-year engineering committee will collect data and will study issues related to the first-year engineering program. Data related to the math placement and spatial visualization abilities of incoming students is reported.

Direct Measures

Faculty assessment of course outcomes

For the fall 2017 semester, all faculty who completed assessments indicated that, on average, all outcomes were met across the three components (analysis, project, and computer) for ENGR 12700. The faculty reports are included in Appendix F.

A faculty suggestion for ENGR 12700 course improvement was to make computer lab material more directly related to engineering applications as well as the course material covered in the studio and lecture portions. To address this, the CME FYE Coordinator adapted existing lab materials to remove redundant problems, emphasize multiple solution methods, and link to real world engineering applications.

During the spring 2018 semester, ENGR 12800 instructors indicated minor issues within the three course components. For the ENGR 12800 lecture component, the instructors has the following comments about student performance:

1. Students had lots of difficulty with integration of discontinuous functions, i.e. one that has segments, each defined by a different function. Extensive coverage of this type of integration was carried out during the lecture, homework, midterm exam and final exam, still less than 70% students could get it right.
2. Students had difficulty with second order differential equations, in particular using the initial conditions to determine the unknown constants of the general solution. Once the function is determined they also have difficulty in using the solution to answer further questions about the system that the solution function is modeling.
3. As the semester went on students attended less and less the lectures and didn't do the homework.

The lecture instructors suggested the following to help student performance.

1) Student attendance went downhill the second half of the semester which contributed a lot to their underperformance in the topics mentioned in (1) and (2) above.

2) Perhaps random 10 minutes quizzes to sharpen their attention and attendance has to be introduced to improve their focus on important topics such as integration.

3) Not directly related to the lectures but there were several students (more than just a few) that missed studio and in particular lab reports which impacted severely on their final grade.

In ENGR 12800 studio, an instructor found that students did not achieve Project Outcome 2 (project work) in one section while students in another section achieved this outcome strongly. One of the reasons for this difference is that in the section where the outcome was not achieved students did not turn in all stages of their project. From observation the instructor noticed some students were confused by details in the design process and by having multiple items due at the same time. In order to address these issues, the instructor suggests introducing the design process earlier in the term, simplifying some stages and eliminating multiple submissions on the same day.

In ENGR 12800 Computer lab, an instructor found students did not achieve Computer Outcome 2 (arrays) and Outcome 5 (functions with non-numerical output) in one section and did not achieve Computer Outcome 2 (arrays) and outcome 7 (loops) in multiple sections. Outcome 2 is the main concern because it appeared in both sections and because poor understanding of arrays could hurt student understanding of later subjects. From observation the instructor noticed that students where not getting the early concepts adequately to perform well as the course built on those ideas. The instructor suggests rearranging some of the first labs to ground students in the basic concepts, particularly moving text variables earlier and using it to emphasize basic variables and their use before introducing functions.

The received faculty reports are included in Appendix F.

Student performance in subsequent courses

Figures 1-3 show the percentage of students who successfully completed key sophomore-level courses, e.g. ME/CE 25000, ECE 20100, and ME 20000. Successful completion is indicated by a final course grade of A, B, or C. The remainder of the students finished the course with D, F, or W (withdraw).

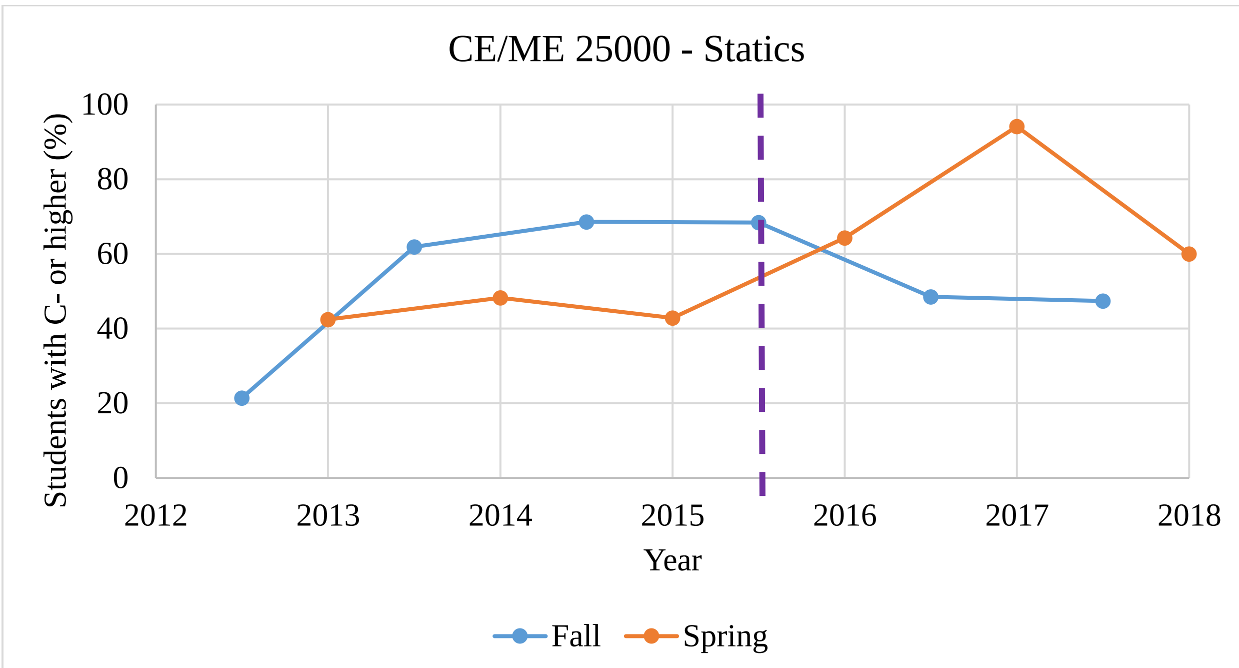


Figure 1. Percentage of students with grade of C- of higher in CE/ME 25000 fall 2012 - spring 2018

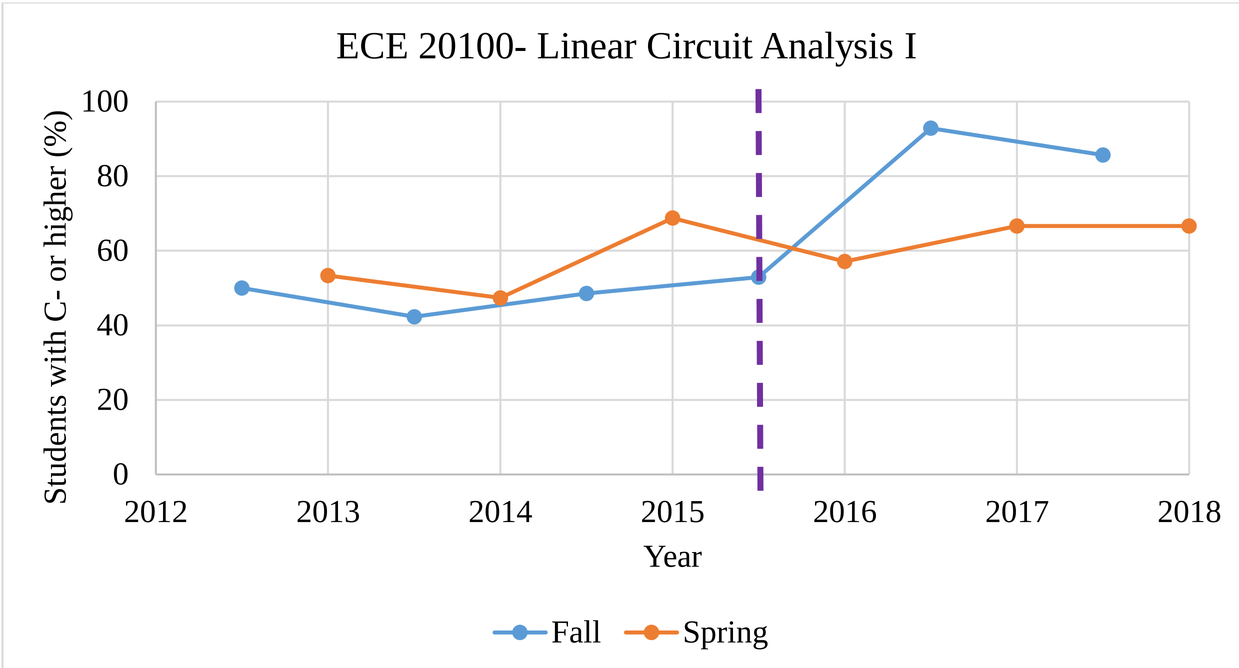


Figure 2. Percentage of students with grade of C- of higher in ECE 20100 fall 2012 - spring 2018

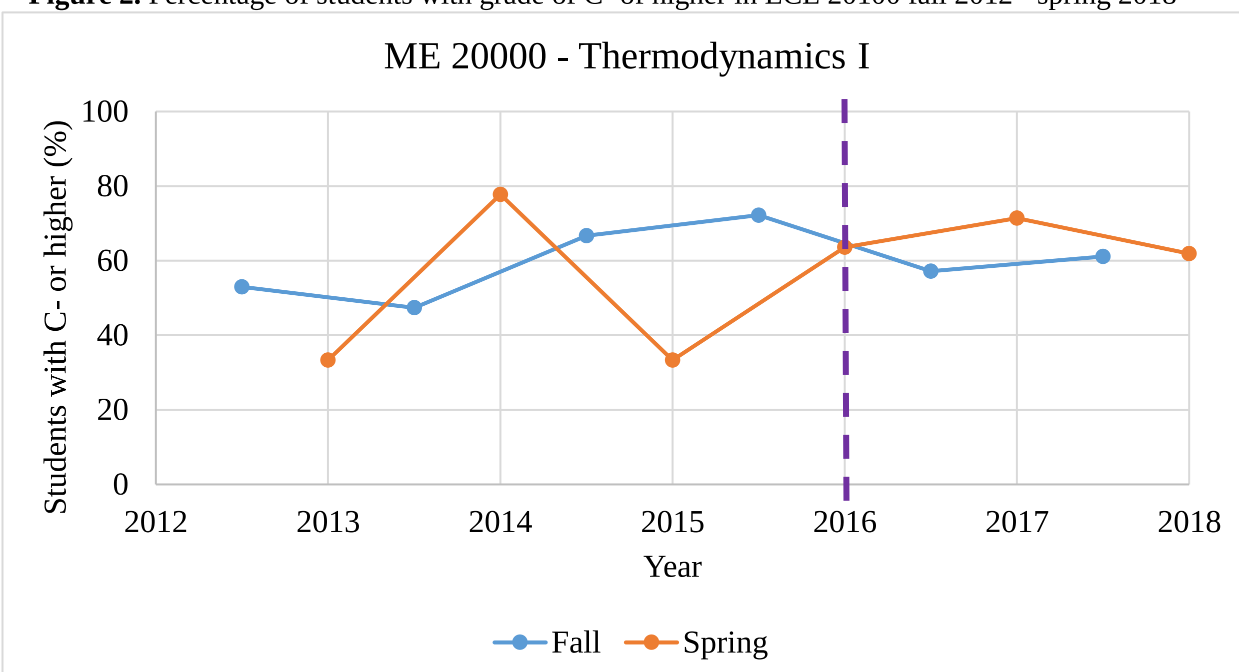


Figure 3. Percentage of students with grade of C- of higher in ECE 20100 fall 2012 - spring 2018

Indirect Measures

Student assessment of course outcomes

An online assessment instrument has been developed for students to record perceived achievement of the course outcomes. Students rated achievement outcomes on a Likert scale of 1-4. Results from the student assessment surveys are shown in Figures 4 – 9. Results are divided by course as well as by course component, and a list of the component outcomes corresponding to each graph are included. Figures 4-6 pertain to ENGR 12700 and Figures 7 – 9 pertain to ENGR 12800. These outcomes were previously presented in the Course Outcomes section of this document including which ABET outcome each course outcome addresses.

ENGR 12700 students were surveyed in the fall 2017 semester, and ENGR 12800 students were surveyed in the spring 2018 semester. The faculty assessment of course outcomes coincides with the student assessment of course outcomes.

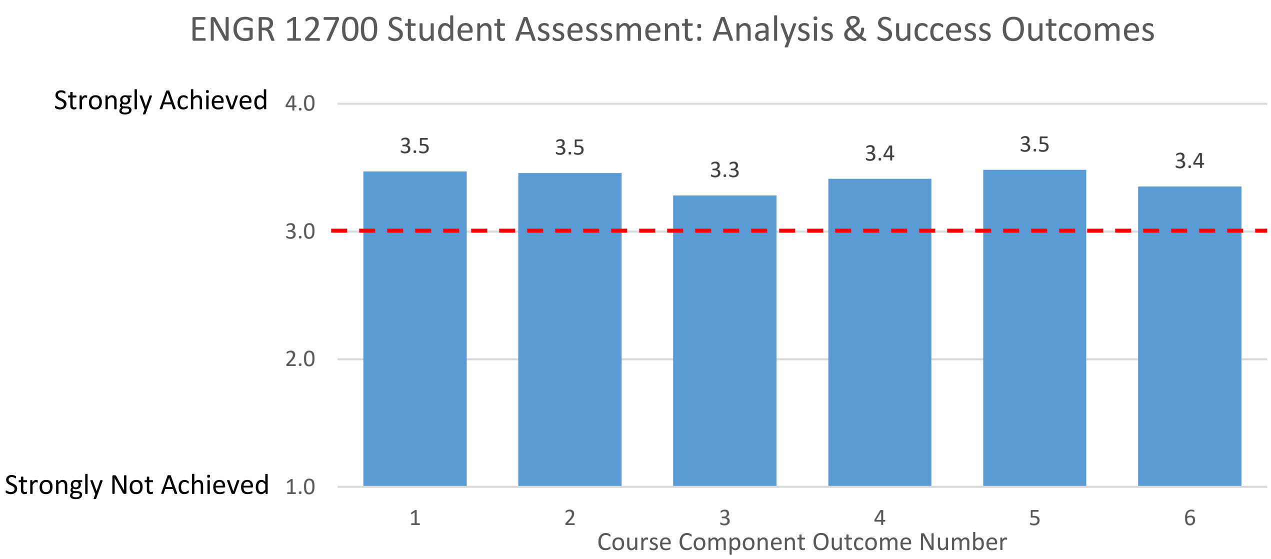


Figure 4. Student assessment of ENGR 12700 – Analysis and Success Outcomes

<u>ENGR 12700 Analysis & Success Outcomes</u>

A.1. formulate and solve engineering problems using linear and quadratic equations
A.2. formulate and solve engineering problems using trigonometry in planar systems
A.3. formulate and solve engineering problems using descriptive statistics
A.4. formulate and solve engineering problems using derivatives
A.5. formulate and solve engineering problems using systems of equations
A.6. explain and apply appropriate study and success strategies, concepts & habits to be successful in an engineering major and exhibit the work ethic necessary to succeed in engineering

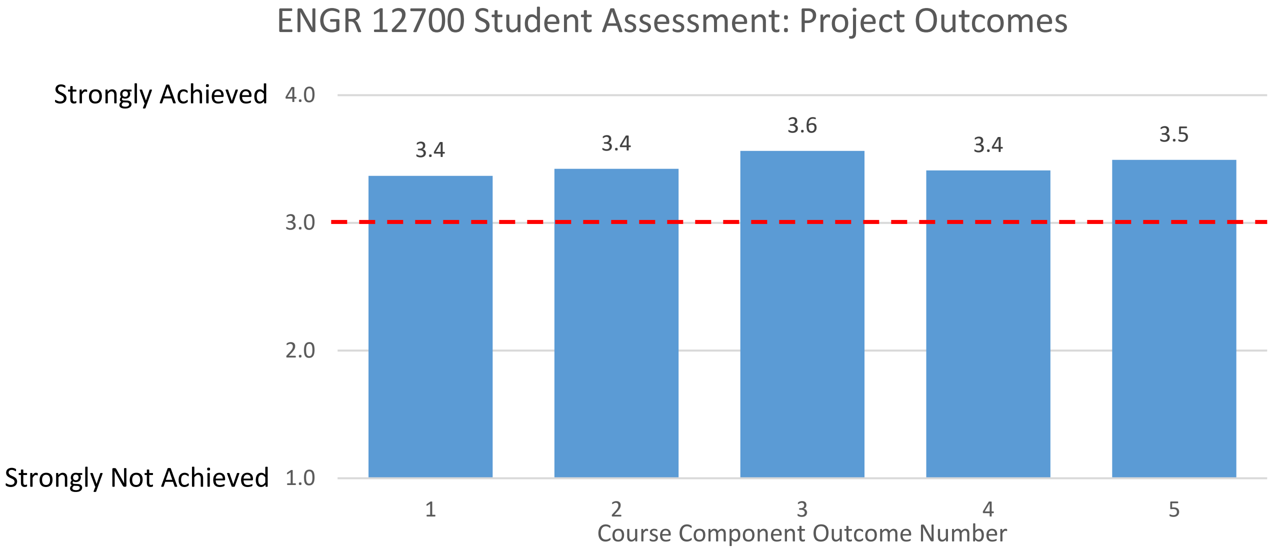


Figure 5. Student assessment of ENGR 12700 – Project Outcomes

<u>ENGR 12700 Project Outcomes</u>

B.1. plan and carry out a disciplined experimental study following a systematic project process of project planning and management

B.2. utilize appropriate analytical and computer tools in project work

B.3. communicate effectively using simple memos, properly formatted tables and properly formatted figures following an engineering format and style guideline

B.4. identify and demonstrate the behaviors of an effective team member and/or leader, prepare a project schedule

B.5. explain and apply the concepts of professional and ethical responsibility, evaluate ethical issues in engineering practice in terms of a Code of Ethics and apply to ethics as an engineering student

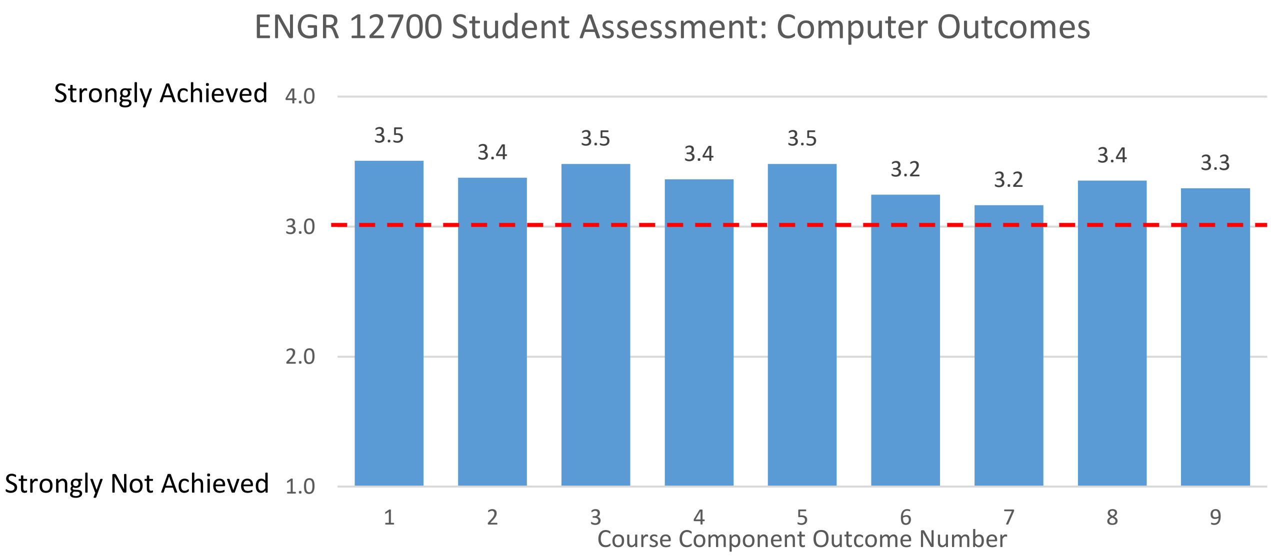


Figure 6. Student assessment of ENGR 12700 – Computer Outcomes

ENGR 12700 Computer Outcomes

C.1. represent a physical object in single-view and multi-view orthographic projections
C.2. dimension parts according to convention
C.3. create pictorial (isometric) representations of a physical object
C.4. create and use drawings and diagrams to solve a problem and to document its solution
C.5. set up and use a spreadsheet to carry out repetitive calculations using formula
C.6. explain and use appropriate spreadsheet functions in solving engineering problems
C.7. calculate and use descriptive statistics and plot histograms
C.8. produce and use clear and effective computer graphs
C.9. clearly format a spreadsheet calculation to communicate a problem solution

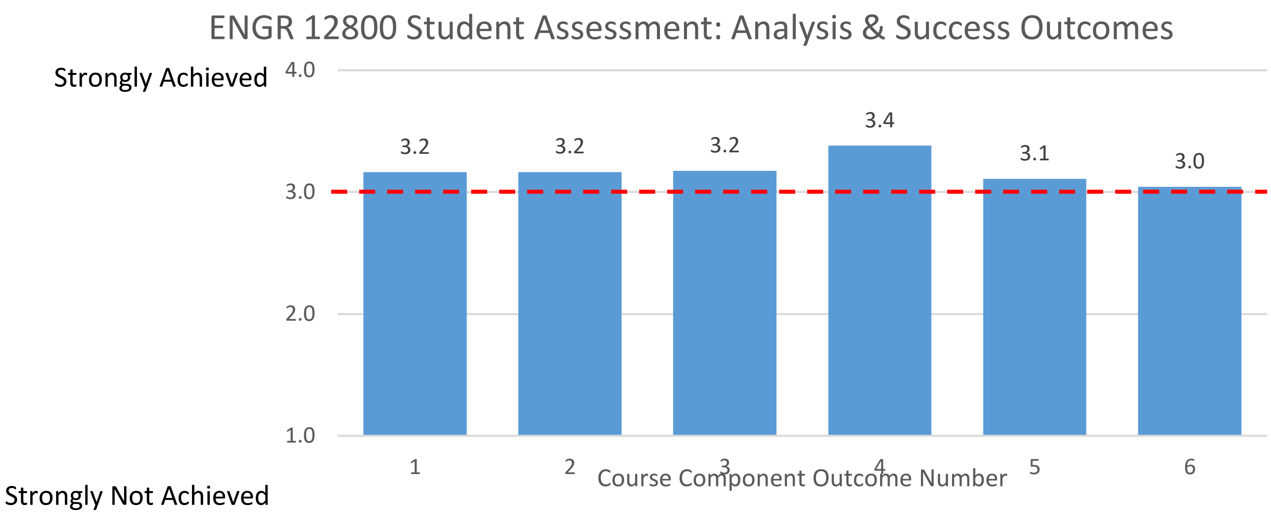


Figure 7. Student assessment of ENGR 12800 – Analysis and Success Outcomes

ENGR 12800 Analysis & Success Outcomes

A.1. formulate and solve engineering problems using complex numbers
A.2. formulate and solve engineering problems using sign waves & frequency
A.3. formulate and solve engineering problems using integration
A.4. formulate and solve engineering problems using Boolean Logic
A.5. formulate and solve engineering problems using log graphing and transformations
A.6. formulate and solve engineering problems using simple differential equations

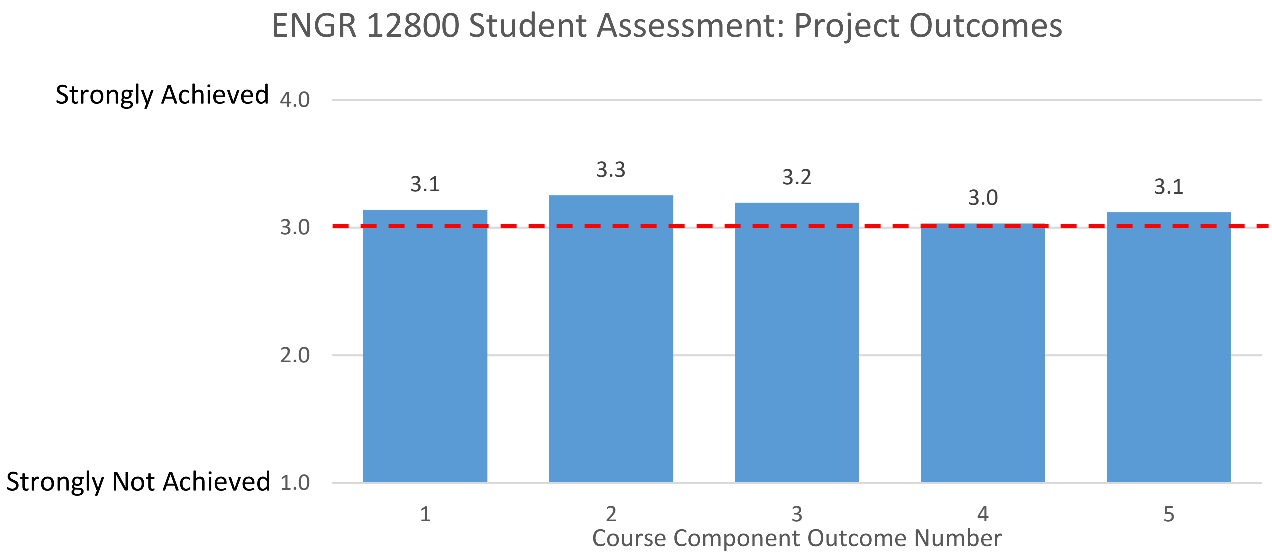


Figure 8. Student assessment of ENGR 12800 – Project Outcomes

<u>Project Outcomes</u>

B.1. plan and carry out a disciplined design project following a systematic design process
B.2. utilize appropriate analytical and computer tools in project work
B.3. write a precise and effective Technical Report Memo. Write clear Abstract, Methodology, Recommendations, and Conclusions sections
B.4. prepare and deliver an effective oral technical presentation
B.5. organize an effective team including setting ground rules, project planning, and task management; explain and utilize effective group processes

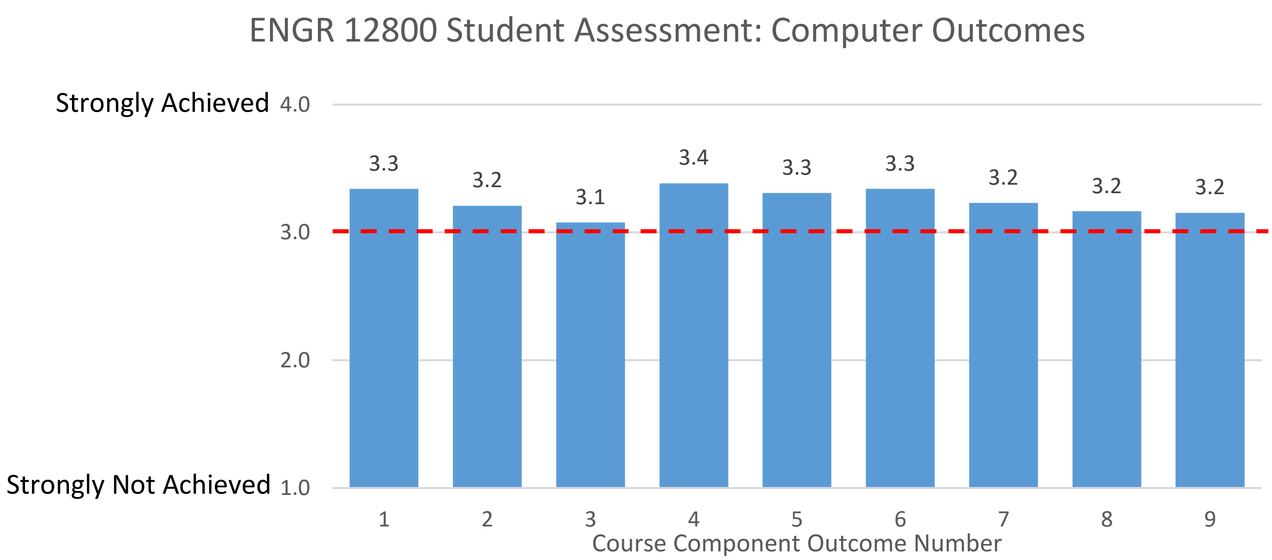


Figure 9. Student assessment of ENGR 12800 – Computer Outcomes

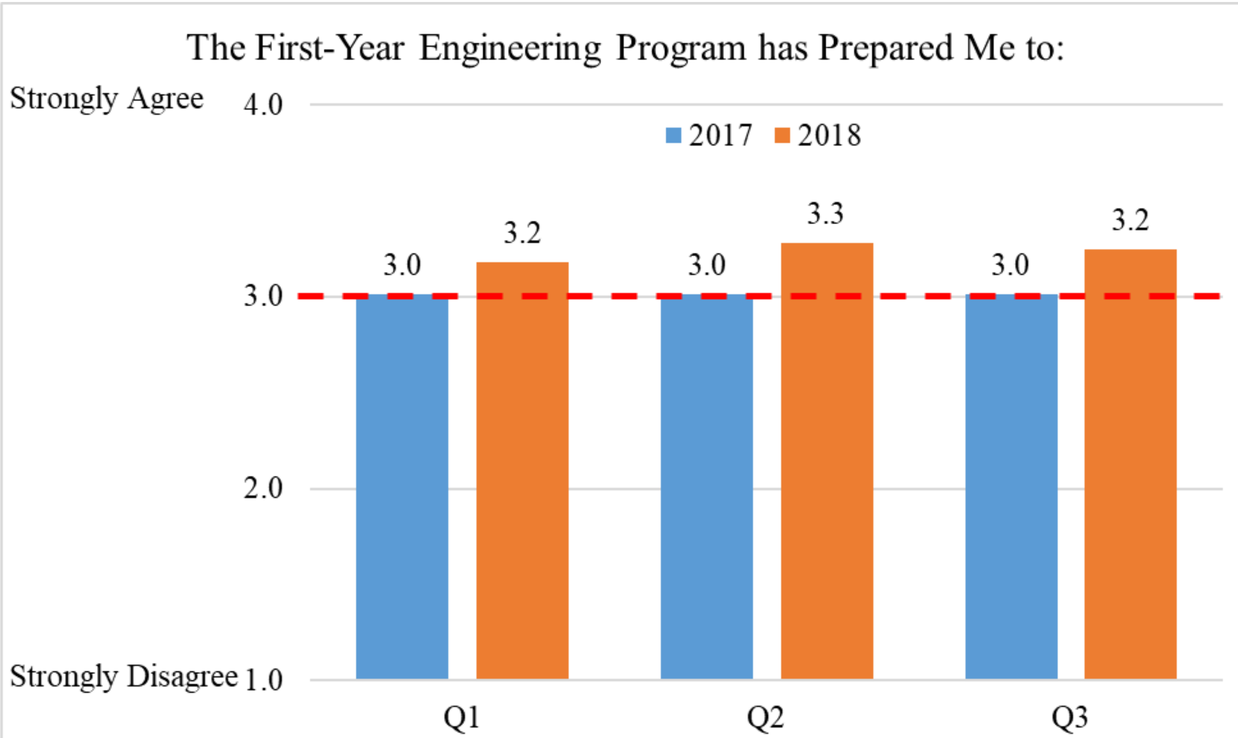
Computer Outcomes

C.1. solve engineering problems using computer tools
C.2. apply arrays and array manipulations
C.3. use and explain text variables and ASCII text files
C.4. write a function with multiple inputs and outputs at the command line
C.5. write a function that results in a non-numerical output
C.6. write programs using logical expressions and conditional statements
C.7. write programs using loop structures
C.8. fit data that follows linear, exponential or power law forms
C.9. properly communicate a solution based on computer calculation or program

Note: According student assessment of course outcomes, all outcomes are being achieved, as indicated by a score of 3.0 or higher.

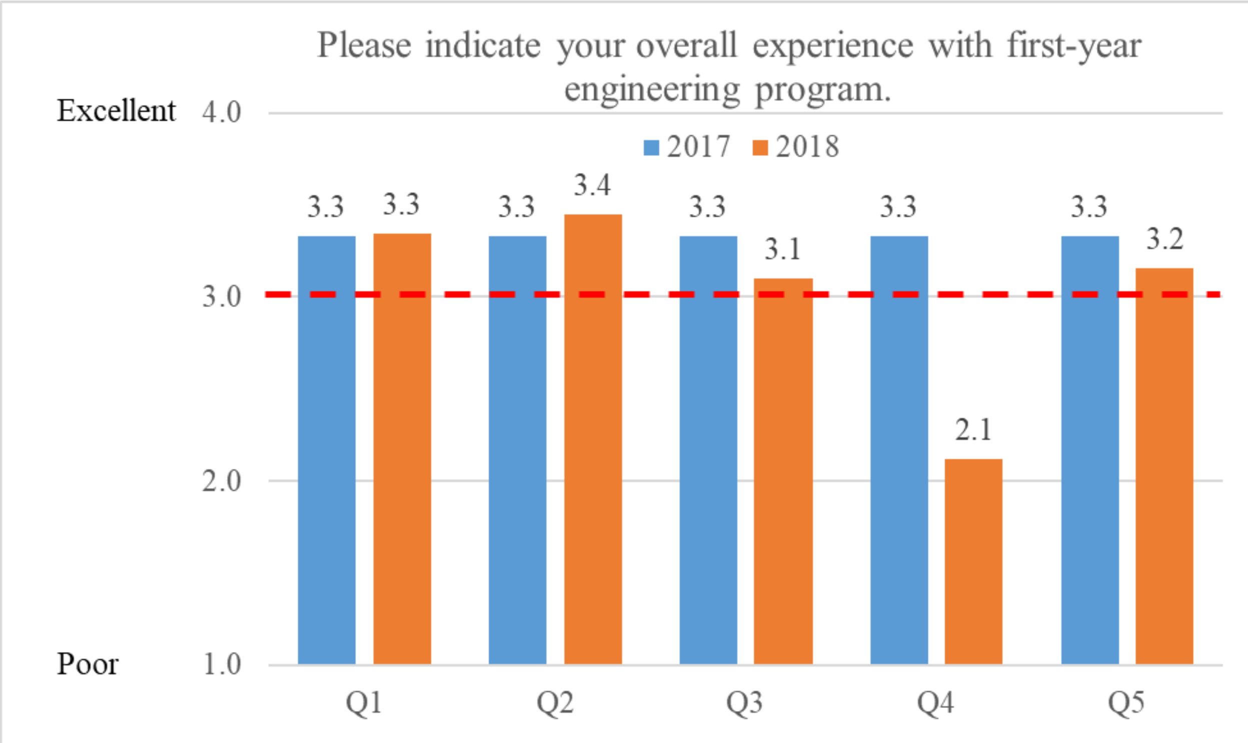
FYE Program Exit Survey

At the completion of ENGR 12800, students were given a survey to assess classrooms, equipment, computer, software, and overall FYE program outcomes and issues. Results are summarized in Figures 10 and 11. The questions on the FYE program exit interview are listed in Appendix D and included below the graphs.



	The first-year engineering program has prepared me to:	strongly disagree			strongly agree
1	solve and document the solution of problems involving different elements or configurations not previously encountered (e.g. a new geometric arrangement, a new term to include in an analysis, a new type of starting condition)	1	2	3	4
2	solve problems using multiple approaches including (e.g., equations including varied analytic approaches, diagrams, formal solution steps or simple computer programs)	1	2	3	4
3	describe the broad nature of various engineering majors and the engineering profession and use this information to make appropriate career choices	1	2	3	4

Figure 10. Results of FYE Exit Survey questions related to outcomes—average responses from n= 38 students in spring 2017 and n=72 in spring 2018.



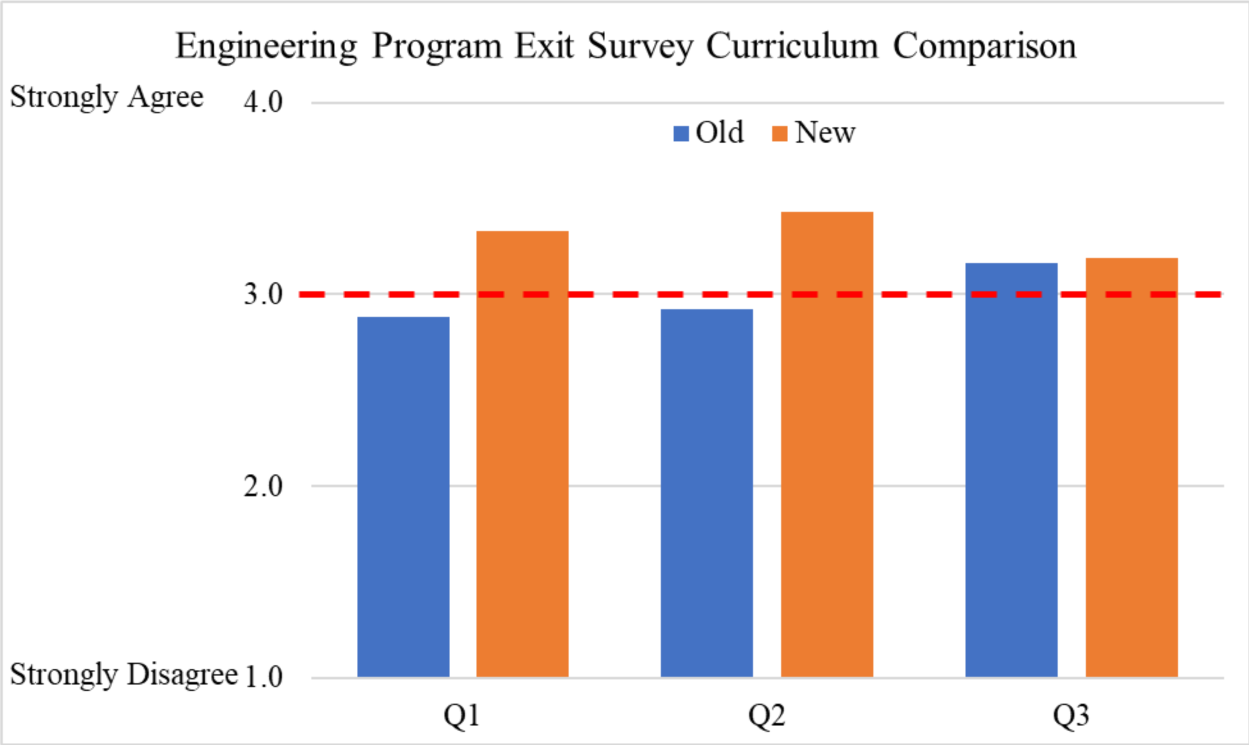
Please indicate your overall experience with first-year engineering program.		**poor**			**excellent**
1	Computer lab hardware is …	1	2	3	4
2	Computer lab software is …	1	2	3	4
3	Studio space is ….	1	2	3	4
4	Textbooks are ….	1	2	3	4
5	The first-year engineering program is …	1	2	3	4

Figure 11. Results of FYE Exit Survey questions related to experiences— average responses from n= 38 students in spring 2017 and n=72 in spring 2018.

Engineering Program Exit Survey

Questions related to the first-year engineering program will be given to all students graduating from an engineering program starting in the fall 2017. Results from these surveys are shown in Figure 12.

The questions on the engineering program exit survey related to the first-year engineering program are listed in Appendix E and included below the graphs.



		strongly disagree			strongly agree
1	The first-year engineering program has provided me with the basic soft-skills, e.g., communications, teamwork, time-management, etc., to be successful in the engineering program.	1	2	3	4
2	The first-year engineering program has provided me with the basic problem-solving skills to be successful in the engineering program.	1	2	3	4
3	The first-year engineering program has provided me with the fundamental computer skills to be successful in the engineering program.	1	2	3	4

Figure 12. Results of the Engineering Exit Survey questions— average responses from n=25 students who completed the old FYE curriculum and n=21 students who completed the current FYE curriculum.

Additional Measures

Mathematics Placement: Impact of Dual Credit on Student Success in the FYE Program

Over the last several years, high schools have increasingly developed dual credit courses that transfer to college. As a result, an increasing number of students are not taking Purdue Fort Wayne's mathematics placement test but are placing in their first mathematics course based on dual credit courses from high school. In the fall of 2017 over half of the students in ENGR 12700 received their mathematics placement based on a dual credit course. Based on interactions with some students there was concern that some dual credit students were not prepared for their mathematics course. Mathematics placement has a direct impact on ENGR 12700 because of the course's mathematics prerequisite and the analytical content of the course.

A preliminary study was conducted for the 2016-2017 FYE Program Assessment Report to examine the success of students based on the way they were placed in their first mathematics course. Because of their importance, the results of the study are also included within this report. No new data nor analysis is being presented for the 2017-2018 study year.

For the 2016-2017 study, students were divided into three groups based on their mathematics placement:

1. **Test:** Students in this group were placed by Purdue Fort Wayne's Accuplacer test or through a successful AP exam score
2. **Dual Credit (with grade of A or B):** Students in this group where placed based on dual credit where they had received an A or a B in the prerequisite dual credit course.
3. **Dual Credit (with grade of C):** Students in this group where placed based on dual credit where they had received a C in the prerequisite dual credit course.

Each student's percent score (out of 100%) in the ENGR 12700 course was estimated through November.

Table 4 shows the number of students in each group. A total of 96 students were included in this sample (roughly the continuing enrollment at this point in the term). These came from six sections of the course involving multiple instructors.

Table 4: Sample sizes for each placement group for dual credit study

Placement Method	Number	Percent
Test	41	43%
Dual Credit (with A or B)	35	36%
Dual Credit (with C)	20	21%
Total	96	100%

Figure 12 shows a box pot of the score distribution for each group. As is typical for this type of plot the box shows the inner quartile range, i.e. the middle half of the student scores. The line in the middle of the box is the media score for the group.

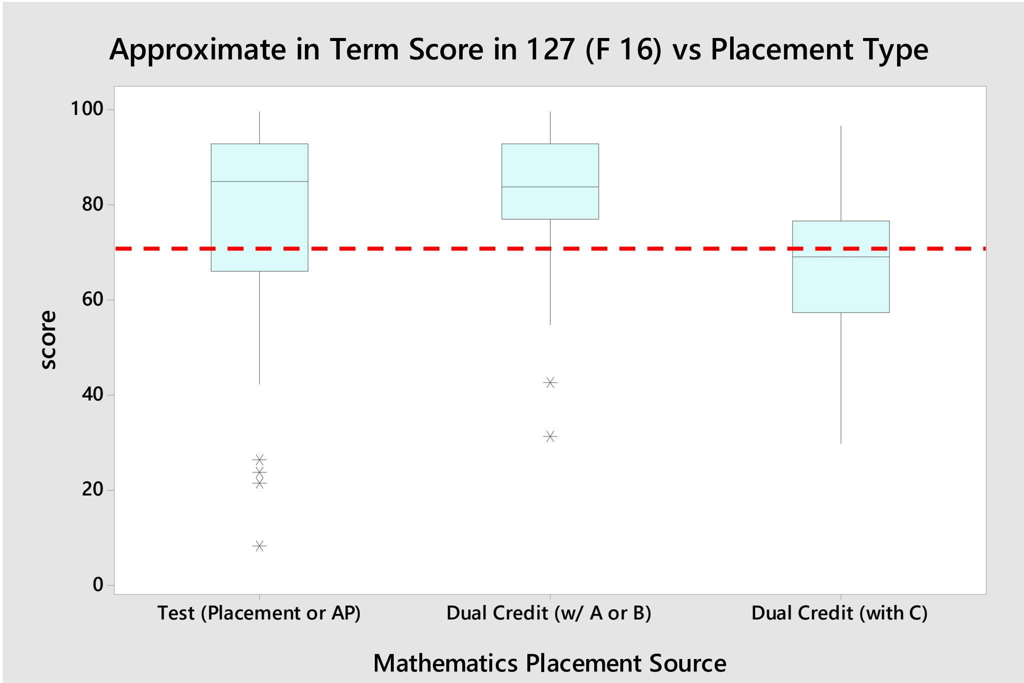


Figure 12: Box plot of student performance through November in ENGR 12700 based on their mathematics placement method. This data raises concern about the preparation of students being placed by a dual credit course in which they received a C.

The first two groups (students placed by test and students placed by dual credit with an A or B grade) have essentially equivalent median scores where the third group (students placed by dual credit with a C grade) has a median score that is approximately 20% lower. This third group represents more than 20% of the students in our first-year course.

Note also that the second group (dual credit with A or B) showed a narrower distribution resulting in almost 3/4 of these students scoring in an A or B range.

The results of students with an A or B grade in a dual credit are encouraging. These students may be performing better than students place by the usual placement test. However, the results for students with a C are concerning. A majority of these students were a low C or lower in their grade at this point in the course.

Recommended Follow up

1. Advise students with a C in a dual credit course used to place them in mathematics to take our placement test and/or repeat the dual credit course to make sure they have command of the material.
2. Continue to monitor the impact of placement on student's success. Plan an expanded study to take a broader look at these placement issues.

FYE Program Retention between ENGR 12700 and ENGR 12800

In the fall 2018, ENGR 12700 instructors (also members for the FYE committee) targeted the low retention rates between ENGR 12700 and ENGR 12800. In an attempt to increase student engagement, three student success topics were added to the ENGR 12700 course: (1) Campus Resources for Course Help, (2) Time Management, and (3) Participation in Campus Activities. For each topic, instructors used a combination of an in-class presentation paired with a take-home assignment for students. The activities were designed to introduce the students to important student success topics, give them an opportunity to interact with important personel on campus, and help motivate them to overcome the initial awkardness new students can feel when trying new activities on a new campus. The specifics of each activity include:

1. Campus Resources: Representatives from the Student Success Center presented information about the different course help available to students on campus. The presentation highlighted two free campus tutoring centers, described professor office hours, and gave the students an opporunity to meet the Student Success Center advisors. The students were assigned to go to any office hours or tutoring before the first midterm. They were required to get the instructor's or tutor's signature as well as answer four short reflection questions.
2. Time Management: The College of Engineering Dean gave a presentation to the students about the importance of time management. The follow-up assignment had students complete a time budget of their weekly schedule and write a short reflection about the results.
3. Participation in Campus Activities: Involvement in campus activities are beneficial to students' college experience and potentially their future careers. To introduce students to some campus activities available to them, instructors presented slides prepared by student organizations. The students were then assigned to choose two campus activities to attend before the second midterm and complete four reflection questions. The presentations only highlighted engineering related student groups, but students were allowed to go to any campus activity for the assignment.

Figure 13 shows the retention rates for the last three years of ENGR 12700-12800. Retention for this analysis was defined as the percent of student who took ENGR 12700 during the fall semester and also took ENGR 12800 during the following spring semester.

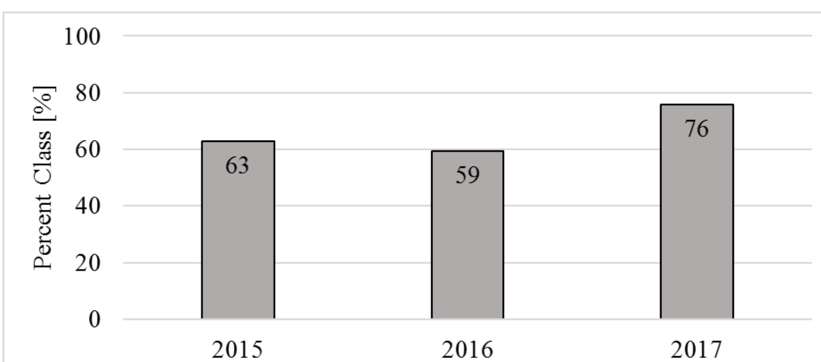


Figure 13. Retention rates of FYE students between ENGR 12700 and ENGR 12800

In prior semesters, approximately 60% of students who took ENGR 12700 in the fall semester also took ENGR 12800 the following spring semester. Following the implementation of the engagement activities in ENGR 12700, student retention rose to 76%. These results are promising and the committee plans to continue with retention efforts in future semesters.

ABET Program Accreditation Report

During the fall of 2017, the engineering programs at Purdue University Fort Wayne underwent their reaccreditation process. As part of the assessment, evaluators were provided with the 2016-2017 FYE Assessment report and course documents for ENGR 12700 and 12800 including syllabi, assignments, and student work. In the final statement, evaluators included the following remark about the First-Year Engineering Program:

> "A dedicated first-year engineering program is used to refresh and reinforce students' foundational skills. In this first-year program, students receive valuable instruction on computerized design, gain significant lab experience, and learn about careers associated with various engineering disciplines. This unique approach to providing key fundamental information and instruction to students as early as possible strengthens their skills and better prepares them to excel in their studies and future careers." – pg 8

This external review of the FYE program highlights the program's continued dedication to helping new engineering students succeed in their chosen majors. No areas of improvement were indicated by the reviewers.

Concluding Remarks

The results of the assessment process described in this report indicate that *course and program outcomes related to first-year engineering are being achieved*. Specifically,

- Student and faculty assessment indicate that overall the course outcomes are being achieved.
- Student success within subsequent sophomore-level courses showed an increase in two out of three courses evaluated.
- When looking at the first-year engineering exit survey results, students showed satisfaction in all assessed areas except the textbook. Upon further investigation of the student comments, it appears that students did not understand the survey covered both ENGR 12700 and ENGR 12800 because many comments stated the course did not require a textbook which is only true for the ENGR 12800 course. This mistake is understandable given the number of surveys students are given at the end of the semester, so greater emphasis on the scope of the exit survey provided by the administrator is recommended in future semesters.

Additional FYE program studies reveal that:

1. A previous study indicated that students with a grade of C in dual-credit math courses might not be prepared for success in an engineering program.
2. Retention rates within the FYE program increased by 16% over the last school year.
3. ABET evaluators highlighted the strengths of the FYE program in their Final Statement granting reaccreditation to the engineering programs at Purdue Fort Wayne. No areas for improvement were indicated.

Efforts to close-the-loop with regards to issues from previous semesters include:

1. Lab materials for ENGR 12700 were adjusted to better convey real world example problems as well as emphasize the multiple methods available to solve problems.

2. Activities were developed to better coordinate the lab and studio material to allow students to practice concepts in multiple contexts.

Topics for the FYE engineering committee to consider in 2018-2019 include:

1. Additional study between math placement and student performance. The committee plans to investigate the possibility of requiring the math placement test or AP exam for admission into an engineering program.

2. Making slight modifications to scheduling to better accommodate students and avoid scheduling conflicts with other required courses.

Appendix A: ABET Student Learning Outcomes

A student who successfully completes the program will have demonstrated

(a) an ability to apply knowledge of mathematics, science, and engineering

(b) an ability to design and conduct experiments, as well as to analyze and interpret data

(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

(d) an ability to function on multidisciplinary 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) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

(i) a recognition of the need for, and an ability to engage in life-long learning

(j) a knowledge of contemporary issues

(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Appendix B: Purdue Fort Wayne's Baccalaureate Framework

Students who earn a baccalaureate degree at Purdue Fort Wayne will be able to apply their knowledge to the needs of an increasingly diverse, complex, and dynamic world. To that end, Purdue Fort Wayne continually develops and enhances curricula and educational experiences that provide all students with a holistic and integrative education.

The Purdue Fort Wayne faculty has identified six foundations of baccalaureate education.

1. Acquisition of Knowledge

Students will demonstrate breadth of knowledge across disciplines and depth of knowledge in their chosen discipline. In order to do so, students must demonstrate the requisite information-seeking skills and technological competencies.

2. Application of Knowledge

Students will demonstrate the ability to integrate and apply that knowledge, and, in so doing, demonstrate the skills necessary for life-long learning.

3. Personal and Professional Values

Students will demonstrate the highest levels of personal integrity and professional ethics.

4. A Sense of Community

Students will demonstrate the knowledge and skills necessary to be productive and responsible citizens and leaders in local, regional, national, and international communities. In so doing, students will demonstrate a commitment to free and open inquiry and mutual respect across multiple cultures and perspectives.

5. Critical Thinking and Problem Solving

Students will demonstrate facility and adaptability in their approach to problem solving. In so doing, students will demonstrate critical-thinking abilities and familiarity with quantitative and qualitative reasoning.

6. Communication

Students will demonstrate the written, oral, and multimedia skills necessary to communicate effectively in diverse settings.

These foundations provide the framework for all baccalaureate degree programs. The foundations are interdependent, with each one contributing to the integrative and holistic education offered at Purdue Fort Wayne.

Appendix C: Faculty Assessment of Course Outcomes Form

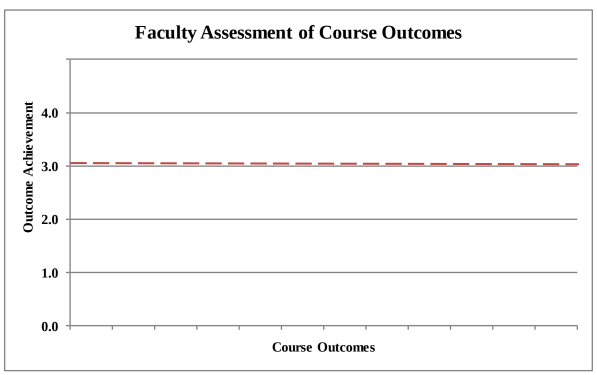
Faculty Assessment of Course -

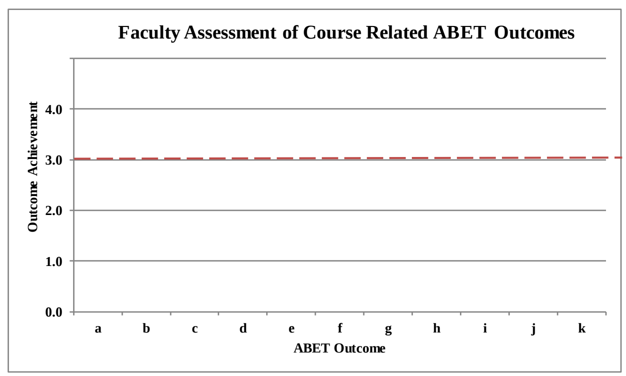
Course:

Semester: **Section:** ______________ **Instructor:** **Number of Students:** ________

Outcomes		Faculty Assessment						
		Tools Used			Course Outcome Achieved?	Criteria Used		
Course	ABET	1	2	3		criterion	Limit	Value

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

Appendix D: FYE Program Exit Survey

When did you take each of the two first-year engineering courses (fall or spring and year)?

ENGR 12700 ___________________

ENGR 12800 ____________________

If you did not take one of these courses please list why (e.g. credit, 2+3 program, transfer credit,…)

What do you see to be the key goals of the first-year engineering courses (ENGR 12700 & 12800)? Please list:

Describe how you used material from one of these courses in another course.

	The first-year engineering program has prepared me to:	strongly disagree			strongly agree
1	solve and document the solution of problems involving different elements or configurations not previously encountered (e.g. a new geometric arrangement, a new term to include in an analysis, a new type of starting condition)	1	2	3	4
2	solve problems using multiple approaches including (e.g., equations including varied analytic approaches, diagrams, formal solution steps or simple computer programs)	1	2	3	4
3	describe the broad nature of various engineering majors and the engineering profession and use this information to make appropriate career choices	1	2	3	4

	Please indicate your overall experience with first-year engineering program.	**poor**			**excellent**
1	Computer lab hardware is … Comments:	1	2	3	4
2	Computer lab software is … Comments:	1	2	3	4
3	Studio space is …. Comments:	1	2	3	4
4	Textbooks are …. Comments:	1	2	3	4
5	The first-year engineering program is … Comments:	1	2	3	4

Appendix E: Engineering program exit survey

The following questions will be added to each program's graduating senior exit survey:

		strongly disagree			strongly agree
1	The first-year engineering program has provided me with the basic soft-skills, e.g., communications, teamwork, time-management, etc., to be successful in the engineering program. Comments:	1	2	3	4
2	The first-year engineering program has provided me with the basic problem-solving skills to be successful in the engineering program. Comments:	1	2	3	4
3	The first-year engineering program has provided me with the fundamental computer skills to be successful in the engineering program. Comments:	1	2	3	4

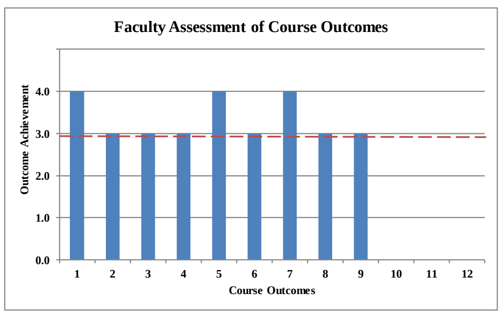
Appendix F: Faculty Assessment Reports for ENGR 12700 and ENGR 12800

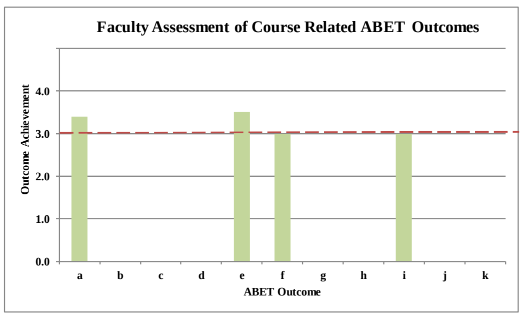
Faculty Assessment of Course - Fall 2017

Course: ENGR 12700 Analysis **Instructor:** Essig
Semester: Fall 2017 **Section:** 02 **Number of Students:** 21

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	formulate and solve engineering problems using linear and quadratic equations	a	Midterm(s)			Yes, strongly	criterion 3	75%	90%
2)	formulate and solve engineering problems using trigonometry in planar systems	a	Midterm(s)			Yes, adequately	criterion 3	75%	90%
3)	formulate and solve engineering problems using descriptive statistics	a	Final Exam			Yes, adequately	criterion 3	75%	81%
4)	formulate and solve engineering problems using derivatives	a	Final Exam			Yes, adequately	criterion 3	75%	76%
5)	formulate and solve engineering problems using systems of equations	a	Midterm(s)			Yes, strongly	criterion 3	75%	100%
6)	explain and apply appropriate study and success strategies, concepts & habits to be successful in an engineering major and exhibit the work ethic necessary to succeed in engineering	i	Midterm(s)			Yes, adequately	criterion 3	75%	95%
7)	solve and document the solution of problems involving different configurations	e	Memo(s)			Yes, strongly	criterion 3	75%	95%
8)	solve problems using multiple approaches (e.g., equations including varied analytic approaches, diagrams, formal solution steps or simple computer programs)	e	Midterm(s)			Yes, adequately	criterion 3	75%	86%
9)	describe the broad nature of various engineering majors and the engineering profession and use this information to make appropriate career choices	f	Final Exam			Yes, adequately	criterion 3	75%	81%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

The only outcome almost not achieved was (4) which required students to apply derivatives to solve engineering problems. The first day of derivative applications, I was not able to teach class so I created an online activity with a worksheet. This section of class overwhelming did not complete the worksheet which I believe put them much further behind in comparison to the other sections. I believe this greatly hindered their ability to complete the exam questions used for the assessment.

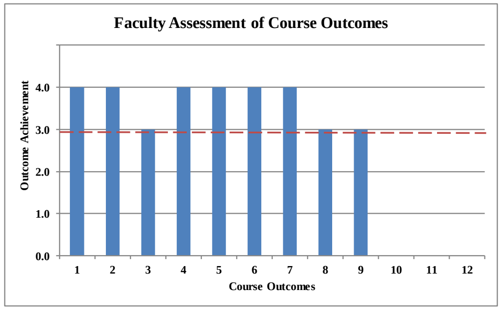
Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

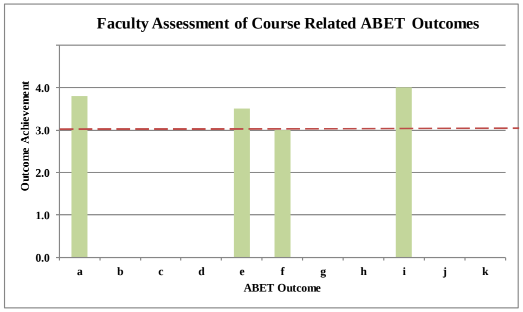
Faculty Assessment of Course - Fall 2017

Course: ENGR 12700 Analysis **Instructor:** Essig
Semester: Fall 2017 **Section:** 04 **Number of Students:** 21

Outcomes				Faculty Assessment					
			Tools Used			Course Outcome Achieved?	Criteria Used		
Course		ABET	1	2	3		criterion	Limit	Value
1)	formulate and solve engineering problems using linear and quadratic equations	a	Midterm(s)			Yes, strongly	criterion 3	75%	90%
2)	formulate and solve engineering problems using trigonometry in planar systems	a	Midterm(s)			Yes, strongly	criterion 3	75%	90%
3)	formulate and solve engineering problems using descriptive statistics	a	Final Exam			Yes, adequately	criterion 3	75%	86%
4)	formulate and solve engineering problems using derivatives	a	Final Exam			Yes, strongly	criterion 3	75%	90%
5)	formulate and solve engineering problems using systems of equations	a	Midterm(s)			Yes, strongly	criterion 3	75%	95%
6)	explain and apply appropriate study and success strategies, concepts & habits to be successful in an engineering major and exhibit the work ethic necessary to succeed in engineering	i	Midterm(s)			Yes, strongly	criterion 3	75%	90%
7)	solve and document the solution of problems involving different configurations	e	Memo(s)			Yes, strongly	criterion 3	75%	90%
8)	solve problems using multiple approaches (e.g., equations including varied analytic approaches, diagrams, formal solution steps or simple computer programs)	e	Midterm(s)			Yes, adequately	criterion 3	75%	86%
9)	describe the broad nature of various engineering majors and the engineering profession and use this information to make appropriate career choices	f	Final Exam			Yes, adequately	criterion 3	75%	86%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

Faculty Assessment of Course - Fall 2017

Course: ENGR 12700 Analysis **Instructor:** Essig
Semester: Fall 2017 **Section:** 05 **Number of Students:** 24

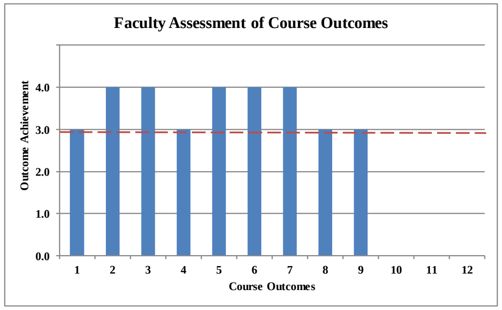
Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	formulate and solve engineering problems using linear and quadratic equations	a	Midterm(s)			Yes, adequately	criterion 3	75%	88%
2)	formulate and solve engineering problems using trigonometry in planar systems	a	Midterm(s)			Yes, strongly	criterion 3	75%	100%
3)	formulate and solve engineering problems using descriptive statistics	a	Final Exam			Yes, strongly	criterion 3	75%	92%
4)	formulate and solve engineering problems using derivatives	a	Final Exam			Yes, adequately	criterion 3	75%	79%
5)	formulate and solve engineering problems using systems of equations	a	Midterm(s)			Yes, strongly	criterion 3	75%	96%
6)	explain and apply appropriate study and success strategies, concepts & habits to be successful in an engineering major and exhibit the work ethic necessary to succeed in engineering	i	Midterm(s)			Yes, strongly	criterion 3	75%	92%
7)	solve and document the solution of problems involving different configurations	e	Memo(s)			Yes, strongly	criterion 3	75%	96%
8)	solve problems using multiple approaches (e.g., equations including varied analytic approaches, diagrams, formal solution steps or simple computer programs)	e	Midterm(s)			Yes, adequately	criterion 3	75%	79%
9)	describe the broad nature of various engineering majors and the engineering profession and use this information to make appropriate career choices	f	Final Exam			Yes, adequately	criterion 3	75%	88%

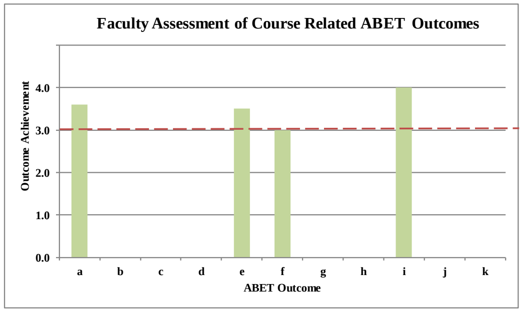
criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	

Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.



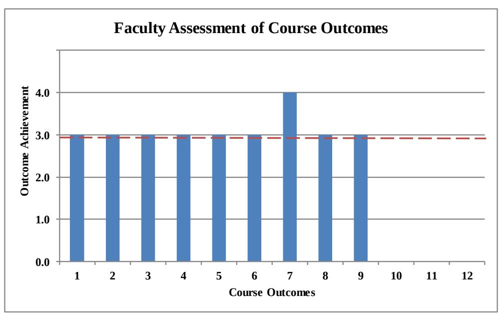


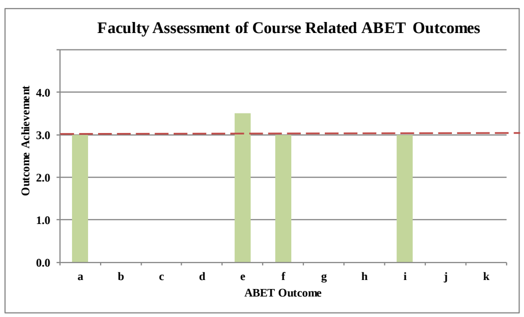
Faculty Assessment of Course - Fall 2017

Course: ENGR 12700 Analysis **Instructor:** Essig
Semester: Fall 2017 **Section:** 06 **Number of Students:** 21

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	formulate and solve engineering problems using linear and quadratic equations	a	Midterm(s)			Yes, adequately	criterion 3	75%	90%
2)	formulate and solve engineering problems using trigonometry in planar systems	a	Midterm(s)			Yes, adequately	criterion 3	75%	86%
3)	formulate and solve engineering problems using descriptive statistics	a	Final Exam			Yes, adequately	criterion 3	75%	76%
4)	formulate and solve engineering problems using derivatives	a	Final Exam			Yes, adequately	criterion 3	75%	76%
5)	formulate and solve engineering problems using systems of equations	a	Midterm(s)			Yes, adequately	criterion 3	75%	90%
6)	explain and apply appropriate study and success strategies, concepts & habits to be successful in an engineering major and exhibit the work ethic necessary to succeed in engineering	i	Midterm(s)			Yes, adequately	criterion 3	75%	90%
7)	solve and document the solution of problems involving different configurations	e	Memo(s)			Yes, strongly	criterion 3	75%	100%
8)	solve problems using multiple approaches (e.g., equations including varied analytic approaches, diagrams, formal solution steps or simple computer programs)	e	Midterm(s)			Yes, adequately	criterion 3	75%	86%
9)	describe the broad nature of various engineering majors and the engineering profession and use this information to make appropriate career choices	f	Final Exam			Yes, adequately	criterion 3	75%	86%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Note: two students were removed from analysis because they did not participate in the course starting 6 weeks into the course. The blank scores for 10 weeks were skewing the results and not portraying an accurate image of the grading situation.

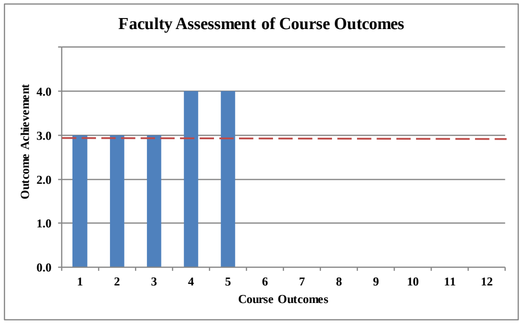
Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

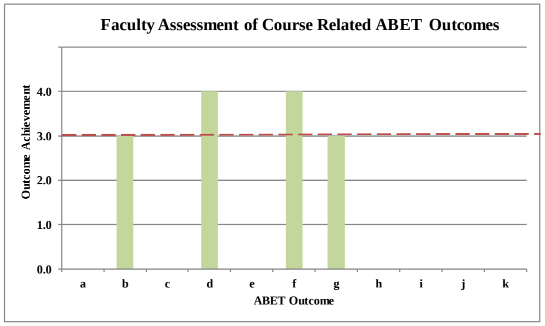
Faculty Assessment of Course -

Course: ENGR 12700 Project **Instructor:**
Semester: **Section:** 2 **Number of Students:** 23

Outcomes				Faculty Assessment					
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	plan and carry out a disciplined experimental study following a systematic project process of project planning and management	b	Memo(s)	Memo(s)	Memo(s)	Yes, adequately	criterion 1	75%	79%
2)	utilize appropriate analytical and computer tools in project work	b	Memo(s)	Memo(s)	Memo(s)	Yes, adequately	criterion 1	75%	79%
3)	communicate effectively using simple memos, properly formatted tables and properly formatted figures	g	Memo(s)	Memo(s)	Memo(s)	Yes, adequately	criterion 1	75%	79%
4)	identify and demonstrate the behaviors of an effective team member and/or leader, prepare a project schedule	d	Exercise(s)			Yes, strongly	criterion 1	75%	96%
5)	explain and apply the concepts of professional and ethical responsibility, evaluate ethical issues in engineering practice in terms of a Code of Ethics and apply to ethics as an engineering student	f	Exercise(s)	Exercise(s)		Yes, strongly	criterion 1	75%	95%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Previous comments:
A greater effort should be made to coordinate the material covered in the lab and studio. Moving the ethics unit to the beginning of the semester would allow the students more time to learn Excel and Autocad before the need to apply it in Studio.

DPD comments Fall 2017: I do not concur that there needs to be coordinated effort between lab and studio. Some coordination is nice - good but too much seems to be doing the same "thing" again in a different "class". Coordination is one manner to get "coaster" students to have some ownership & responsibility. This is best exemplified with velocity, projectile motion, & energy lab spreadsheets.

Higher expectation of graphics produces in studio is a good way to connect with CAD. Professional license topic is lacking. I added info. for this

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.
Some deliverable, not always graded though, should be required each studio session. Studio time seems not well spent by many groups and distractions abound with computer, phones/devices, & chatting. Some groups are eager to "run" out of studio given first opportunity - saying at times we will work on this later. This was most evident when students were to spend time writing or reviewing memos.

Impact of missing group members caused great problems. All electornic files should be shared with each group member at the end of each studio session.

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

The use of phones/devices during studio hinders effective use of time, hinders any attention.

Some individual assignments seems appropriate to deal with folks not pulling their own weight and to get more student buy-in.

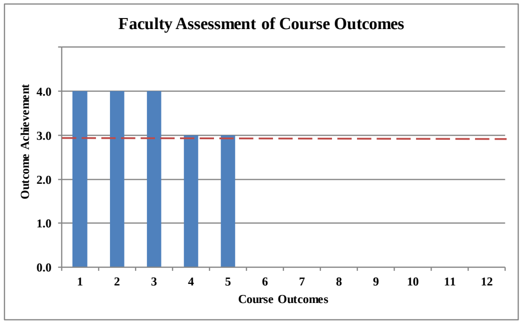
GANTT exercise is not meaningful - it is too easy, to open ended for any real assessment. It is fine as an intro. to topic. After the current exercise, use of GANTT for some campus or community project could be done outside of studio time or to be turned in next studio.

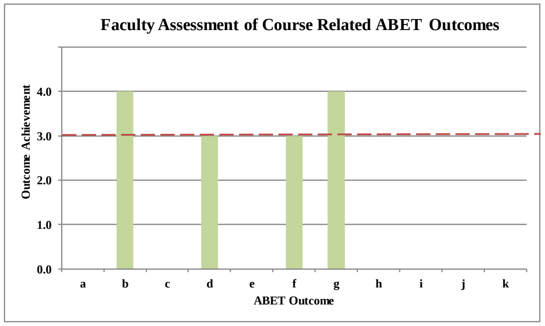
Faculty Assessment of Course - Fall 2017

Course: ENGR 12700 Project **Instructor:** Essig
Semester: Fall 2017 **Section:** 04 **Number of Students:** 21

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	plan and carry out a disciplined experimental study following a systematic project process of project planning and management	b	Memo(s)	Memo(s)	Memo(s)	Yes, strongly	criterion 3	75%	90%
2)	utilize appropriate analytical and computer tools in project work	b	Memo(s)	Memo(s)	Memo(s)	Yes, strongly	criterion 3	75%	90%
3)	communicate effectively using simple memos, properly formatted tables and properly formatted figures	g	Memo(s)	Memo(s)	Memo(s)	Yes, strongly	criterion 3	75%	90%
4)	identify and demonstrate the behaviors of an effective team member and/or leader, prepare a project schedule	d	Exercise(s)			Yes, adequately	criterion 3	75%	86%
5)	explain and apply the concepts of professional and ethical responsibility, evaluate ethical issues in engineering practice in terms of a Code of Ethics and apply to ethics as an engineering student	f	Exercise(s)	Exercise(s)		Yes, adequately	criterion 3	75%	86%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

A greater effort should be made to coordinate the material covered in the lab and studio. Moving the ethics unit to the beginning of the semester would allow the students more time to learn Excel and Autocad before the need to apply it in Studio.

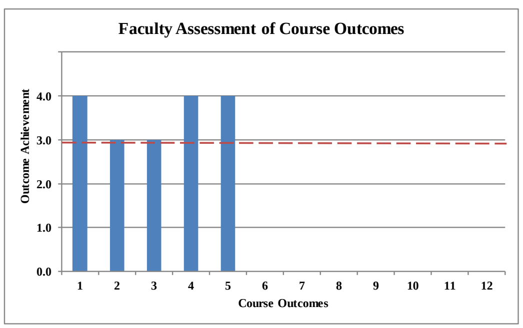
Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

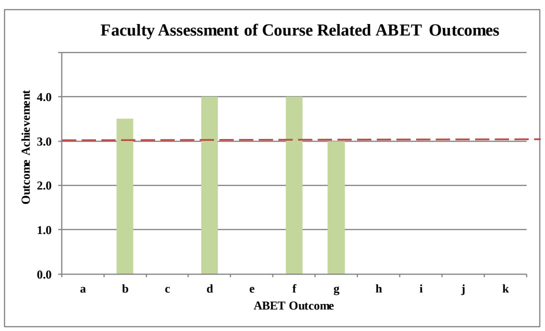
Faculty Assessment of Course - Fall 2017

Course: ENGR 12700 Project **Instructor:** Essig
Semester: Fall 2017 **Section:** 05 **Number of Students:** 23

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	plan and carry out a disciplined experimental study following a systematic project process of project planning and management	b	Memo(s)	Memo(s)	Memo(s)	Yes, strongly	criterion 3	75%	100%
2)	utilize appropriate analytical and computer tools in project work	b	Memo(s)	Memo(s)	Memo(s)	Yes, adequately	criterion 3	75%	83%
3)	communicate effectively using simple memos, properly formatted tables and properly formatted figures	g	Memo(s)	Memo(s)	Memo(s)	Yes, adequately	criterion 3	75%	83%
4)	identify and demonstrate the behaviors of an effective team member and/or leader, prepare a project schedule	d	Exercise(s)			Yes, strongly	criterion 3	75%	100%
5)	explain and apply the concepts of professional and ethical responsibility, evaluate ethical issues in engineering practice in terms of a Code of Ethics and apply to ethics as an engineering student	f	Exercise(s)	Exercise(s)		Yes, strongly	criterion 3	75%	96%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

A greater effort should be made to coordinate the material covered in the lab and studio. Moving the ethics unit to the beginning of the semester would allow the students more time to learn Excel and Autocad before the need to apply it in Studio.

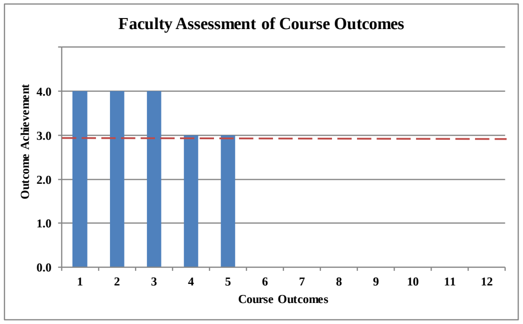
Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

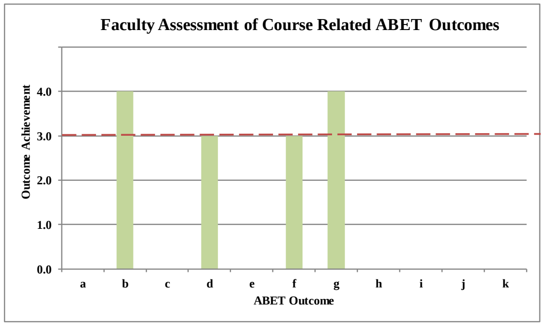
Faculty Assessment of Course - Fall 2017

Course: ENGR 12700 Project **Instructor:** Essig
Semester: Fall 2017 **Section:** 06 **Number of Students:** 20

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	plan and carry out a disciplined experimental study following a systematic project process of project planning and management	b	Memo(s)	Memo(s)	Memo(s)	Yes, strongly	criterion 3	75%	95%
2)	utilize appropriate analytical and computer tools in project work	b	Memo(s)	Memo(s)	Memo(s)	Yes, strongly	criterion 3	75%	95%
3)	communicate effectively using simple memos, properly formatted tables and properly formatted figures	g	Memo(s)	Memo(s)	Memo(s)	Yes, strongly	criterion 3	75%	95%
4)	identify and demonstrate the behaviors of an effective team member and/or leader, prepare a project schedule	d	Exercise(s)			Yes, adequately	criterion 3	75%	80%
5)	explain and apply the concepts of professional and ethical responsibility, evaluate ethical issues in engineering practice in terms of a Code of Ethics and apply to ethics as an engineering student	f	Exercise(s)	Exercise(s)		Yes, adequately	criterion 3	75%	85%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

A greater effort should be made to coordinate the material covered in the lab and studio. Moving the ethics unit to the beginning of the semester would allow the students more time to learn Excel and Autocad before the need to apply it in Studio.

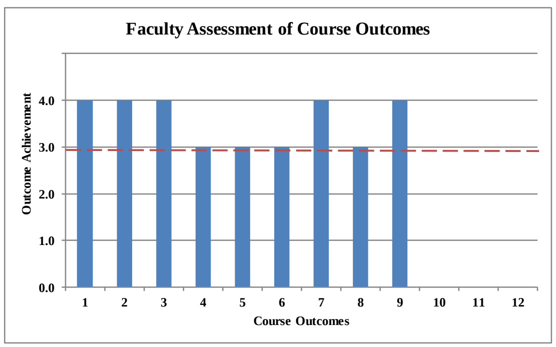
Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

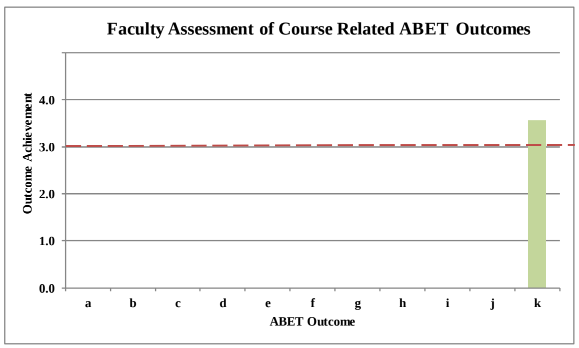
Faculty Assessment of Course - Fall 2017

Course: ENGR 12700 01-Computer
Semester: Fall 2017 **Section:** 1
Instructor:
Number of Students: ıctical final exam 20

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	represent a physical object in single-view and multi-view orthographic projections	k	Final Exam			Yes, strongly	criterion 1	75%	91%
2)	dimension parts according to convention	k	Final Exam			Yes, strongly	criterion 1	75%	89%
3)	create pictorial (isometric) representations of a physical	k	Homework			Yes, strongly	criterion 1	75%	96%
4)	create and use drawings and diagrams to solve a problem and to document its solution	k	Final Exam			Yes, adequately	criterion 1	75%	69%
5)	set up and use a spreadsheet to carry out repetitive calculations using formula	k	Final Exam			Yes, adequately	criterion 1	75%	58%
6)	explain and use appropriate spreadheet functions in solving engineering problems	k	Final Exam			Yes, adequately	criterion 1	75%	58%
7)	calculate and use descriptive statistics and plot histograms	k	Homework			Yes, strongly	criterion 1	75%	93%
8)	produce and use clear and effective computer graphs	k	Final Exam			Yes, adequately	criterion 1	75%	82%
9)	clearly format a spreadsheet calculation to communicate a problem solution	k	Final Exam			Yes, strongly	criterion 1	75%	100%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Some students might benefit from a text book that includes information on CAD and spreadsheet tools. However, the abundance of resources available on the Internet, not the least of which are many videos on YouTube, negates the impact of a text book, even more so considering the cost-benefit of a text book.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Much of the lab can occur on a self-study, self-directed basis, particularly with detailed instruction sheets - assignment sheets. Consideration to in-class assignments is important so it is known that students are doing the work themselves rather than copy & sharing electronic files. Much of the CAD seems to be too easy for most students, several have basic CAD skills prior to class. Many students attempt to complete assignemnts but do NOT read through sheet and most of the time can earn most if not all credit.

The varying levels of student skills causes difficulty in class with students who know already what is being done or pick info. up rapidly to the few who do not follow class-lab instruction or directions and need special, individual attention to follow keystrokes in order to achieve desired CAD or spreadsheet result .

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

Consideration of student portfolio. Also, submission of assignments in electronic form, not to grade, but to keep record of student work and to evaluated copy work of other students.

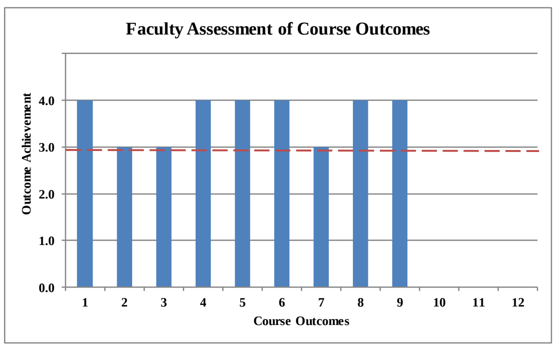
Simpler spreadsheets and CAD drawings could be self-checked or peer checked, likely much during lab session. More rigorous & challenging spreadsheet and CAD drawings could be made for assignments.

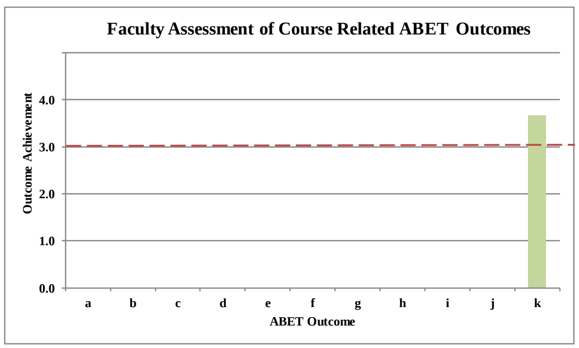
Faculty Assessment of Course - Fall 2017

Course: ENGR 12700 01-Computer
Semester: Fall 2017
Section: 02 and 03
Instructor:
Number of Students: 23/23

	Outcomes		Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	represent a physical object in single-view and multi-view orthographic projections	k	Final Exam	Homework		Yes, strongly	criterion 1	**75%**	85%
2)	dimension parts according to convention	k	Final Exam	Homework		Yes, adequately	criterion 1	**75%**	75%
3)	create pictorial (isometric) representations of a physical	k	Homework			Yes, adequately	criterion 1	**75%**	80%
4)	create and use drawings and diagrams to solve a problem and to document its solution	k	Final Exam	Homework		Yes, strongly	criterion 1	**75%**	88%
5)	set up and use a spreadsheet to carry out repetitive calculations using formula	k	Final Exam	Homework		Yes, strongly	criterion 1	**75%**	87%
6)	explain and use appropriate spreadheet functions in solving engineering problems	k	Final Exam	Homework		Yes, strongly	criterion 1	**75%**	85%
7)	calculate and use descriptive statistics and plot histograms	k	Homework	Homework		Yes, adequately	criterion 1	**75%**	89%*
8)	produce and use clear and effective computer graphs	k	Final Exam	Homework		Yes, strongly	criterion 1	**75%**	87%
9)	clearly format a spreadsheet calculation to communicate a problem solution	k	Final Exam	Homework		Yes, strongly	criterion 1	**75%**	86%

criterion 1: The average of students in the assessment tool is equal to or greater than	**75%**
criterion 2: The percentage of students with grade 70 or more is at least equal to	**70%**
criterion 3: The percentage of students passing the assessment tool is greater than	**75%**
criterion 4: The average grade of students passing the assessment tool is at least equal to	**75%**
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Students would benefit from a text book that includes information on CAD and spreadsheet tools.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Some students did not submit all of the homework; these students did rather poorly on the final exam.

The reason that I indicated YES, ADEQUATELY for statistics is that it was not assessed on the final exam. It was assessed using only one homework assignment.

Most items were assessed using specific questions on the final exam and specific homework assignments.

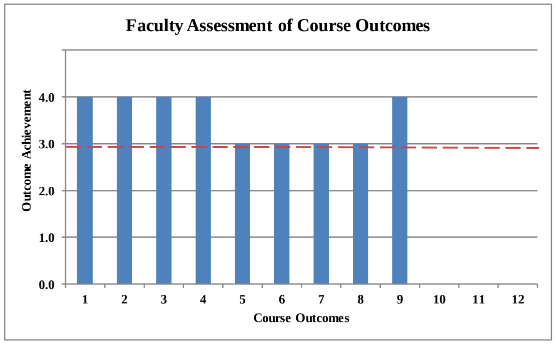
Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

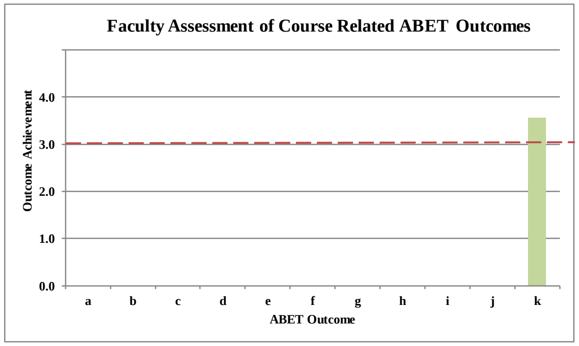
Faculty Assessment of Course - Fall 2017

Course: ENGR 12700 04-Computer **Instructor:**
Semester: Fall 2017 **Section:** 4 - Lab **Number of Students:** 19

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	represent a physical object in single-view and multi-view orthographic projections	k	Final Exam			Yes, strongly	criterion 1	75%	94%
2)	dimension parts according to convention	k	Final Exam			Yes, strongly	criterion 1	75%	88%
3)	create pictorial (isometric) representations of a physical	k	Homework			Yes, strongly	criterion 1	75%	97%
4)	create and use drawings and diagrams to solve a problem and to document its solution	k	Final Exam			Yes, strongly	criterion 1	75%	97%
5)	set up and use a spreadsheet to carry out repetitive calculations using formula	k	Final Exam			Yes, adequately	criterion 1	75%	78%
6)	explain and use appropriate spreadsheet functions in solving engineering problems	k	Final Exam			Yes, adequately	criterion 1	75%	78%
7)	calculate and use descriptive statistics and plot histograms	k	Homework			Yes, adequately	criterion 1	75%	83%
8)	produce and use clear and effective computer graphs	k	Final Exam			Yes, adequately	criterion 1	75%	83%
9)	clearly format a spreadsheet calculation to communicate a problem solution	k	Final Exam			Yes, strongly	criterion 1	75%	93%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Some students might benefit from a text book that includes information on CAD and spreadsheet tools. However, the abundance of resources available on the Internet, not the least of which are many videos on YouTube, negates the impact of a text book, even more so considering the cost-benefit of a text book.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Much of the lab can occur on a self-study, self-directed basis, particularly with detailed instruction sheets - assignment sheets. Consideration to in-class assignments is important so it is known that students are doing the work themselves rather than copy & sharing electronic files. Much of the CAD seems to be too easy for most students, several have basic CAD skills prior to class. Many students attempt to complete assignemnts but do NOT read through sheet and most of the time can earn most if not all credit.

The varying levels of student skills causes difficulty in class with students who know already what is being done or pick info. up rapidly to the few who do not follow class-lab instruction or directions and need special, individual attention to follow keystrokes in order to achieve desired CAD or spreadsheet result .

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

Consideration of student portfolio. Also, submission of assignments in electronic form, not to grade, but to keep record of student work and to evaluated copy work of other students.

Simpler spreadsheets and CAD drawings could be self-checked or peer checked, likely much during lab session. More rigorous & challenging spreadsheet and CAD drawings could be made for assignments.

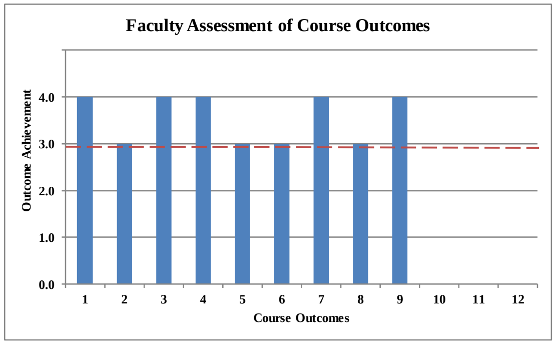
Faculty Assessment of Course -

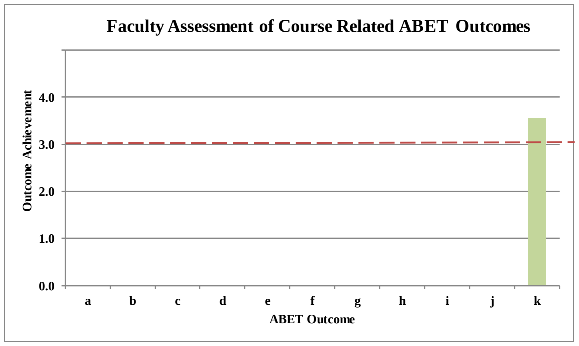
Course: ENGR 12700 05-Computer **Instructor:**

Semester: **Section:** 5 - Lab **Number of Students:** 23

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	represent a physical object in single-view and multi-view orthographic projections	k	Final Exam			Yes, strongly	criterion 1	**75%**	84%
2)	dimension parts according to convention	k	Final Exam			Yes, adequately	criterion 3	**75%**	75%
3)	create pictorial (isometric) representations of a physical	k	Homework			Yes, strongly	criterion 1	**75%**	100%
4)	create and use drawings and diagrams to solve a problem and to document its solution	k	Final Exam			Yes, strongly	criterion 1	**75%**	92%
5)	set up and use a spreadsheet to carry out repetitive calculations using formula	k	Final Exam			Yes, adequately	criterion 1	**75%**	77%
6)	explain and use appropriate spreadheet functions in solving engineering problems	k	Final Exam			Yes, adequately	criterion 1	**75%**	77%
7)	calculate and use descriptive statistics and plot histograms	k	Homework			Yes, strongly	criterion 1	**75%**	85%
8)	produce and use clear and effective computer graphs	k	Final Exam			Yes, adequately	criterion 1	**75%**	78%
9)	clearly format a spreadsheet calculation to communicate a problem solution	k	Final Exam			Yes, strongly	criterion 1	**75%**	96%

criterion 1: The average of students in the assessment tool is equal to or greater than	**75%**
criterion 2: The percentage of students with grade 70 or more is at least equal to	**70%**
criterion 3: The percentage of students passing the assessment tool is greater than	**75%**
criterion 4: The average grade of students passing the assessment tool is at least equal to	**75%**
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Some students might benefit from a text book that includes information on CAD and spreadsheet tools. However, the abundance of resources available on the Internet, not the least of which are many videos on YouTube, negates the impact of a text book, even more so considering the cost-benefit of a text book.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Much of the lab can occur on a self-study, self-directed basis, particularly with detailed instruction sheets - assignment sheets. Consideration to in-class assignments is important so it is known that students are doing the work themselves rather than copy & sharing electronic files. Much of the CAD seems to be too easy for most students, several have basic CAD skills prior to class. Many students attempt to complete assignemnts but do NOT read through sheet and most of the time can earn most if not all credit.

The varying levels of student skills causes difficulty in class with students who know already what is being done or pick info. up rapidly to the few who do not follow class-lab instruction or directions and need special, individual attention to follow keystrokes in order to achieve desired CAD or spreadsheet result .

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

Consideration of student portfolio. Also, submission of assignments in electronic form, not to grade, but to keep record of student work and to evaluated copy work of other students.

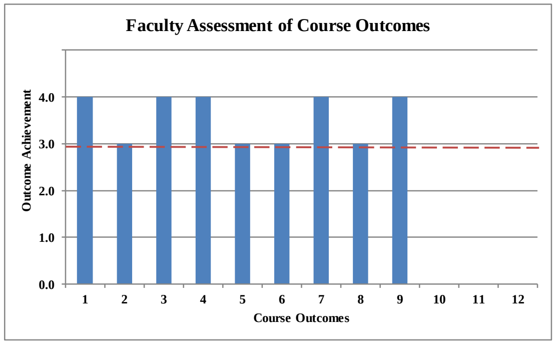
Simpler spreadsheets and CAD drawings could be self-checked or peer checked, likely much during lab session. More rigorous & challenging spreadsheet and CAD drawings could be made for assignments.

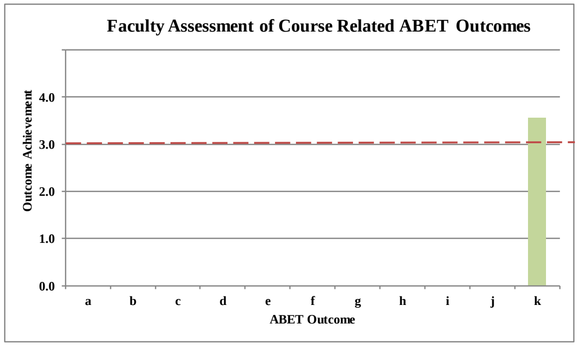
Faculty Assessment of Course - Fall 2017

Course: ENGR 12700 06-Computer **Instructor:**
Semester: Fall 2017 **Section:** 6 - Lab **Number of Students:** 20

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	represent a physical object in single-view and multi-view orthographic projections	k	Final Exam			Yes, strongly	criterion 1	75%	87%
2)	dimension parts according to convention	k	Final Exam			Yes, adequately	criterion 1	75%	73%
3)	create pictorial (isometric) representations of a physical	k	Homework			Yes, strongly	criterion 1	75%	100%
4)	create and use drawings and diagrams to solve a problem and to document its solution	k	Final Exam			Yes, strongly	criterion 1	75%	89%
5)	set up and use a spreadsheet to carry out repetitive calculations using formula	k	Final Exam			Yes, adequately	criterion 1	75%	81%
6)	explain and use appropriate spreadsheet functions in solving engineering problems	k	Final Exam			Yes, adequately	criterion 1	75%	81%
7)	calculate and use descriptive statistics and plot histograms	k	Homework			Yes, strongly	criterion 1	75%	96%
8)	produce and use clear and effective computer graphs	k	Final Exam			Yes, adequately	criterion 1	75%	73%
9)	clearly format a spreadsheet calculation to communicate a problem solution	k	Final Exam			Yes, strongly	criterion 1	75%	93%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Some students might benefit from a text book that includes information on CAD and spreadsheet tools. However, the abundance of resources available on the Internet, not the least of which are many videos on YouTube, negates the impact of a text book, even more so considering the cost-benefit of a text book.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Much of the lab can occur on a self-study, self-directed basis, particularly with detailed instruction sheets - assignment sheets. Consideration to in-class assignments is important so it is known that students are doing the work themselves rather than copy & sharing electronic files. Much of the CAD seems to be too easy for most students, several have basic CAD skills prior to class. Many students attempt to complete assignemnts but do NOT read through sheet and most of the time can earn most if not all credit.

The varying levels of student skills causes difficulty in class with students who know already what is being done or pick info. up rapidly to the few who do not follow class-lab instruction or directions and need special, individual attention to follow keystrokes in order to achieve desired CAD or spreadsheet result .

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

Consideration of student portfolio. Also, submission of assignments in electronic form, not to grade, but to keep record of student work and to evaluated copy work of other students.

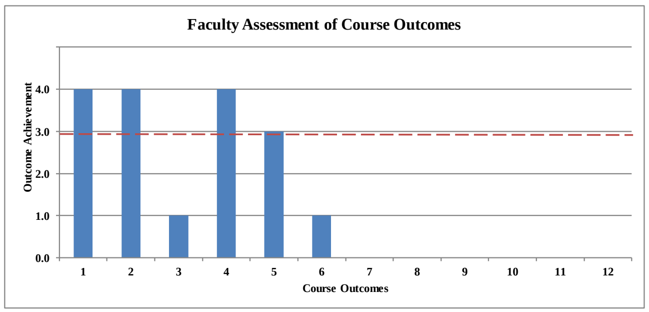
Simpler spreadsheets and CAD drawings could be self-checked or peer checked, likely much during lab session. More rigorous & challenging spreadsheet and CAD drawings could be made for assignments.

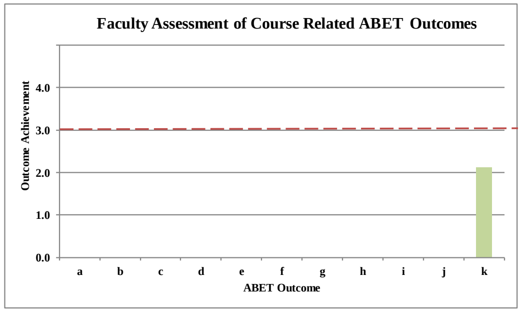
Faculty Assessment of Course - Spring 2018

Course: ENGR 12800 - Lecture
Semester: Spring 2018
Section: 01 - 02 - 03 -04
Instructor: carlos pomalaza-raez
Number of Students: 91

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	formulate and solve engineering problems using complex numbers	a	Midterm(s)	Homework	Exercise(s)	Yes, strongly	criterion 2	70%	
2)	formulate and solve engineering problems using sign waves & frequency	a	Midterm(s)	Homework	Exercise(s)	Yes, strongly	criterion 2	70%	
3)	formulate and solve engineering problems using integration	a	Midterm(s)	Final Exam	Homework	No	criterion 2	70%	
4)	formulate and solve engineering problems using Boolean Logic	a	Midterm(s)	Homework	Exercise(s)	Yes, strongly	criterion 2	70%	
5)	formulate and solve engineering problems using log graphing and transformations	a	Homework	Exercise(s)		Yes, adequately	criterion 2	70%	
6)	formulate and solve engineering problems using simple differential equations	a	Final Exam	Homework	Exercise(s)	No	criterion 2	70%	

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

1) Students had lots of difficulty with integration of discontinous functions , i.e. one that has segments, each defined by a different function. Extensive coverage of this type of integration was carried out during the lecture, homework, midterm exam and final exam, still less that 70% students could get it right.

2) Students had difficulty with second order differential equations, in particular using the initial conditions to determine the unknow constants of the general solution. Once the function is determined they also have difficulty in using the solution to answer further questions about the sytem that the solution function is modeling.

3) As the semester went on studens attended less and less the lectures and didn't do the homework.

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

1) Students attendance went down hill the second half of the semester which contributed a lot to their underperformance in the topics mentioned in (1) and (2) above.

2) Perhaps random 10 minutes quizzes to sharpen their attention and attendance has to be introduced to improve their focus on important topics such as integration.

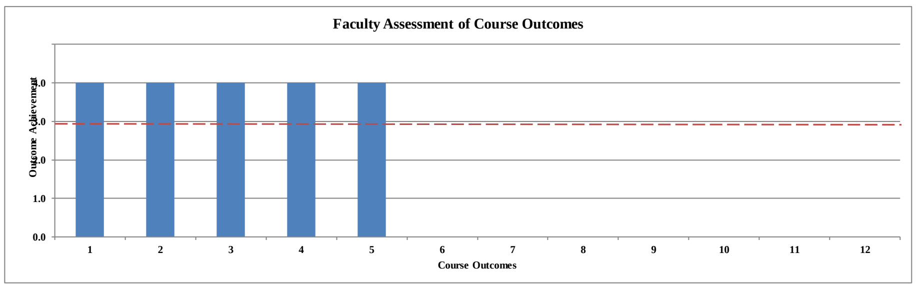
3) Not directly related to the lectures but there were several students (more than just a few) that missed studio and in particular lab reports which impacted severely on their final grade.

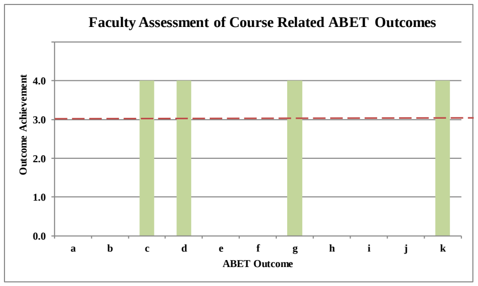
Faculty Assessment of Course - Spring 2018

Course: ENGR 12800 - Studio
Semester: Spring 2018
Section: 01
Instructor: Moor
Number of Students: 24

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	plan and carry out a disciplined design project following a systematic design process	c	Final Project Report	Project(s)		Yes, strongly	criterion 2	70%	100%
2)	utilize appropriate analytical and computer tools in project work	k	Initial Project Memo	Memo(s)		Yes, strongly	criterion 2	70%	88%
3)	write a precise and effective Technical Report Memo. Write clear Abstract, Methodology, Recommendations, and Conclusions sections	g	Final Project Report			Yes, strongly	criterion 2	70%	100%
4)	prepare and deliver an effective oral technical presentation	g	Final Project Report			Yes, strongly	criterion 2	70%	100%
5)	organize an effective team including setting ground rules, project planning, and task management; explain and utilize effective group processes	d	Initial Project Memo			Yes, strongly	criterion 2	70%	100%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

See comments for section 02

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

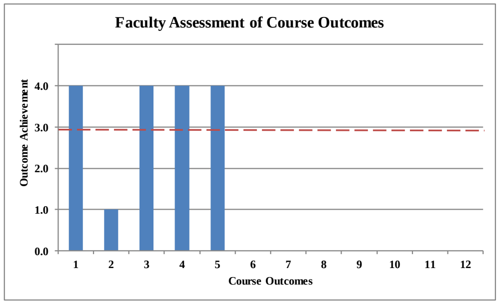
See comments for section 02

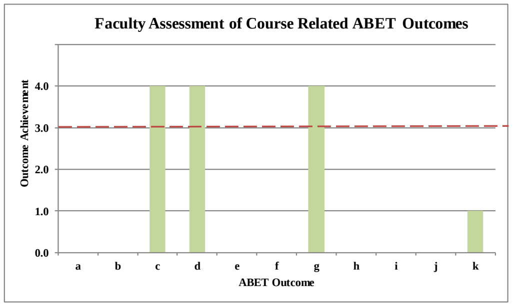
Faculty Assessment of Course - Spring 2018

Course: ENGR 12800 - Studio
Semester: Spring 2018
Section: 02
Instructor: Moor
Number of Students: 23

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	plan and carry out a disciplined design project following a systematic design process	c	Final Project Report	Project(s)		Yes, strongly	criterion 2	70%	83%
2)	utilize appropriate analytical and computer tools in project work	k	Others	Memo(s)		No	criterion 2	70%	65%
3)	write a precise and effective Technical Report Memo. Write clear Abstract, Methodology, Recommendations, and Conclusions sections	g	Final Project Report			Yes, strongly	criterion 2	70%	100%
4)	prepare and deliver an effective oral technical presentation	g	Final Project Report			Yes, strongly	criterion 2	70%	100%
5)	organize an effective team including setting ground rules, project planning, and task management; explain and utilize effective group processes	d	Initial Project Memo			Yes, strongly	criterion 2	70%	87%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Students did well with the simple assignments illustrating class content.

They had some struggles with the design process that could be smoothed out.

I have some concern that few of the objectives can be evaluated individually, we may need to look at ways to provide more individual accounability.

The workload in some weeks was a bit high (for both student and instructor).

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

Below are preliminary suggestions based on sections 01 and 02 my assessment only. They need to be evaluated and revised in the light of the other sections and student assessment.

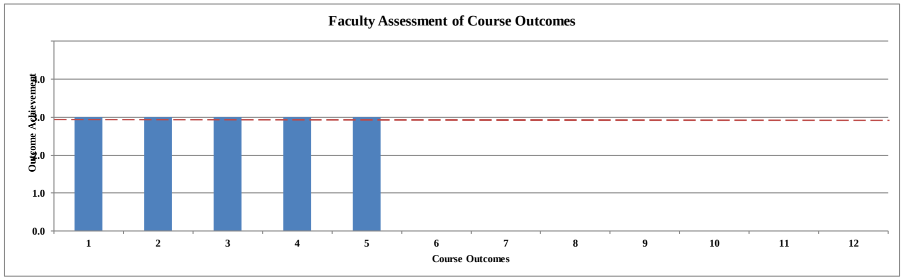
Where possible simplify requirments particularly:
1. avoid two memos due in a single week. Including considering alternating weeks between design project and class activities rather than doing both the same week.
2. consider some simplifications to the design process that don't fit the specific project well.
3. If possible give more time for design project

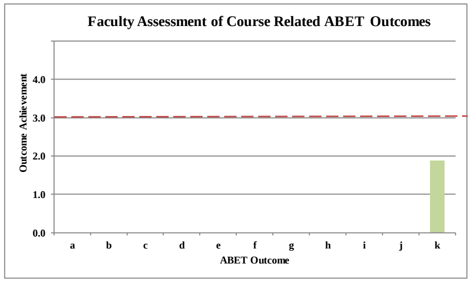
Faculty Assessment of Course - Spring 2018

Course: ENGR 12800 - Studio
Semester: Spring 2018
Section: 3
Instructor: Dave Devine
Number of Students: 21

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome	Criteria Used		
	Course	ABET	1	2	3	Achieved?	criterion	Limit	Value
1)	plan and carry out a disciplined design project following a systematic design process	c	Project(s)			Yes, adequately	criterion 1	75%	80.95
2)	utilize appropriate analytical and computer tools in project work	k	Lab Report(s)			Yes, adequately	criterion 1	75%	80.95
3)	write a precise and effective Technical Report Memo. Write clear Abstract, Methodology, Recommendations, and Conclusions sections	g	Memo(s)	Final Project Report		Yes, adequately	criterion 2	70%	71.43
4)	prepare and deliver an effective oral technical presentation	g	Presentation(s)			Yes, adequately	criterion 1	75%	90.48
5)	organize an effective team including setting ground rules, project planning, and task management; explain and utilize effective group processes	d	Project(s)			Yes, adequately	criterion 1	75%	80.95

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Some deliverable seems appropriate during studio for each studio week, otherwise student efforts are off task and "we are meeting .... to finish"

students need to share all files each and every week, particularly early in the semester when drops occur, two students who "had the files" dropped during the term or at least did not show up for lab anymore

more detail to rubrics would permit more critical grading

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Keeping students "on task" during studio is an ongoing challenge

going through engineering process is seemingly an outcome that is appropriate also

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

having students explain what occurs in a circuit seems not the point as much as data gathering and processing, what values include error, what values do not? Some reports stated "error" occurred with Multisim.

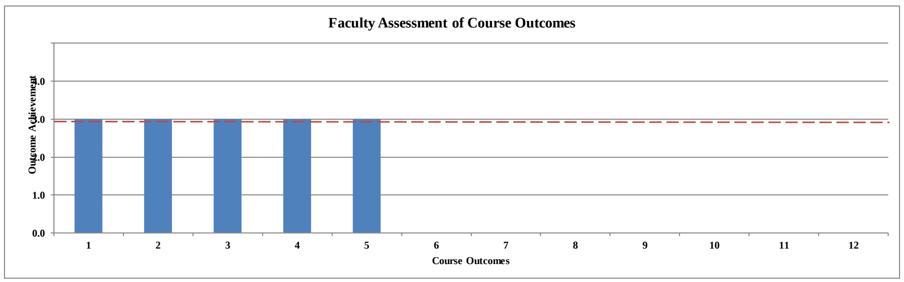
Faculty Assessment of Course - Spring 2018

Course: ENGR 12800 - Studio
Semester: Spring 2018
Section: 4
Instructor: Dave Devine
Number of Students: 24

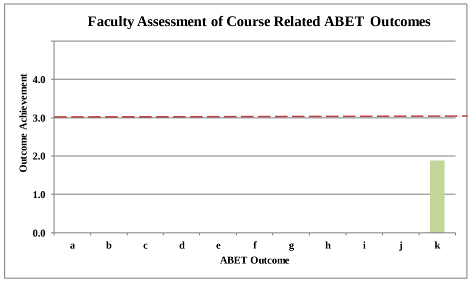
Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	plan and carry out a disciplined design project following a systematic design process	c	Project(s)			Yes, adequately	criterion 1	75%	91.67
2)	utilize appropriate analytical and computer tools in project work	k	Lab Report(s)			Yes, adequately	criterion 1	75%	83.33
3)	write a precise and effective Technical Report Memo. Write clear Abstract, Methodology, Recommendations, and Conclusions sections	g	Memo(s)	Final Project Report		Yes, adequately	criterion 1	75%	91.67
4)	prepare and deliver an effective oral technical presentation	g	Presentation(s)			Yes, adequately	criterion 1	75%	91.67
5)	organize an effective team including setting ground rules, project planning, and task management; explain and utilize effective group processes	d	Project(s)			Yes, adequately	criterion 1	75%	91.67

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	

Faculty Assessment of Course Outcomes



Faculty Assessment of Course Related ABET Outcomes



Instructor comments on recommendation from previous assessment of the course.

Some deliverable seems appropriate during studio for each studio week, otherwise student efforts are off task and "we are meeting .... to finish"

students need to share all files each and every week, particularly early in the semester when drops occur, two students who "had the files" dropped during the term or at least did not show up for lab anymore

more detail to rubrics would permit more critical grading

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

One group, a group of two students, did not work well together and ended up with efforts of just one student, the other student stood silent during the presentation.

Keeping students "on task" during studio is an ongoing challenge

going through engineering process is seemingly an outcome that is appropriate also

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

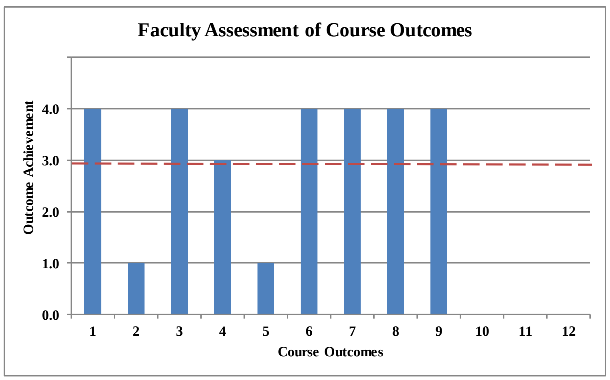
having students explain what occurs in a circuit seems not the point as much as data gathering and processing, what values include error, what values do not? Some reports stated "error" occurred with Multisim.

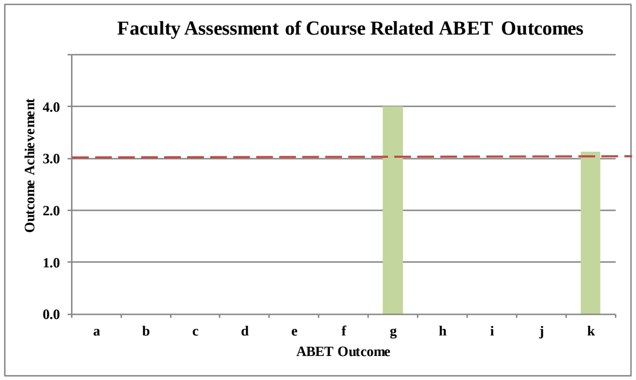
Faculty Assessment of Course - Spring 2018

Course: ENGR 12800 - Lab
Semester: Spring 2018
Section: 02
Instructor: Moor
Number of Students: 22

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	solve engineering problems using computer tools	k	Final Exam			Yes, strongly	criterion 2	65%	81%
2)	apply arrays and array manipulations	k	Final Exam			No	criterion 2	65%	57%
3)	use and explain text variables and ASCII text files	k	Final Exam			Yes, strongly	criterion 2	65%	86%
4)	write a function with multiple inputs and outputs at the command line	k	Final Exam			Yes, adequately	criterion 2	65%	71%
5)	write a function that results in a non-numerical output	k	Final Exam			No	criterion 2	65%	62%
6)	write programs using logical expressions and conditional statements	k	Final Exam			Yes, strongly	criterion 2	65%	90%
7)	write programs using loop structures	k	Final Exam			Yes, strongly	criterion 2	65%	81%
8)	fit data that follows linear, exponential, and power law forms	k	Final Exam			Yes, strongly	criterion 2	65%	81%
9)	properly communicate a solution based on a computer calculation or program	g	Final Exam			Yes, strongly	criterion 2	65%	86%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	65%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

I recommend simplifying the lab activities in order to help with student confusion. The current labs not only required students to figure out the new coding method, but also introduced students to science and engineering concepts they haven't seen before. I recommend simplifying down the complexity of the problems in order to allow students to focus more on learning the coding practices.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

We have continued to work on scafolding and focusing the classes on the goals including simplfying where appropriate as suggested from the previous semester.

This semester student completing and turning in of program assignments was significantly worse that in previous semesters where I have taught this computer lab. I am not sure of the reason for this. I will be focused on watching this and asking students about this problem in upcomming semesters.

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

The following recommendations are based on my assessment of sections 02 and 04. They are tentitive with out the benifit of the other sections and the students' assessment.
Continuing the efforts to improve this lab in scalfolding, resources and focus should continue.
The lab team should consider
1. Revising the first lab to focus more on MATLAB coding. The resistance network examples that are used are good but are not leaving enough time for the code. This change will affect other components of the course and will need to be corrdinated with the entire 128 team.
2. I would suggest a simple schedule change of reversing the order of lab 3: Intro to Functions

Faculty Assessment of Course - Spring 2018

Course: ENGR 12800 - Lab **Instructor:** S Moor
Semester: Spring 2018 **Section:** 04 **Number of Students:** 20

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	solve engineering problems using computer tools	k	Final Exam			Yes, strongly	criterion 2	65%	75%
2)	apply arrays and array manipulations	k	Final Exam			No	criterion 2	65%	45%
3)	use and explain text variables and ASCII text files	k	Final Exam			Yes, adequately	criterion 2	65%	65%
4)	write a function with multiple inputs and outputs at the command line	k	Final Exam			Yes, adequately	criterion 2	65%	65%
5)	write a function that results in a non-numerical output	k	Final Exam			Yes, adequately	criterion 2	65%	65%
6)	write programs using logical expressions and conditional statements	k	Final Exam			Yes, adequately	criterion 2	65%	75%
7)	write programs using loop structures	k	Final Exam			No	criterion 2	65%	60%
8)	fit data that follows linear, exponential, and power law forms	k	Final Exam			Yes, adequately	criterion 2	65%	76%
9)	properly communicate a solution based on a computer calculation or program	g	Final Exam			Yes, adequately	criterion 2	65%	76%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	65%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	

Instructor comments on recommendation from previous assessment of the course.

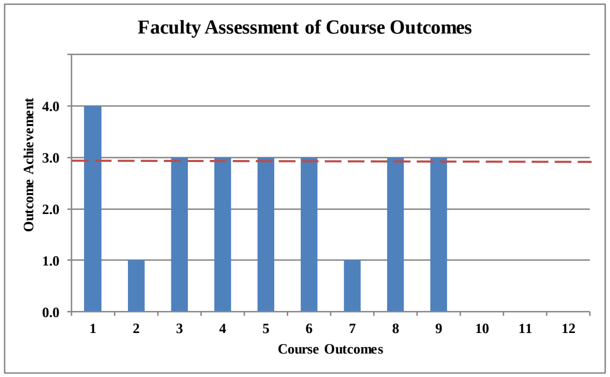
I recommend simplifying the lab activities in order to help with student confusion. The current labs not only required students to figure out the new coding method, but also introduced students to science and engineering concepts they haven't seen before. I recommend simplifying down the complexity of the problems in order to allow students to focus more on learning the coding practices.

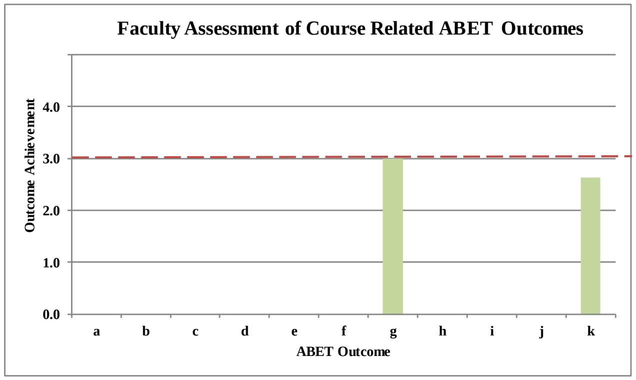
Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

See comments with assessment for section 02

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

See comments with assessment for section 02

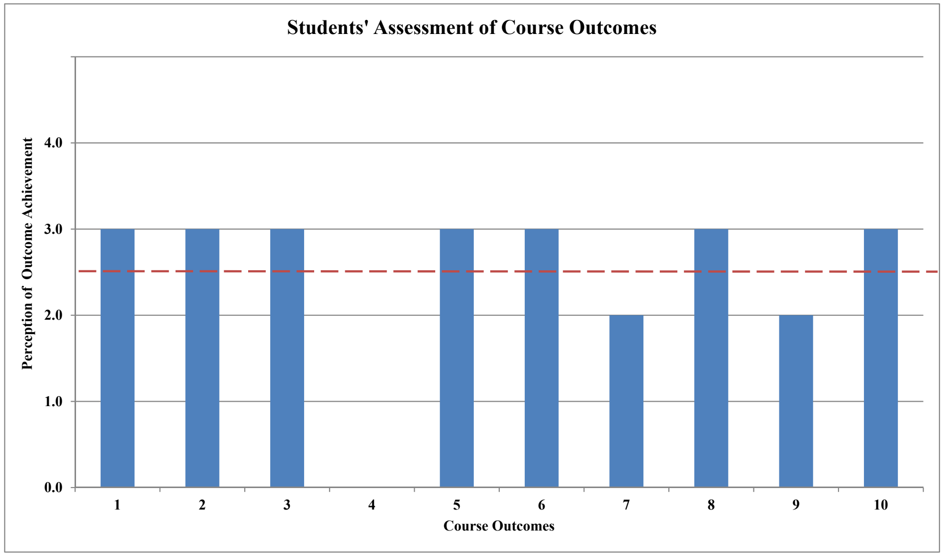


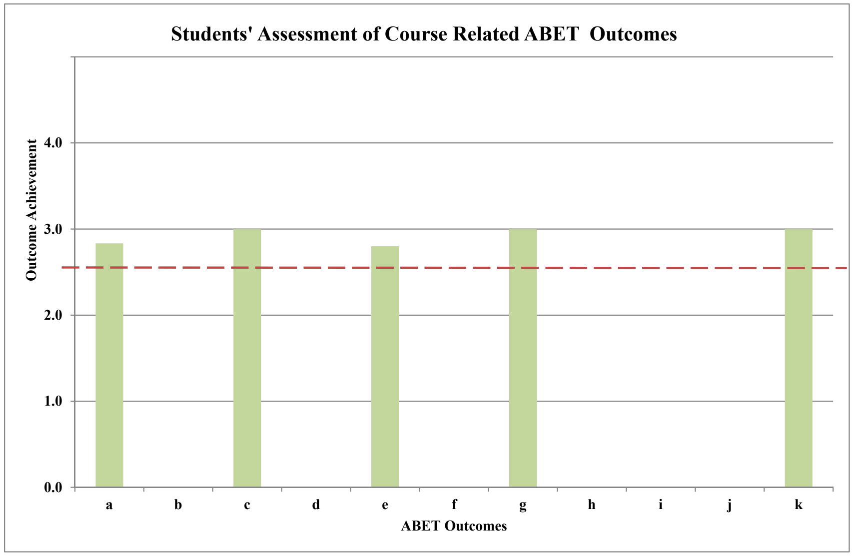


Appendix A-8: Student Assessment Results

Students Assessment of Course - SPRING 2018

Course: CE 25200 Strength of Materials
Instructor: NJOCKLIBII
Semester: SPRING 2018
Section: 1
Number of Students: 4

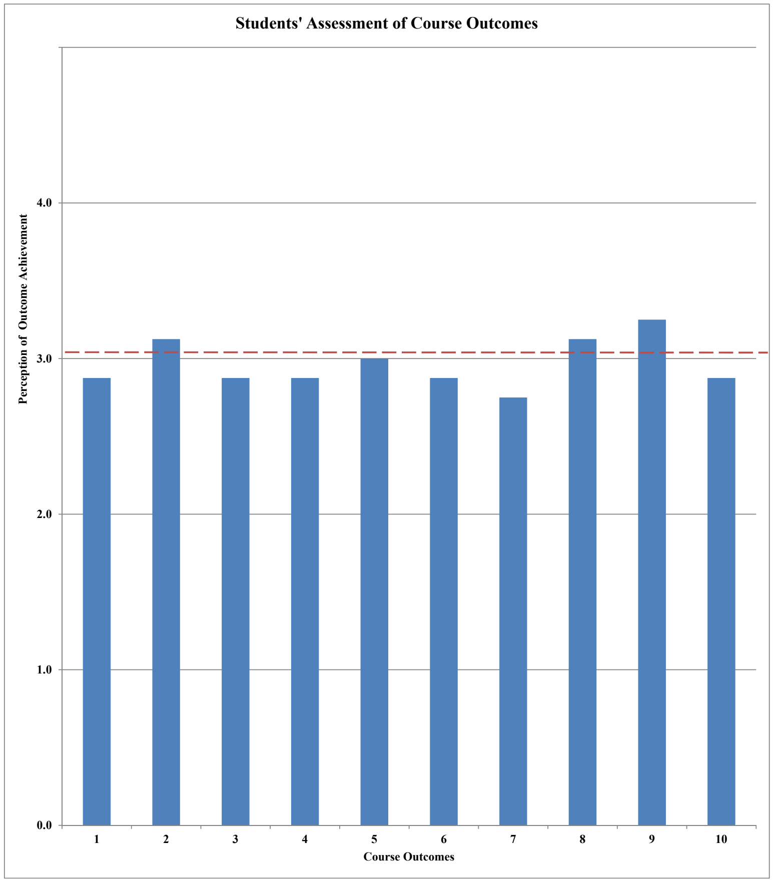


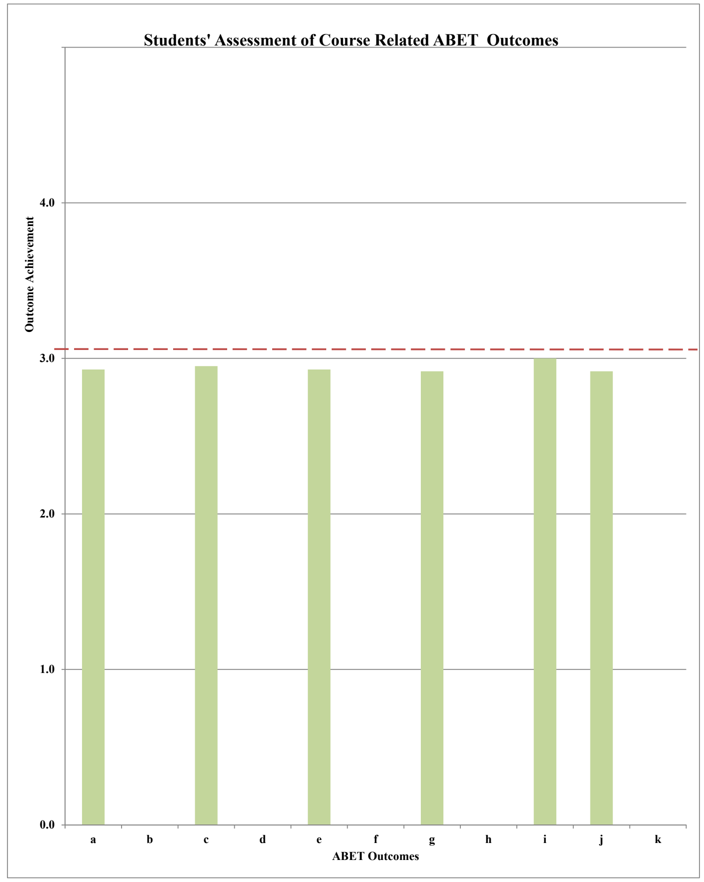


Course Outcomes	Results						ABET Outcomes	Comments per Outcome
	1	2	3	4	Total	Average		
1) Understand the concepts of stress and strain at a point as well as the stress-strain relatio	0	0	1	0	1	3.0	a	
2) Calculate the stresses and strains in axially-loaded members, circular torsion members,	0	0	1	0	1	3.0	a,e	
3) Calculate the stresses and strains associated with thin-wall spherical and cylindrical pr	0	0	1	0	1	3.0	a,e	
4) Determine the stresses and strains in members subjected to combined loading and appl							a,e	
5) Determine and illustrate principal stresses, maximum shearing stress, and the stresses a	0	0	1	0	1	3.0	a,e	
6) Determine the deflections and rotations produced by the three fundamental types of loa	0	0	1	0	1	3.0	a,e	
7) Analyze slender, long columns subjected to axial loads. (a, e)	0	1	0	0	1	2.0	a,e	
8) Design simple bars, beams, and circular shafts for allowable stresses and loads. (c, g, k	0	0	1	0	1	3.0	c,g,k	
	0	1	0	0	1	2.0		
	0	0	1	0	1	3.0		

Students Assessment of Course - SPRING 2018

Course: CE 31800 Fluid Mechanics **Instructor:** NJOCKLIBII
Semester: SPRING 2018 **Section:** 1 **Number of Students:** 12



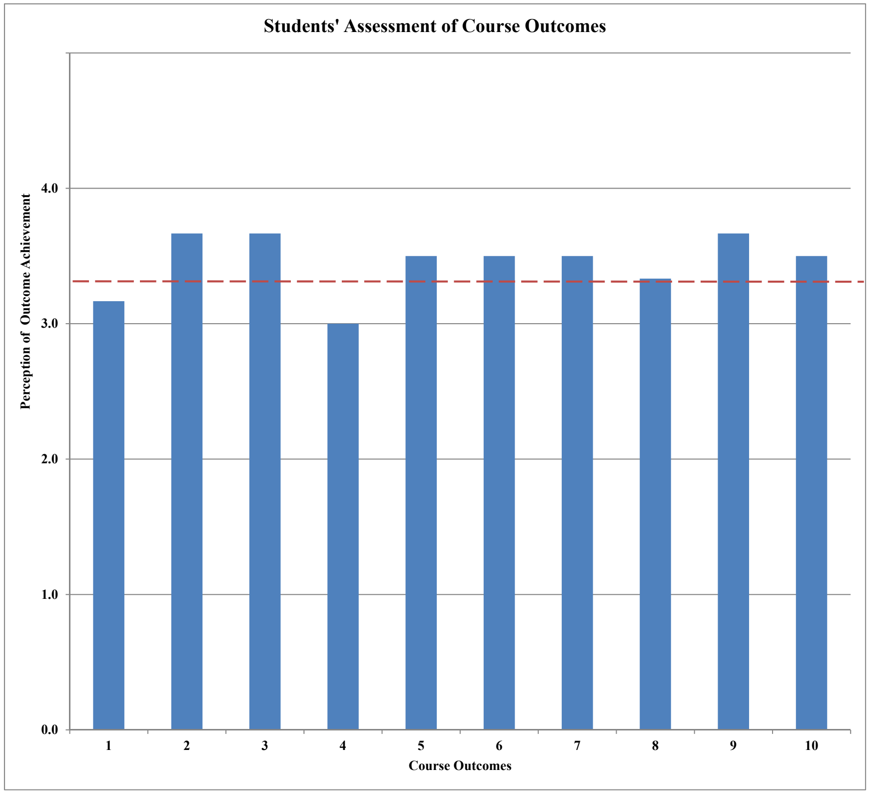


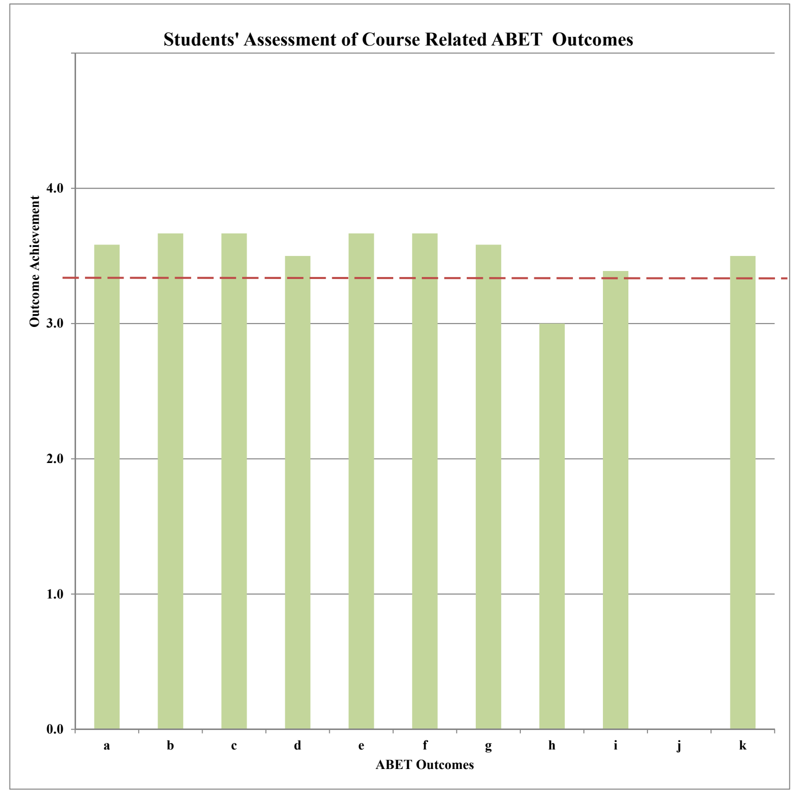
Course Outcomes	Results						ABET Outcomes	Comments per Outcome
	1	2	3	4	Total	Average		
1) Know the definitions of fundamental concepts of fluid mechanics including: continuun	0	3	3	2	8	2.9	a,e	We didn't really cover concectual stuff, mainly deridation actvities.
2) Apply the basic equation of fluid statics to determine forces on planar and curved surfa	0	1	5	2	8	3.1	a,e	
3) Use of conservation laws in integral form and apply them to determine forces and mon	0	3	3	2	8	2.9	a,e	
4) Use of conservation laws in differential forms and apply them to determine velocities,	0	3	3	2	8	2.9	a,e	We can do the math but what the numbers mean is rearely discussed.
5) Use Euler's and Bernoulli's equations and the conservation of mass to determine veloc	0	3	2	3	8	3.0	a,e	Same
6) Understand the concepts of rotational vs. irrotational flows; stream functions, velocity	0	3	3	2	8	2.9	a,e	Quickly covered it only
7) Understand the concepts of static, thermodynamic, stagnation, total, and dynamic press	1	2	3	2	8	2.8	a,c,e,g,j	I know the difference between gage and absolute; that's all
8) Apply principles of dimensional analysis and similitude to simple problems and use di	0	1	5	2	8	3.1	a,c,e,g,j	
9) Determine flow rates, pressure changes, minor and major head losses for viscous flows	0	1	4	3	8	3.3	a,e	Can do the math, once again not what numbers mean
10) Design simple pipe systems to deliver fluids under specified conditions. (a, c, e, g)	0	3	3	2	8	2.9	a,c,e,g,j	
11) Understand principles of flow measurements such as direct methods, flow-restriction n	1	2	3	2	8	2.8	a,e	Barely remember covering this
12) Understand the concepts of viscous boundary layers and the momentum integral and us	1	3	2	2	8	2.6	a,e	Once again, he went over the math only
13) Understand the mechanics of viscous flow about immersed boundaries, as it relates to	0	2	4	2	8	3	a,c,e	rushed through it at the end
14) Apply principles of fluid mechanics to the operation, design, and selection of fluid mac	0	2	4	2	8	3	a,c,e,i	

Students Assessment of Course - SPRING 2018

Course: CE 31900 Fluids Mecchanics Lab   **Instructor:** AKOHWARIEN

Semester: SPRING 2018   **Section:** 1   **Number of Students:** 6

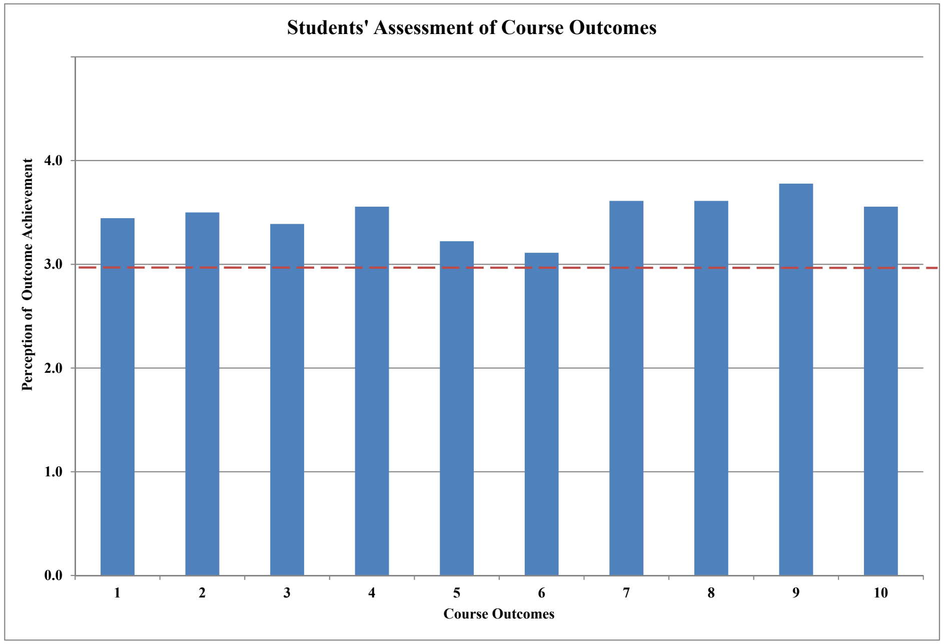


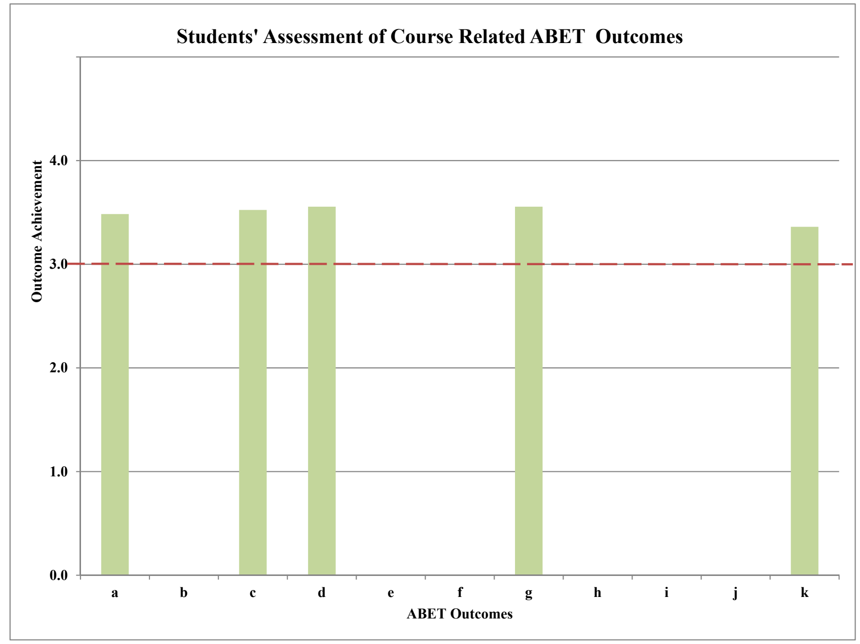


Course Outcomes	Results						ABET Outcomes	Comments per Outcome
	1	2	3	4	Total	Average		
1) Identify, name, and characterize flow patterns and regimes. (a, 1)	0	1	3	2	6	3.2	a	
2) Understand basic units of measurement, convert units, and appreciate their magnitudes	0	0	2	4	6	3.7	a	
3) Utilize basic measurement techniques of fluid mechanics. (a,1)	0	0	2	4	6	3.7	a	
4) Discuss the differences among measurement techniques, their relevance and applicatio	0	2	2	2	6	3.0	h,i	
5) Measure fluid pressure and relate it to flow velocity. (k, 6)	0	1	1	4	6	3.5	k	
6) Demonstrate practical understanding of the various equations of Bernoulli. (k, 6)	0	1	1	4	6	3.5	k	
7) Demonstrate practical understanding of friction losses in internal flows. (k, 6)	0	0	3	3	6	3.5	k	
8) Demonstrate practical understanding of boundary layers, separation, drag, and lift. (k,	0	1	2	3	6	3.3	k	
9) Demonstrate the ability to write clear lab reports. (g, 8)	0	0	2	4	6	3.7	g	
10) Use word processors, graphics packages, and computational software in writing. (g, i,	0	0	3	3	6	3.5	g,i	
11) Prove good understanding of concepts and their applications in the laboratory. (a , g, 1	0	0	2	4	6	3.7	a,g	
12) Compare the results of analytical models introduced in lecture to the actual behavior o	0	0	2	4	6	3.7	a,k	
13) Demonstrate the ability to work in groups on small design projects that are appropriate	0	0	3	3	6	3.5	d,g	
14) Demonstrate the ability to produce a working model through hands-on experience in f	0	0	2	4	6	3.666667	a,b,c,e,g	
15) Understand ethical issues associated with decision making and professional conduct. (	0	0	2	4	6	3.666667	f	

Students Assessment of Course - SPRING 2018

Course: CE 34500 Transportation Engineering
Instructor: DEVINE
Semester: SPRING 2018
Section: 1
Number of Students: 23

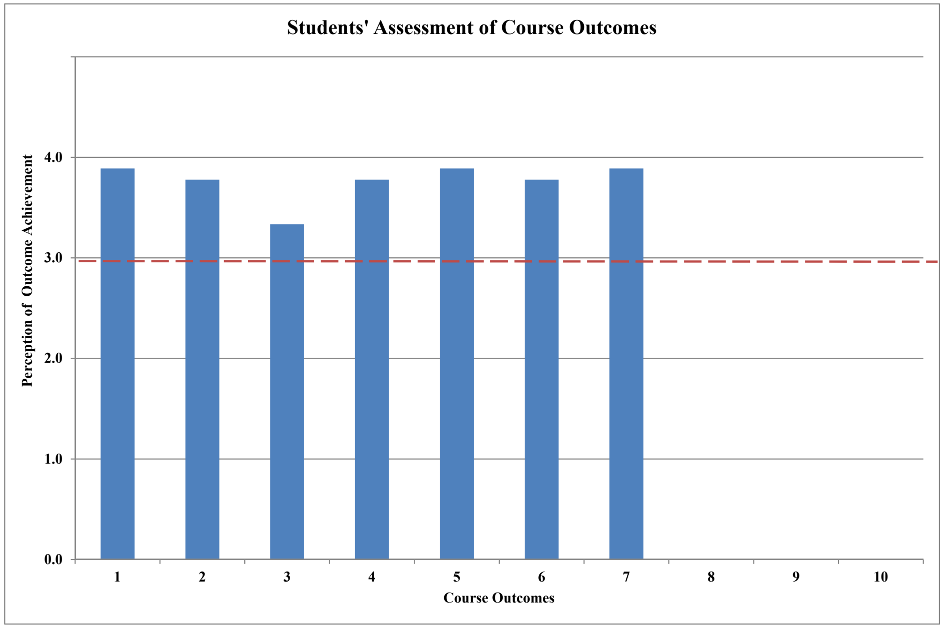


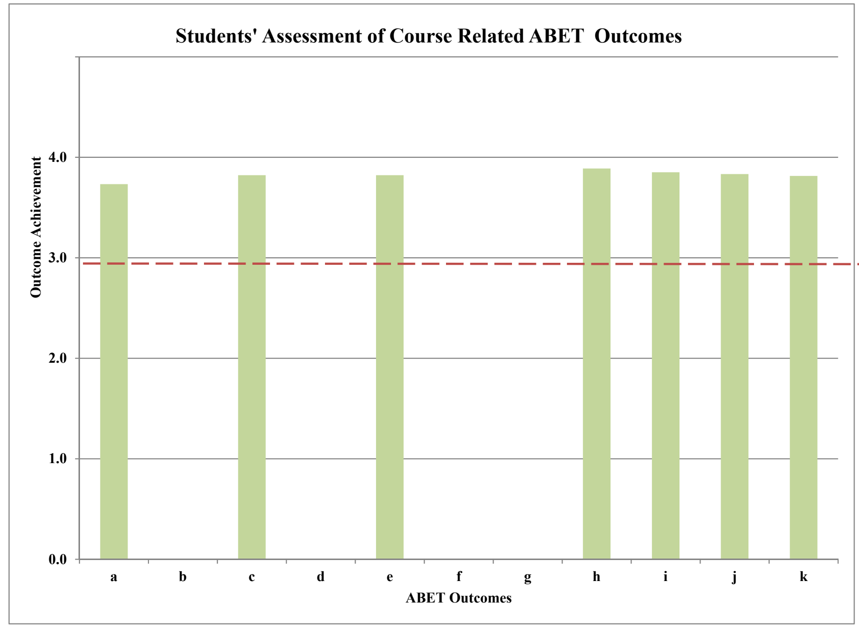


Course Outcomes	Results 1	2	3	4	Total	Average	ABET Outcomes	Comments per Outcome
1) Understand the factors influencing road vehicle performance characteristics and desig	0	0	10	8	18	3.4	a	
2) Apply basic science principles in estimating stopping and passing sight distance requir	0	0	9	9	18	3.5	a	
3) Understand basic traffic stream parameters and models, traffic flow models, and queu	0	1	9	8	18	3.4	a	
4) Perform level of service analysis to determine LOS for selected highway segments. [a,	0	0	8	10	18	3.6	a,c	
5) Use Highway Capacity Software (HCS) for finding LOS. [k]	1	2	7	8	18	3.2	k	
6) Design basic traffic signal phasing and timing plan. [c]	0	2	12	4	18	3.1	c	
7) Be familiar of the four stages of the transport planning and prediction models. [a, c]	0	0	7	11	18	3.6	a,c	
8) Design basic horizontal alignment of the highway. [c]	0	0	7	11	18	3.6	c	
9) Design basic vertical alignment of the highway. [c]	0	0	4	14	18	3.8	c	
10) Understand and use AASHTO method for soil classification. [a]	0	0	8	10	18	3.6	a	
11) Design of flexible pavement layers. [c]	0	0	10	8	18	3.4	c	
12) Calculate the stresses and deflections in pavements. [a]	0	3	6	9	18	3.3	a	
13) Use EXCEL tools for design of vertical and horizontal curves. [k]	0	0	9	9	18	3.5	k	
14) Design transportation related project in a team of two or three students and submits a f	0	0	8	10	18	3.555556	c,d,g	

Students Assessment of Course - SPRING 2018

Course: CE 46500 Water and Wastewater Engineering
Instructor: FRUCHEY
Semester: SPRING 2018
Section: 1
Number of Students: 11

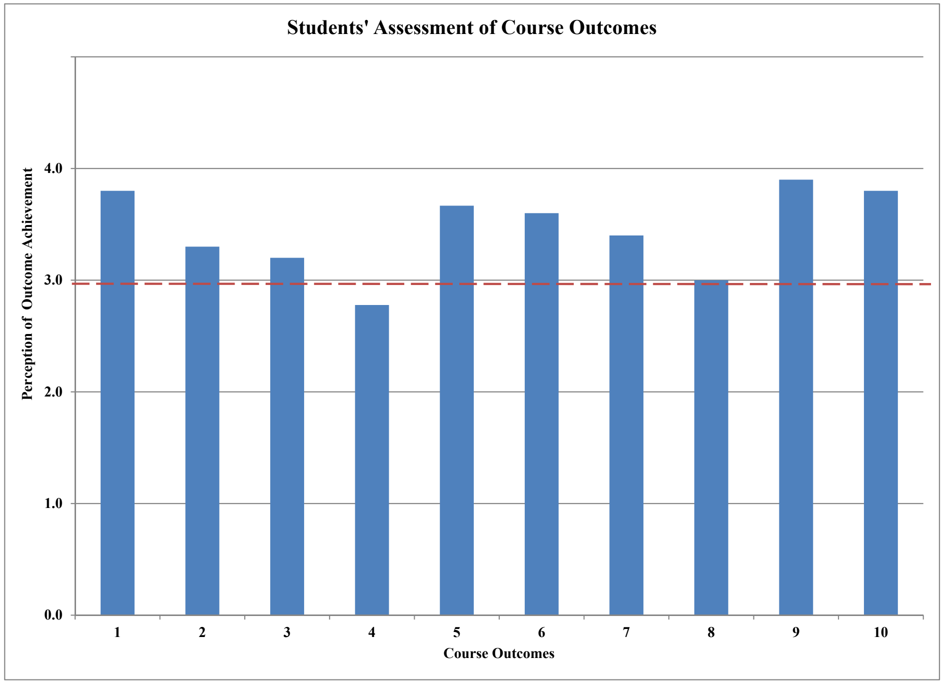


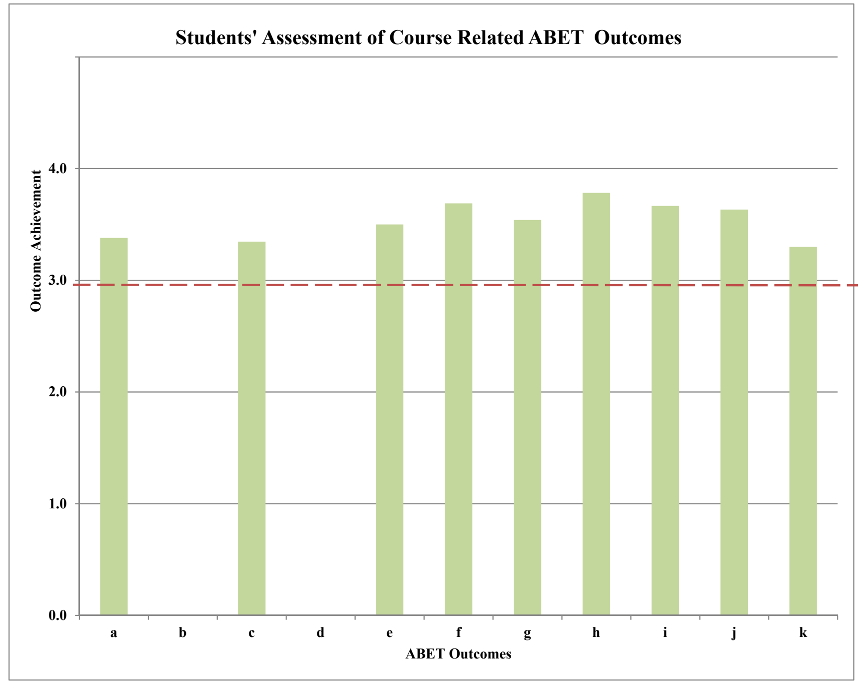


Course Outcomes	Results						ABET Outcomes	Comments per Outcome
	1	2	3	4	Total	Average		
1) Select or construct appropriate treatment schemes to remove certain pollutants present	0	0	1	8	9	3.9	a,c,e,j	
2) Design a water or wastewater treatment component. [c, e, j, k]	0	0	2	7	9	3.8	c,e,j,k	
3) Balance chemical reactions and use balanced reactions to determine the distribution of	0	1	4	4	9	3.3	a	
4) Develop a mass balance expression for contaminants under different case scenarios an	0	0	2	7	9	3.8	a,c,e	
5) Learn how to characterize source water, and the best available technologies (BAT) for	0	0	1	8	9	3.9	a,c,e,I,j,k	
6) Learn how to characterize wastewater, and the BAT for physical, chemical and microb	0	0	2	7	9	3.8	a,c,e,I,j,k	
7) Understand selected contemporary global water and wastewater issues such as water s	0	0	1	8	9	3.9	h,j	Great learning Experience, loved learning how our class material relates to our professional careers.

Students Assessment of Course - SPRING 2018

Course: CE 48700 CE Design Project I
Instructor: CHEN
Semester: SPRING 2018
Section: 1
Number of Students: 10





Course Outcomes	Results						ABET Outcomes	Comments per Outcome
	1	2	3	4	Total	Average		
1) Formulate a problem statement. [a, c, e]	0	0	2	8	10	3.8	a,c,e	
2) Develop multiple preliminary design solutions using brainstorming techniques. [a, c]	0	2	3	5	10	3.3	a,c	
3) Evaluate alternative solutions using a well-defined criteria and produce feasible solutio	0	1	6	3	10	3.2	a,c,e,k	We're Civils
4) Build, test and evaluate feasible solutions using modern engineering tools and select th	2	0	5	2	9	2.8	c	
5) Understand and use the most recent federal/state regulations and standards in the proje	0	0	3	6	9	3.7	f,h,I,j	
6) Successfully develop detailed final design for the project considering safety, economic	0	1	2	7	10	3.6	a,c,e,g,k	
7) Develop technical drawings and specifications if needed for the project. [c, e, f, g, k]	0	2	2	6	10	3.4	c,e,f,g,k	
8) Develop cost estimate and schedule for project activities, if needed. [a, g, k]	0	3	3	3	9	3.0	a,g,k	We're Civils
9) Write clear and concise technical reports. [g]	0	0	1	9	10	3.9	g	
10) Present the final design to both technical professionals and public. [g]	0	0	2	8	10	3.8	g	
11) Knowledge of contemporary issues related to the area of the project [j]	0	0	4	6	10	3.6	j	
12) Understand the impact of civil engineering on society. [h]	0	0	1	9	10	3.9	h	
13) Recognition of the need for life-long learning. [f]	0	0	0	10	10	4	f	I think senior design should be used as a design project, for potentially local businesses where we can use the design to better help the community and where as a business can cover after completion any design requirements. This process can help initate the actual processes of any design project.

Appendix A-9: Laboratory Evaluation Results

Civil & Mechanical Engineering Program
Indiana University-Purdue University Fort Wayne
Lab Evaluation by Students

Course #: CE 38100 Section: 01 Course Title: SOIL MECHANICS LAB

Semester: Spring Year: 2018

Instructor: F. NIAZI Expected Grade:

Please indicate your overall experience with the labs that you took by circling a number

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. The lab is well equipped	1	2	3	4

If not, what do you think is missing?
Total: 17
Strongly Agree: 8
Agree: 9
Average: 3.47

	Strongly Disagree	Disagree	Agree	Strongly Agree
2. The lab equipment is functional	1	2	3	4

If not, please elaborate
Total: 17
Strongly Agree: 10
Agree: 7
Average: 3.59

	Strongly Disagree	Disagree	Agree	Strongly Agree
3. The lab experiments are reasonable in length.	1	2	3	4

If not, how can we improve it?
Total: 17
Strongly Agree: 7
Agree: 10
Average: 3.41
Comment: It could be long to be more indepth

	Strongly Disagree	Disagree	Agree	Strongly Agree
4. The lab experiments are reasonable in content.	1	2	3	4

If not, how can we improve it?
Total: 17
Strongly Agree: 9
Agree: 8
Average: 3.53

	Strongly Disagree	Disagree	Agree	Strongly Agree
5. The lab manual adequately describes experiments.	1	2	3	4

If not, please help us identify the shortcomings.
Total: 17
Strongly Agree: 11
Agree: 6
Average: 3.65

Civil & Mechanical Engineering Program
Indiana University-Purdue University Fort Wayne
Lab Evaluation by Students

6. The general rules of lab safety were clearly explained at the start of the semester.	1	2	3	4

If not, please elaborate.
Total: 17
Strongly Agree: 12
Agree: 5
Average: 3.71

7. Safety provisions pertaining to each experiment and/or lab activity were explained at the beginning of the associated lab session (if applicable/required/needed)	1	2	3	4

If not, please elaborate.
Total: 17
Strongly Agree: 10
Agree: 7
Average: 3.59

Appendix A-10: 5-Year Lab Improvement Plan of the Department

Improvement Plan for Civil & Mechanical Engineering Labs

One of the goals for the Civil and Mechanical Engineering Department (CME) is to provide undergraduate civil and mechanical engineering students access to high-quality, ***accredited*** programs that include relevant curriculum, engaged and experiential learning environments, and up-to-date laboratory activities.

Providing our students with up-to-date and safe labs, as well as, new experiential learning environments is important to our evolving curriculum and necessary to produce qualified civil and mechanical engineers to meet the needs of the NE Indiana region. The status of our labs is continuously being monitored as part of our assessment process which is detailed in our assessment plan. In addition, it is required for ABET accreditation of our programs. As shown in Figures 1 and 2, the current assessment measures indicate that our labs are not adequate.

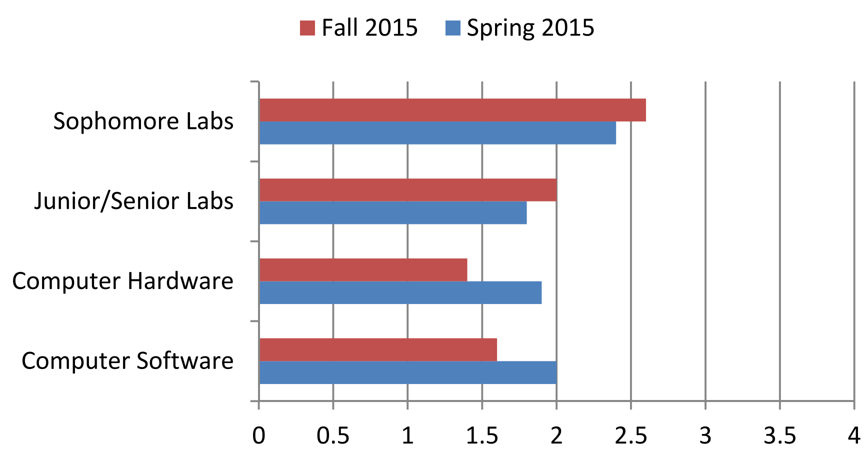


Figure 1. Spring 2015 (12 responses) and Fall 2015 (5 responses) ME exit surveys – computers and labs.

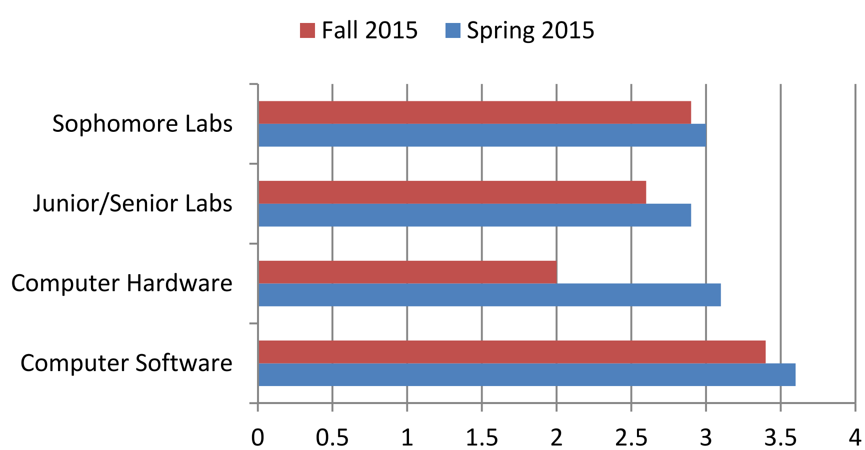


Figure 2. Spring 2015 (8 responses) and Fall 2015 (9 responses) CE exit surveys – computers and labs.

This Lab Plan is part of our continuous improvement process that is an important part of ABET accreditation Criterion 7; "*Classrooms, offices, laboratories, and associated equipment must be adequate to support attainment of the student outcomes and to provide an atmosphere conducive to learning. Modern tools, equipment, computing resources, and laboratories appropriate to the program must be available, accessible, and systematically maintained and upgraded to enable students to attain the student outcomes and to support program needs. Students must be provided appropriate guidance regarding the use of the tools, equipment, computing resources, and laboratories available to the program.*"

The funding of this lab plan will provide students access to current labs by implementing our lab plan. It involves developing new labs, upgrading lab equipment, and maintaining others.

Improvement Plan for Civil & Mechanical Engineering Labs

Labs	Required Course	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Materials and Solids Lab	ME 304 MET 180	0	16,000	108,000	0	0	124,000
	- Required lab equipment: Tensile tester, strain indicator, creep tester, and vibration tester - Equipment will be shared with MCET department - The cost is to be equally split between CME and MCET departments.						
Fluid Mechanics Lab	CE/ME 319	0	0	0	0	78,000	78,000
	- Required lab equipment: wind tunnel, smoke tunnel						
Surveying Lab	CE 210 CET 104 CET 206 CET 209	122,000	0	0	0	0	122,000
	- Lab equipment: 8 surveying stations - Equipment will be shared with MCET department - The cost is to be equally split between CME and MCET departments.						
Environmental Lab	CE 366 CHM 241 CHM 343 CHM 424 CHM 535	0	0	0	60,000	0	60,000
	- Required lab equipment: ion chromatography - Equipment will be shared with CHM department - The cost is to be split between CME and CHM departments based on usage						
Geotechnical Lab	CE 381 CET 431	0	15,000	0	0	0	15,000
	- Required lab equipment: soil sampling and permeability tester - Equipment will be shared with MCET department - The cost is to be split between CME and MCET departments based on usage						
CE Materials Lab	CE 316 CET 266	0	30,000	0	0	0	30,000
	- Required lab equipment: superpave asphalt binder tester - Equipment will be shared with MCET department - The cost is to be split between CME and MCET departments based on usage						
Total		122,000	61,000	108,000	60,000	78,000	429,000

See next page for enrollment data for lab courses.

Enrollment Data for Lab Courses

Course	Summer 2015	Fall 2015	Spring 2016	Total
CE 210	8	7	0	34
CET 104	1	8	5	
CET 206**	0	0	0	
CET 209	0	0	6	
CE 316	0	14	0	34
CET 266	0	0	20	
CE 366	0	0	6	45
CHM 241	0	0	15	
CHM 343	0	0	3	
CHM 424	0	0	15	
CHM 535	0	0	6	
CE 381	0	0	11	27
CET 431	0	16	0	
CE/ME 319	0	24	28	52
ME 304	0	13	26	120
MET 180	0	45	36	

0 = not offered
** will be offered Fall2016

Appendix A-11: Department Student Forum

Student Forum

Organized by ASCE Student Chapter

Monday, March 26, 2018

12:00 – 1:00 PM, ET 107

Present: Nash Younis, CME Chair, Mechanical Engineering Students – 2, Civil Engineering Students - 4

I. Dr. Younis presented his slide show, providing the students with CME Department Statistics for Fall 2017 which include:

- Enrollment for Engineering Students in Fall for the last ten years
- Funds from the State is determined by number of students and number of credit hours
- Enrollment for Graduate and Undergraduate students for Engineering
- Number of students enrolled by major
- Class enrollment has to be 15 students
- Breakdown between CME and ECE majors
- Graduate breakdown for major

Civil Engineering is hiring for Assistant Professor and have interviewed candidates and a decision will be made soon.

CME was up for reaccreditation last October. Our CME program had no issues, and we anticipate reaccreditation for 6 years.

Registration starts today and there were several changes to the Fall 2018 schedule.

II. The floor was then opened for a Q & A session, where the students could ask questions of Dr. Younis and he would answer them to the best of his ability or he would find the answer out for them. Grades will not be discussed.

Q1: Is co-op only summer or fall?
A1: Co-op is any semester depending on the company. You can take up to 6 credit hours with co-op. Internship you can just do in the summer.

Respectfully Submitted by:
Rita Reed, Administrative Assistant CME

Appendix A-12: Exit Survey Results
(5 responded)

EXIT SURVEY- CIVIL ENGINEERING SPRING 2018 (5 RESPONSES)

To help improve the Department of Civil and Mechanical Engineering at IPFW, we are assessing the quality of our program by means of exit surveys. Your input will help us to better understand the strengths and weaknesses of our engineering programs. Your input to this process is greatly appreciated. Please use extra pages if you want to provide suggestions and comments not covered by this survey.

DEGREE: CE **GRADUATING SEMESTER:** SPRING 2018

HAVE YOU ALREADY RECEIVED A JOB OFFER?

RESPONDENT #1	Yes
RESPONDENT #2	Yes
RESPONDENT #3	Yes
RESPONDENT #4	Yes
RESPONDENT #5	Yes

 # OF JOB OFFERS?

RESPONDENT #1	1
RESPONDENT #2	1
RESPONDENT #3	3
RESPONDENT #4	1
RESPONDENT #5	2

SALARY EXPECTATIONS?

RESPONDENT #1	$ 50,000.00
RESPONDENT #2	$ 52,000.00
RESPONDENT #3	$51,000+
RESPONDENT #4	$50,000-52,000
RESPONDENT #5	$ 61,000.00

ARE YOU GOING TO GRADUATE SCHOOL?

RESPONDENT #1	No
RESPONDENT #2	No
RESPONDENT #3	Yes
RESPONDENT #4	No
RESPONDENT #5	Yes

UNIVERSITY?

RESPONDENT #1

RESPONDENT #2	
RESPONDENT #3	N/A
RESPONDENT #4	
RESPONDENT #5	TBD - Some time in the next 1-3 years

DEGREE?

RESPONDENT #1	
RESPONDENT #2	
RESPONDENT #3	N/A
RESPONDENT #4	
RESPONDENT #5	Masters in Structural Engineering

PART I. CURRICULUM

#1. BACKGROUND PROVIDED IN THE BASIC SCIENCE AND MATHEMATICS IS SUFFICIENT…

1 STRONGLY DISAGREE
2 DISAGREE
3 AGREE
4 STRONGLY AGREE

RESPONDENT #1	3
RESPONDENT #2	4
RESPONDENT #3	4
RESPONDENT #4	4
RESPONDENT #5	4
AVERAGE	3.8

#2. CONTENT AND AMOUNT OF GEN ED COURSES ARE USEFUL…

1 STRONGLY DISAGREE
2 DISAGREE
3 AGREE
4 STRONGLY AGREE

RESPONDENT #1	3
RESPONDENT #2	2
RESPONDENT #3	2
RESPONDENT #4	3
RESPONDENT #5	3
AVERAGE	2.6

#3. FREQUENCY OF COURSES OFFERING IN YOUR MAJOR IS SATISFACTORY…

1 STRONGLY DISAGREE

2 DISAGREE
3 AGREE
4 STRONGLY AGREE

RESPONDENT #1	3
RESPONDENT #2	4
RESPONDENT #3	2
RESPONDENT #4	3
RESPONDENT #5	1
AVERAGE	2.6

#4. VARIETY OF TECHNICAL ELECTIVES IS SUFFIECIENT…

1 STRONGLY DISAGREE
2 DISAGREE
3 AGREE
4 STRONGLY AGREE

RESPONDENT #1	2
RESPONDENT #2	2
RESPONDENT #3	1
RESPONDENT #4	2
RESPONDENT #5	1
AVERAGE	1.6

WHAT TOPICS WOULD YOU RECOMMEND TO BE GIVEN MORE EMPHASIS OR TO BE INTRODUCED IN THE CURRICULUM?

RESPONDENT #1	Engineering economics
RESPONDENT #2	Structural Engineering
RESPONDENT #3	Less geotechnical and more environmental
RESPONDENT #4	More available technical electives, not enough staff to teach elective courses
RESPONDENT #5	Structual courses

PLEASE ADD ANY ADDITIONAL COMMENTS ABOUT THE CURRICULUM

RESPONDENT #1	
RESPONDENT #2	Civil and Mechanical Departments need to be split
RESPONDENT #3	
RESPONDENT #4	Curriculum is solid, but technical electives are not offered in great volume
RESPONDENT #5	Joint CE ME classes are usually ME dominated to the detriment of CE topics

PART II. FACULTY

#1. FACULTY ARE PROFICIENT IN THEIR FIELD OF EXPERTISE…

1 STRONGLY DISAGREE
2 DISAGREE

3 AGREE
4 STRONGLY AGREE

RESPONDENT #1	3
RESPONDENT #2	3
RESPONDENT #3	3
RESPONDENT #4	4
RESPONDENT #5	4
AVERAGE	3.4

#2. FACULTY ARE WELL PREPARED FOR THE LECTURES…

1 STRONGLY DISAGREE
2 DISAGREE
3 AGREE
4 STRONGLY AGREE

RESPONDENT #1	3
RESPONDENT #2	3
RESPONDENT #3	2
RESPONDENT #4	4
RESPONDENT #5	3
AVERAGE	3

#3. FACULTY PROVIDE GOOD ACADEMIC ADVISING…

1 STRONGLY DISAGREE
2 DISAGREE
3 AGREE
4 STRONGLY AGREE

RESPONDENT #1	3
RESPONDENT #2	3
RESPONDENT #3	2
RESPONDENT #4	4
RESPONDENT #5	2
AVERAGE	2.8

#4. FACULTY PROVIDE A SUFFICIENT AMOUNT AND ADEQUACY OF OFFICE HOURS

1 STRONGLY DISAGREE
2 DISAGREE
3 AGREE
4 STRONGLY AGREE

RESPONDENT #1	3
RESPONDENT #2	3
RESPONDENT #3	4
RESPONDENT #4	4
RESPONDENT #5	4

AVERAGE	3.6

#5. FACULTY ARE HELPFUL INSIDE AND OUTSIDE THE CLASSROOMS…

1 STRONGLY DISAGREE
2 DISAGREE
3 AGREE
4 STRONGLY AGREE

RESPONDENT #1	**3**
RESPONDENT #2	**3**
RESPONDENT #3	**4**
RESPONDENT #4	**4**
RESPONDENT #5	**3**
AVERAGE	3.4

#6. FACULTY SHOW CONCERN TOWARD STUDENTS…

1 STRONGLY DISAGREE
2 DISAGREE
3 AGREE
4 STRONGLY AGREE

RESPONDENT #1	**3**
RESPONDENT #2	**2**
RESPONDENT #3	**3**
RESPONDENT #4	**4**
RESPONDENT #5	**2**
AVERAGE	2.8

#7. FACULTY ARE ENTHUSIASTIC ABOUT WHAT THEY TEACH…

1 STRONGLY DISAGREE
2 DISAGREE
3 AGREE
4 STRONGLY AGREE

RESPONDENT #1	**3**
RESPONDENT #2	**3**
RESPONDENT #3	**3**
RESPONDENT #4	**4**
RESPONDENT #5	**3**
AVERAGE	3.2

PLEASE ADD ANY ADDITIONAL COMMENTS ABOUT THE FACULTY

RESPONDENT #1	
RESPONDENT #2	**The school needs to find more professors with experience in structures and transportation.**
RESPONDENT #3	
RESPONDENT #4	**Faculty members are all great, but department doesn't have enough help to provide a large variety of electives.**

RESPONDENT #5

PART III. FACILITIES

#1. LABOARATORIES FACILITIES (OTHER THAN COMPUTER LABS) ADEQUACY

(A) SOPHOMORE LEVEL…

1 POOR
2 FAIR
3 GOOD
4 EXCELLENT

RESPONDENT #1	**3**
RESPONDENT #2	**3**
RESPONDENT #3	**3**
RESPONDENT #4	**4**
RESPONDENT #5	**4**
AVERAGE	3.4

(B) JUNIOR LEVEL & ABOVE…

1 POOR
2 FAIR
3 GOOD
4 EXCELLENT

RESPONDENT #1	**3**
RESPONDENT #2	**3**
RESPONDENT #3	**3**
RESPONDENT #4	**4**
RESPONDENT #5	**4**
AVERAGE	3.4

#2. COMPUTER LABORATORIES ADEQUACY

(A) HARDWARE…

1 POOR
2 FAIR
3 GOOD
4 EXCELLENT

RESPONDENT #1	**3**
RESPONDENT #2	**3**
RESPONDENT #3	**3**
RESPONDENT #4	**4**
RESPONDENT #5	**4**
AVERAGE	3.4

(B) SOFTWARE…

1 POOR

2 FAIR
3 GOOD
4 EXCELLENT

RESPONDENT #1	3
RESPONDENT #2	3
RESPONDENT #3	3
RESPONDENT #4	3
RESPONDENT #5	4
AVERAGE	3.2

PLEASE ADD ANY ADDITIONAL COMMENTS ABOUT THE FACILITIES

RESPONDENT #1	
RESPONDENT #2	Always need more areas to study
RESPONDENT #3	
RESPONDENT #4	Some minor computer program inconsistencies, highly occupied labs typically have needed programs, and vice versa.
RESPONDENT #5	

PART IV. IPFW (PLEASE SCORE ON THE ADEQUACY OF THE FOLLOWING SERVICES OR FACILITIES)

#1. LIBRARY FACILITIES...

1 POOR
2 FAIR
3 GOOD
4 EXCELLENT

RESPONDENT #1	4
RESPONDENT #2	4
RESPONDENT #3	3
RESPONDENT #4	
RESPONDENT #5	4
AVERAGE	3.75

#2. ADMISSION OFFICE'S SERVICES...

1 POOR
2 FAIR
3 GOOD
4 EXCELLENT

RESPONDENT #1	3
RESPONDENT #2	4
RESPONDENT #3	3
RESPONDENT #4	
RESPONDENT #5	3
AVERAGE	3.25

#3. REGISTRAR OFFICES SERVICES

	1 POOR
	2 FAIR
	3 GOOD
	4 EXCELLENT
RESPONDENT #1	**3**
RESPONDENT #2	**4**
RESPONDENT #3	**3**
RESPONDENT #4	**3**
RESPONDENT #5	**3**
AVERAGE	3.2

#4. INTERNATIONAL STUDENTS OFFICE SERVICES…

	1 POOR
	2 FAIR
	3 GOOD
	4 EXCELLENT
RESPONDENT #1	
RESPONDENT #2	
RESPONDENT #3	**3**
RESPONDENT #4	
RESPONDENT #5	**4**
AVERAGE	3.5

#5. CAMPUS-WIDE COMPUTER FACILITIES…

	1 POOR
	2 FAIR
	3 GOOD
	4 EXCELLENT
RESPONDENT #1	**3**
RESPONDENT #2	**3**
RESPONDENT #3	**3**
RESPONDENT #4	**3**
RESPONDENT #5	**4**
AVERAGE	3.2

PLEASE ADD ANY ADDITIONAL COMMENTS ABOUT THE SERVICES OR FACILITIES

RESPONDENT #1	
RESPONDENT #2	
RESPONDENT #3	
RESPONDENT #4	**Just inconsistencies with some computer labs only having certain programs, others which are readily available having very little in terms of programs.**
RESPONDENT #5	

PART V. ABET PROGRAM OUTCOMES

#1. ADEQUATELY PREPARED YOU TO APPLY THE KNOWLEDGE OF MATHEMATICS, SCIENCE, AND ENGINEERING…

1 STRONGLY DISAGREE
2 DISAGREE
3 AGREE
4 STRONGLY AGREE

RESPONDENT #1	**3**
RESPONDENT #2	**4**
RESPONDENT #3	**4**
RESPONDENT #4	**4**
RESPONDENT #5	**4**
AVERAGE	3.8

#2. ADEQUATELY PREPARED YOU TO DESIGN AND CONDUCT EXPERIEMTNS, AS WELL AS TO ANALYZE AND INTERPRET DATA…

1 STRONGLY DISAGREE
2 DISAGREE
3 AGREE
4 STRONGLY AGREE

RESPONDENT #1	**3**
RESPONDENT #2	**4**
RESPONDENT #3	**4**
RESPONDENT #4	**4**
RESPONDENT #5	**3**
AVERAGE	3.6

#3. ADEQUATELY PREPARED YOU TO DESIGN A SYSTEM, COMPONENT, OR PROCESS TO MEET DESIRED NEEDS.

1 STRONGLY DISAGREE
2 DISAGREE
3 AGREE
4 STRONGLY AGREE

RESPONDENT #1	**3**
RESPONDENT #2	**4**
RESPONDENT #3	**3**
RESPONDENT #4	**4**
RESPONDENT #5	**2**
AVERAGE	3.2

#4. HAS CULTIVATED IN YOU AN ABILITY TO FUNCTION IN A GROUP OR ON MULTIDISCIPLINARY TEAMS…

1 STRONGLY DISAGREE
2 DISAGREE
3 AGREE

4 STRONGLY AGREE

RESPONDENT #1	3
RESPONDENT #2	4
RESPONDENT #3	3
RESPONDENT #4	4
RESPONDENT #5	3
AVERAGE	3.4

#5. HAS ENABLED YOU TO IDENTIFY, FORMULATE, AND SOLVE ENGINEERING PROBLEMS…

1 STRONGLY DISAGREE
2 DISAGREE
3 AGREE
4 STRONGLY AGREE

RESPONDENT #1	3
RESPONDENT #2	4
RESPONDENT #3	4
RESPONDENT #4	4
RESPONDENT #5	4
AVERAGE	3.8

#6. ADEQUATELY FAMILIARIZED YOU WITH AN UNDERSTANDING OF PROFESSIONAL AND ETHICAL RESPONSIBILITY…

1 STRONGLY DISAGREE
2 DISAGREE
3 AGREE
4 STRONGLY AGREE

RESPONDENT #1	3
RESPONDENT #2	4
RESPONDENT #3	3
RESPONDENT #4	4
RESPONDENT #5	4
AVERAGE	3.6

#7. PROVIDED YOU THE MEANS BY WHICH TO COMMUNICATE TECHNICAL INFORMATION EFFECTIVELY…

1 STRONGLY DISAGREE
2 DISAGREE
3 AGREE
4 STRONGLY AGREE

RESPONDENT #1	3
RESPONDENT #2	4
RESPONDENT #3	3
RESPONDENT #4	4
RESPONDENT #5	4
AVERAGE	3.6

#8. GIVEN YOU THE BROAD EDUCATION NECESSARY TO UNDERSTAND THE IMPACT OF ENGINEERING SOLUTIONS IN A GLOBAL AND SOCIETAL CONTEXT…

1 STRONGLY DISAGREE
2 DISAGREE
3 AGREE
4 STRONGLY AGREE

RESPONDENT #1	**3**
RESPONDENT #2	**3**
RESPONDENT #3	**3**
RESPONDENT #4	**4**
RESPONDENT #5	**2**
AVERAGE	3

#9. FAMILIARIZED YOU WITH THE RECOGNITION OF THE NEED FOR, AND AN ABILITY TO ENGAAGE IN LIFE-LONG LEARNING…

1 STRONGLY DISAGREE
2 DISAGREE
3 AGREE
4 STRONGLY AGREE

RESPONDENT #1	**3**
RESPONDENT #2	**3**
RESPONDENT #3	**4**
RESPONDENT #4	**4**
RESPONDENT #5	**1**
AVERAGE	3

#10. FAMILIARIZED YOU WITH THE KNOWLEDGE OF CONTEMPORARY ISSUES…

1 STRONGLY DISAGREE
2 DISAGREE
3 AGREE
4 STRONGLY AGREE

RESPONDENT #1	**3**
RESPONDENT #2	**3**
RESPONDENT #3	**3**
RESPONDENT #4	**3**
RESPONDENT #5	**1**
AVERAGE	2.6

#11. ENABLED YOU TO USE THE TECHNIQUES, SKILLS, AND MODERN ENGINEERING TOOLS NECESSARY FOR ENGINEERING PRACTICE…

1 STRONGLY DISAGREE
2 DISAGREE
3 AGREE
4 STRONGLY AGREE

RESPONDENT #1	**3**
RESPONDENT #2	**4**
RESPONDENT #3	**4**
RESPONDENT #4	**4**
RESPONDENT #5	**3**
AVERAGE	3.6

ADDITIONAL COMMENTS:	
RESPONDENT #1	
RESPONDENT #2	**Offer more specific courses for structural and transportation concentrations.**
RESPONDENT #3	
RESPONDENT #4	**Civil Program needs more resources.**
RESPONDENT #5	

Appendix A-13: Internship and Co-op Survey Report

INDIANA UNIVERSITY-PURDUE UNIVERSITY FT.WAYNE
Department of Civil and Mechanical Engineering

TO: Assessment Committee

FROM: Max Yen
CE Co-Op Coordinator

DATE: August 3, 2018

SUBJECT: CE Co-Op Report (Summer 2018)

Rating

Student (class)	Employer	Student's rate of the overall performance	Employer's rate of the overall performance
1. Colton Amstutz (So)	NUCOR	Very Good	Very Good
2. Stas Kosnik (Jr)	NUCOR	Outstanding	Outstanding
3. Taylor Hartman (Sr)	INDOT	Very Good	Very Good

External Assessment:
The table below indicates performance factors and areas of competence the student ***(1-7above)*** can achieve through the co-op experience. The items below can be mapped to the Civil Engineering program outcomes. The number indicates the student's level of performance in these areas during the current work term as reported by the supervisors.

Conclusion: Based on:

- Student evaluation
- Student report
- Employer evaluation
- My company visit and meeting with the students and supervisors

The cooperative education students demonstrated:
1. An ability to identify, formulate, and solve engineering problems.
2. An understanding of professional and ethical responsibility.
3. A recognition of the need for, and an ability to engage in life long learning.
4. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
5. An ability to communicate effectively.
6. An ability to analyze and interpret data.

The Civil Engineering curriculum is preparing the students very well for the Cooperative Education jobs. The employers are very satisfied with the academic preparations of the students.

1 = Outstanding, 2 = Very Good, 3 = Average, 4 = Marginal, 5 = Unsatisfactory, – = Not Applicable

Measurements Related to the Program Outcomes; Student:	***1***	***2***	***3***
Ability to integrate theory (academic learning) and practice (co-op experience).	2	1	2
Academically prepared for this job (course preparation).	2	2	2
Communicates clearly in written form.	2	1	2
Communicates clearly verbally.	2	1	1
Demonstrates ability to use decision-making skills.	2	1	2
Demonstrates analytical problem solving skills.	2	1	2
Demonstrates necessary technical skills.	3	2	2
Demonstrates ability to apply technical knowledge/skills.	3	2	2
Demonstrates the necessary computer skills.	2	2	1
Demonstrates ability to design.	-	-	2
Demonstrates to Work under Pressure	-	-	2
Exercise Judgement	-	-	2

Appendix A-14: ABET EAC Final Statement

Civil Engineering
BSCE Program

Program Criteria for Civil and Similarly Named Engineering Programs

Introduction

The civil engineering BSCE program is offered by the Department of Civil and Mechanical Engineering. The program has four full-time faculty members and two adjunct or limited-term lecturers. The program currently enrolls 76 undergraduate students and awarded 14 bachelor's degrees in the 2016-17 academic year.

Program Concern

1. Criterion 8. Institutional Support This criterion requires that the resources available to the program must be sufficient to attract, retain, and provide for the continued professional development of a qualified faculty. For the first time in many years, the program has provided funds in the 2017-18 academic year to support faculty members' travel to scientific conferences and workshops. If such support is not provided on a continual basis, the professional development of the program's faculty members may suffer, and future compliance with this criterion may be jeopardized.

    - 30-day due-process response: The EAC acknowledges receipt of a statement from the vice chancellor for academic affairs dated February 16, 2018, that formally documents how the university will compute the amount of funds to be dedicated to faculty development. The funding formula set forth in this statement will ensure that future support will be sufficient to permit faculty members to attend scientific conferences, workshops, and other professional development activities.

    - The concern is resolved.

Appendix A-15: CE Course Assessment Schedule

	Course/Lab	S11	F11	S12	F12	S13	F13	S14	F14	S15	F15	S16	F16	S17	F17	S18	F18
Fundamentals and Engineering	ENGR 127 Fundamentals of Engineering I								✓		✓	✓	✓	x			
	ENGR 128 Fundamentals of Engineering II									✓		✓	✓	x			
…Courses	CE 210 Introduction to Geomatics				✓		✓*								*		
	CE 250 Statics	✓	✓					✓	✓	✓		✓	✓				
	CE 251 Dynamics	✓			✓		✓*				✓	✓	✓	x			
	CE 252 Strength of Materials	✓		✓	✓		✓					✓	✓	x	*	*	
	CE 315 CE Materials	✓		✓								✓					
	CE 316 CE Materials Lab				✓		✓				✓		✓				
	CE 316 CE Materials Lab Evaluation				✓		✓				✓		✓				
	CE 318 Fluid Mechanics					✓	✓*				✓					*	*
	CE 319 Fluid Mechanics Lab							✓			✓		✓	x	*	*	*
	CE 319 Fluid Mechanics Lab Evaluation							✓*		✓	✓		✓	x			
	CE 330 Construction Management				✓		✓				✓		✓				
	CE 345 Transportation Engineering	✓		✓												*	
	CE 365 Environmental Engineering	✓		✓					✓				✓				

CE Core	CE 366 Environmental Engineering Lab		✓											x			
	CE 366 Environmental Engineering Lab Evaluation		✓											x			
	CE 375 Structural Analysis		✓					✓	✓	✓			✓	x	*		*
	CE 380 Soil Mechanics			✓		✓		✓				✓		x			
	CE 381 Soil Mechanics Lab			✓		✓		✓		✓		✓		x			
	CE 381 Soil Mechanics Lab Evaluation			✓		✓		✓*				✓		x		*	
	CE 401 Civil Engineering Profession and Practice		✓				✓				✓				*		
	CE 418 Hydraulics Engineering				✓						✓						*
	CE 478 Design of Concrete Structures	✓				✓						✓					
	CE 481 Foundation Engineering								✓		✓		✓		*		
	CE 487 Senior Design I		✓	✓	✓	✓	✓	✓	✓		✓	✓		x		*	
	CE 488 Senior Design II			✓	✓	✓		✓									*
CE Elective Courses	CE 450 Urban Transportation Planning	✓				✓				✓		✓					*
	CE 465 Water and Wastewater Engineering	✓				✓						✓				*	*
	CE 475 Design of Steel Structure				✓				✓		✓				*		*
	CE 490 Selected Topics in Civil Engineering				✓		✓							x			

TO: Nash Younis, Chair
FROM: ETCS Assessment Committee
SUBJ: 2017-2018 Assessment Report for CE
DATE: January 31, 2019

The ETCS Assessment Committee has received and reviewed the CE's 2017-2018 Assessment Report. Our comments below follow the rubrics derived from the revised Senate Document 98-22. Appendix D.

BS report of 2017-2018 assessment activities:

Reporting results:

- Results are clearly presented (e.g., student evaluation of course learning outcomes).
- Make sure data in tables are complete. For example, the "n" is included in some tables (e.g., exit survey), but not in all tables.
- Past iterations of results are provided in most cases; this is helpful information.
- The report indicates there were three senior design projects, yet only two are reported on – is this simply an oversight?

Report dissemination and collaboration:

- Information is shared with faculty. This is more clearly stated than prior reports.
- Information is routinely provided to the program's Industrial Advisory Board (IAB).

Use of results for programmatic change to improve student learning, achievement and success:

- While some recommendations for continuous improvement based on last year's results are provided, it would be helpful if the report provided more specific evidence of what changes have been re-assessed based on previous recommendations. Making this more explicit would be helpful (perhaps a table indicating the change that was made, the assessment tool used to assess the change, and a brief description of results).

Overall, the CE program has an established plan for collecting and reporting data for assessment purposes. For next year's report we suggest you:

- Indicate if the program plans to change anything to align with ABET's new program outcomes.
- The ME report mentions surveying graduate advisors to determine if PFW CE students are adequately prepared for graduate work. This is an excellent idea; has CE also considered doing this?
- Have the PE test results been analyzed for trends that suggest any changes needed in the curriculum?
- Ensure surveys and reports are updated to designate Purdue Fort Wayne as our institution.

Please contact us if we can provide any assistance as you move forward with your assessment process.

Indiana University-Purdue University Fort Wayne

Department of Electrical and Computer Engineering

Computer Engineering Program

Assessment Plan

Spring 2017

Revision History

Background: The Computer Engineering Assessment Plan has gone through several revisions as follows. In July 2015, the Department of Engineering was split into two departments: Electrical and Computer Engineering, and Civil and Mechanical Engineering. The Assessment Plan has been revised to reflect those changes.

0. Original document – approved by faculty December 1, 2004
1. New measures table and SD forms updated – approved by faculty February 21, 2005
2. Procedure to update PEOs – approved by faculty December 2, 2006
3. Original schedule of program & course outcomes assessment (now obsolete)removed ;guidelines for frequency of assessment updated– approved by faculty September 25, 2006
4. PEOs modified – approved by faculty February 25, 2010
5. Due date of reports changed and SD assessment emphasized – approved by faculty April 18, 2011
6. New proposed CPE PEOs – approved on Feb 27, 2012.
7. Lab evaluations by both instructor and student emphasized on lab safety – approved on April 23, 2012
8. Student Learning Outcomes updated to be in alignment with ABET outcomes – approved on November 18, 2013
9. SDI outcomes and assessment questions revised – approved by faculty Spring 2014.
10. SDII course outcomes recommended to be assessed by faculty advisor(s) and course coordinator separately, with faculty advisors (1) to (4) and course coordinator (5)-(8) – approved by faculty fall 2013 (page 22).
11. CPE SLOs updated to be in alignment with ABET outcomes, – approved by faculty Feb 13, 2017 (page 7).
12. Mapping of IPFW Baccalaureate framework to CMPE SLO added in Section 4.2, Table 2b – approved by faculty March 20, 2017 (page 8)
13. Tab3a, 3b: Mapping of course outcomes Revised: Mapping from course outcomes to SLOs/ABET Program outcome with degree of mapping – approved by faculty March 20, 2017 (page 11)
14. Freshman Engineering Courses Assessment Cycle Revised in Section 6.1 – approved by faculty March 20, 2017(page 13)
15. Exit Survey Procedure updated in Section 6.3.2.2. – updated spring 2017 (page 24)
16. "Program Outcomes" changed into "Student Learning Outcomes (SLOs)" – updated in spring 2017.
17. Mapping from CPE PEOs to SLOs proposed, – approved by faculty March 20, 2017 (page 7)

Note: When courses are added, changed or removed from the curriculum, Table 3 is modified accordingly. This table was done most recently in the spring 2017.

Table of Contents

1. Introduction

The Department of Electrical and Computer Engineering (ECE) in the College of Engineering, Technology, and Computer Science (ETCS), at Indiana University – Purdue University Fort Wayne (IPFW) serves the needs of students, industry, and government of northeastern Indiana. This Department was split from the Department of Engineering and established on July 1, 2015. The department offers Bachelor of Science (B.S.) degrees in the following fields:

- Electrical Engineering (B.S.E.E.)
- Computer Engineering (B.S.CPE.)

The Electrical, and Computer engineering programs are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone: 410-347-7700.

The major aim of the Department of Electrical and Computer Engineering is to ensure its graduates understand basic concepts of mathematics and sciences, have studied one engineering field in sufficient depth to appreciate its methodologies of analysis and design, and have acquired a solid basis for life-long learning. These goals are accomplished through the establishment of courses in:

- science and mathematics
- required technical topics in the major area
- elective technical topics that combine breadth of subject matter with specific study in depth
- general education

Laboratory and design experience are an essential part of the curricula.

The ABET criteria are based on the principles of total quality management and continuous improvement. The criteria require that each program's mission be consistent with the institutional mission. The mission must be translated into specific program educational objectives and Student Learning Outcomes that are expected as a result of the educational process. The Student Learning Outcomes should be measurable and must be assessed regularly. The results of outcomes assessment should be used as feedback to make program improvements. Finally, a quality assurance and management process must be in place to achieve success.

2. Department Mission

Our mission is to support the needs of northeast Indiana through education, scholarship and service. We are committed to providing quality educational opportunities to both traditional and non-traditional students and seek to equip our students with the knowledge, skills, and experience to pursue productive engineering careers. Our faculty is also dedicated to excellence in scholarship and service to the community and the profession.

This department mission is consistent with the mission of the college and the university.

3. Computer Engineering Program Educational Objectives

The faculty members of the Department of Electrical and Computer Engineering continuously work with the alumni, their employers, and the department's Industry Advisory Board on the formulation of the educational objectives.

The original educational objectives were established and approved by the faculty of the Department of Engineering in fall 2001. They were developed based on the alumni survey conducted in 2001 and on recommendations from the department's Industry Advisory Board. They are consistent with the missions of the university, the school, and the department. In 2009, the educational objectives were revised slightly, following an alumni survey conducted in summer 2009 and with input from employers, industrial sponsors of capstone senior design projects, and members of the department's Industry Advisory Board. Based on the feedback, the objectives are relevant and appropriate. These modified objectives were recommended by the Assessment Committee and approved by the faculty at the 22 February 2010 department meeting. During 2011-2012 academic year, the CPE program educational objectives (PEOs) have gone through another round review and update process. As a result, the following PEOs of the computer engineering program were approved by the faculty of the Department of Electrical and Computer Engineering on February 27, 2012. In 2015, PEOs went through another review, assessment results demonstrate that no revision of current PEOs were necessary.

As a framework for the continuous improvement policy, the computer engineering program has adopted a set of program educational objectives that describe the anticipated accomplishments of our graduates 3-5 years after graduation.

The computer engineering program educational objectives are to produce graduates who:

1. Function and communicate effectively to solve technical problems.
2. Advance professionally to roles of greater computer engineering responsibilities and/or by transitioning into leadership positions in business, government, and/or education.
3. Participate in life-long learning through the successful completion of advanced degree(s), professional development, and/or engineering certification(s)/licensure.
4. Demonstrate a commitment to community by applying technical skills and knowledge to support various service activities.

3.1 Procedure to Update Program Educational Objectives

The educational objectives of the computer engineering program at IPFW are to be periodically evaluated every five years starting in the fall of 2007. This evaluation is to be performed by seeking input from the following constituencies: 1) Alumni, 2) Industrial Sponsors of the Capstone Senior Design Projects, 3) Employers, and 4) Industry Advisory Board.

Input:

- ⇨ During the fall semester of every fifth academic year, the Assessment Committee will develop appropriate surveys and send them to all the alumni (who have graduated in the last five years), their employers, and the industrial sponsors of the capstone senior design projects. The surveys are in Appendix I.
- ⇨ The feedback from the surveys is to be shared with the Industry Advisory Board members when seeking their input.

Action:

- ⇨ All the input is reviewed by the Assessment Committee.
- ⇨ The committee prepares a report. If the report recommends a change of the educational objectives it will also include a draft of the new educational objectives. The revised educational objectives shall also be consistent with the mission and goals of IPFW.
- ⇨ The report is presented to the faculty of the Department of ECE for discussion and approval. This final step takes place before the end of the spring semester following the fall semester of the fifth year of the evaluation cycle.

The process for the periodic evaluation of the educational objectives of the computer engineering program is illustrated in the figure below.

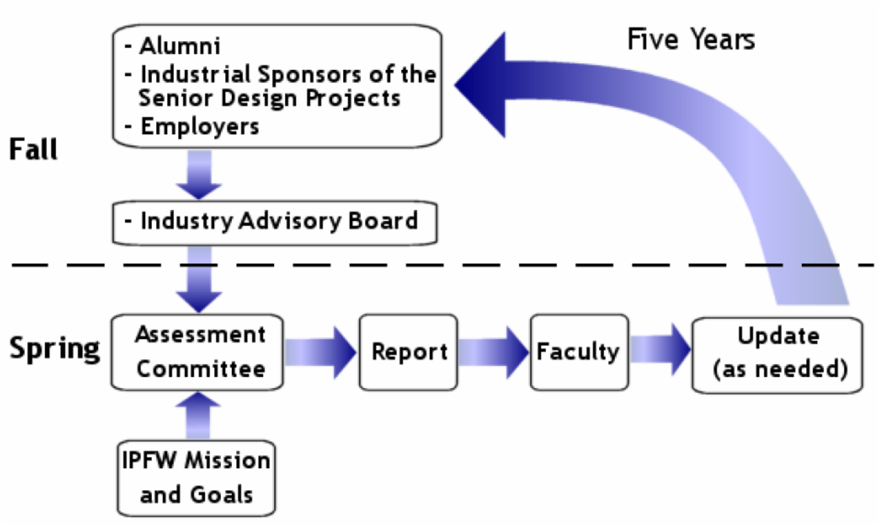


Figure: Process for the periodic evaluation of the program educational objectives.

4. Computer Engineering Student Learning Outcomes and IPFW Baccalaureate Framework

The computer engineering Student Learning Outcomes lead to the achievement of the program educational objectives as illustrated in Table 1. The following Student Learning Outcomes of the computer engineering program at IPFW were established and approved by the faculty in spring 2017:

(a) an ability to apply knowledge of mathematics, science, and engineering

(b) an ability to design and conduct experiments, as well as to analyze and interpret data

(c) an ability to design a computer system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

(d) an ability to function as team members on engineering projects, laboratory experiments, and/or multidisciplinary activities

(e) an ability to identify, formulate, and solve computer engineering problems

(f) an understanding of professional and ethical responsibility

(g) an ability to communicate effectively

(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

(i) a recognition of the need for, and an ability to engage in life-long learning

(j) a knowledge of contemporary issues

(k) an ability to use the techniques, skills, and modern engineering tools necessary for computer engineering practice.

Table 1: Relation between Computer Engineering Student Learning Outcomes and Educational Objectives

		Student Learning Outcomes										
		a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
CPE PEOs	**1**	X	X	X	X	X		X				X
	2					X	X	X	X		X	
	3									X	X	
	4						X		X		X	

4.1 ABET Program Outcomes

Engineering programs must demonstrate that their students attain the following outcomes:

(a) an ability to apply knowledge of mathematics, science, and engineering

(b) an ability to design and conduct experiments, as well as to analyze and interpret data

(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

(d) an ability to function on multidisciplinary 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) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

(i) a recognition of the need for, and an ability to engage in life-long learning

(j) a knowledge of contemporary issues

(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

The Computer Engineering Student Learning Outcomes at IPFW are one-to-one mapped to ABET a-k outcomes as illustrated in Table 2a.

Table 2a: Relation between ABET a-k Outcomes to Computer Engineering Student Learning Outcomes

ABET	a	b	c	d	e	f	g	h	i	j	k
Computer Engineering	a	b	c	d	e	f	g	h	i	j	k

4.2 IPFW Baccalaureate Framework Mapping from CMPE Program Outcome

IPFW has developed a framework for its Baccalaureate Degree in April 10, 2016 as the following:

> Students who earn a baccalaureate degree at IPFW will be able to apply their knowledge to the needs of an increasingly diverse, complex, and dynamic world. To that end, IPFW continually develops and enhances curricula and educational experiences that provide all students with a holistic and integrative education.

The IPFW faculty has identified six foundations of baccalaureate education.

- **Acquisition of Knowledge**
  Students will demonstrate breadth of knowledge across disciplines and depth of knowledge in their chosen discipline. In order to do so, students must demonstrate the requisite information- seeking skills and technological competencies.
- **Application of Knowledge**
  Students will demonstrate the ability to integrate and apply that knowledge, and, in so doing, demonstrate the skills necessary for life-long learning.
- **Personal and Professional Values**
  Students will demonstrate the highest levels of personal integrity and professional ethics.
- **A Sense of Community**
  Students will demonstrate the knowledge and skills necessary to be productive and responsible citizens and leaders in local, regional, national, and international communities. In so doing, students will demonstrate a commitment to free and open inquiry and mutual respect across multiple cultures and perspectives.
- **Critical Thinking and Problem Solving**
  Students will demonstrate facility and adaptability in their approach to problem solving. In so doing, students will demonstrate critical-thinking abilities and familiarity with quantitative and qualitative reasoning.
- **Communication**
  Students will demonstrate the written, oral, and multimedia skills necessary to communicate effectively in diverse settings.

These foundations provide the framework for all baccalaureate degree programs. The foundations are interdependent, with each one contributing to the integrative and holistic education offered at IPFW.

The mapping from Computer Engineering program students' Learning Outcomes to IPFW Baccalaureate Degree Framework is shown in Table 2b.

Table 2b. IPFW Baccalaureate Framework Map from CMPE SLOs

Computer Engineering Students Learning Outcomes	IPFW Baccalaureate Degree Framework					
	Acquisition of Knowledge	Application of Knowledge	Personal and Professional Values	A Sense of Community	Critical Thinking and Problem Solving	Communication
(a).an ability to apply knowledge of mathematics, science, and engineering	X	X			X	
(b) an ability to design and conduct experiments, as well as to analyze and interpret data	X	X	X		X	
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	X	X	X	X	X	
(d) an ability to function as team members on engineering projects, laboratory experiments, and/or multidisciplinary activities		X	X		X	X
(e) an ability to identify, formulate, and solve computer engineering problems		X	X		X	
(f) an understanding of professional and ethical responsibility			X	X		X
(g) an ability to communicate effectively						X
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context			X	X	X	
(i) a recognition of the need for, and an ability to engage in life-long learning			X			
(j) a broad knowledge of contemporary issues				X		
(k) an ability to use the techniques, skills, and modern tools necessary for computer engineering practice.			X		X	

5. Computer Engineering Course Outcomes

Outcomes for all required and technical elective computer engineering courses have been developed by the faculty members of the computer engineering program. The Assessment Committee assigned a primary faculty and a related faculty, based on their area of expertise and experience, to establish the outcomes for each course. The course outcomes are part of the syllabus for every course taught by an engineering faculty. The course outcomes are mapped to the ABET and computer engineering programs outcomes as illustrated in Table 3a for the required courses, and in Table 3b, for the technical elective courses.

The learning objectives of the general education courses are assessed by campus-wide committees according to a specific schedule for each area.

Table 3a**. Mapping of Required CPE Course Outcomes to CPE SLOs/ABET Outcomes**

CPE SLOs	Design Content	a	b	c	d	e	f	g	h	i	j	k
ABET Program Outcomes		a	b	c	d	e	f	g	h	i	j	k
ENGR 127	Low	H	M		H	L	H	M		L		H
ENGR 128	Medium	H		M	H	L	L	H				H
ECE 201	Low	H				M						
ECE 202	Low	H				H						M
ECE 255	Medium	H		L		M						M
ECE 208	High	H	H	L		L						
ECE 207	High	H	H	L		L		H				H
ECE 270	High	H	H	H		M		L				H
ECE 301	None	H				M						M
ECE 302	None	H				M						
ECE 358	High	H	H	L								H
ECE 362	High	H	H	L		M		M				H
ECE 368	High	H	H			L						H
ECE 437	High	H	H	L		H				L		H
ECE 465	High	H		L		H						H
ECE 485	High	H	H	L				M				H
ECE 405	High	M		H	M	H	M	H	L			
ECE 406	High			H	H		H	H	H	H	H	
CS 229^	Medium	H	M	M	L	M	L	L	M	L	L	H
Overall Mapping Index*		53	28	21	12	31	10	20	6	6	4	39

Table 3b**. Mapping of Elective CPEE Course Outcomes to CPE SLOs/ABET Outcomes**

CPE SLOs	Design Content	a	b	c	d	e	f	g	h	i	j	k
ABET Program Outcomes		A	b	c	d	e	f	g	h	i	j	k
ECE 311	Low	H		M		L						
ECE 313	High	H	H			M		H				H
ECE 324	Medium	H				H					L	M
ECE 333	High	H		H		M						H
ECE 428	Medium	H		M		M						H
ECE 436	High	H				H		M				M
ECE 483	High	H		H		M						H
ECE 547	None	H	M	L		H		L				
ME 253^	None	H				H						
Overall Mapping Index*		27	5	11		21		6			1	16

*H: Outcome Assessed High Degree, M: Outcome Assessed Middle Degree, L: Outcome Assessed Low degree
Computed with values assigned to the indicators; i.e. H=3, M=2, and L=1
^ Courses not offered by ECE departments.

6. Assessment Process

The educational objectives and Student Learning Outcomes (SLOs) of the computer engineering program at IPFW are assessed using direct and indirect measures as summarized in Table 4.

Table 4: Direct and Indirect Measures

	Measures	
	Direct	Indirect
Educational Objectives	1) Employers (Supervisors) survey and Feedback 2) Student Learning Outcomes	1) Alumni Survey 2) Admittance to Graduate School 3) Industry Advisory Committee
Program SLOs	1) Interim Assessment by Faculty 2) Capstone Assessment • Industrial Sponsor • Faculty Members	1) Interim Assessment by Students • Courses Outcomes • Laboratory Evaluation • ECE Students' Forums 2) Exit Survey 3) FE Exam 4) Co-op Education Coordinator Report

6.1 Assessment Reports

The Assessment Committee prepares *Assessment Reports* for each engineering program summarizing the assessment results in each semester. The reports are due by February 15 and September 15 for the fall and spring semesters, respectively.

Starting fall 2016, based on the recommendation of First-Year Engineering Committee, ENGR 127/128 will be assessed and reported by First-Year Engineering Committee annually. ENGR127 will be assessed in fall semester and ENGR128 will be assessed in spring semester. The First-Year Engineering Assessment Report will be available around May and included in spring assessment report.

6.2 Educational Objectives Assessment

6.2.1 Direct Measures

6.2.1.1 Employer (Supervisors) Survey and Feedback

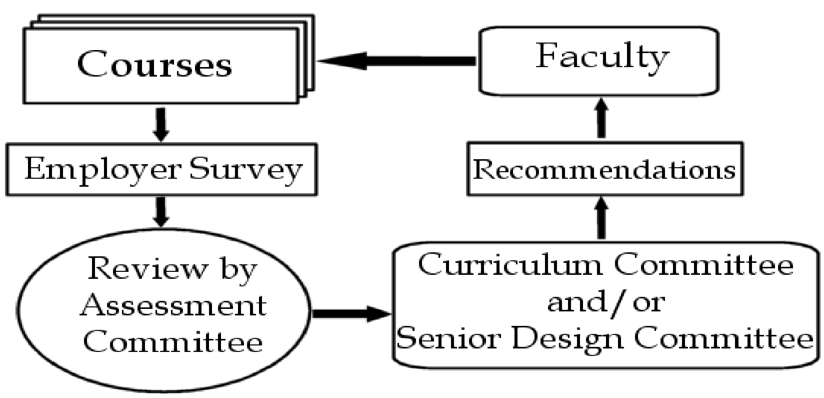
This survey consists of several questions that will provide the Assessment Committee with data and feedback to assess the readiness of our graduate to embark upon professional career in the area of computer engineering and to assess the achievement of the educational objectives of the computer engineering program at IPFW. A sample copy of this survey along with a cover letter can be found in Appendix I.

Frequency:

- The employer survey is sent in July to all the employers of alumni who return a survey, i.e. coincides with the alumni survey time table.

Action:

- Feedback is reviewed by the Assessment Committee.
- Any concerns or negative feedback are referred to the computer engineering Curriculum Committee and/or Senior Design Committee to act upon and provide recommendations.



6.2.1.2 Student Learning Outcomes

According to ABET criteria *"program outcomes are statements that describe what students are expected to know or be able to do by the time of graduation from the program"*. The computer engineering Student Learning Outcomes at IPFW were established to lead to the achievement of the programs educational objectives as illustrated in Table 1. Therefore, the achievement of the programs outcomes can be used as an indirect measure for the achievement of our programs educational objectives.

Frequency:

- See Student Learning Outcomes assessment section.

Action:

- See Student Learning Outcomes assessment section.

6.2.2 Indirect Measures

6.2.2.1 Alumni Survey

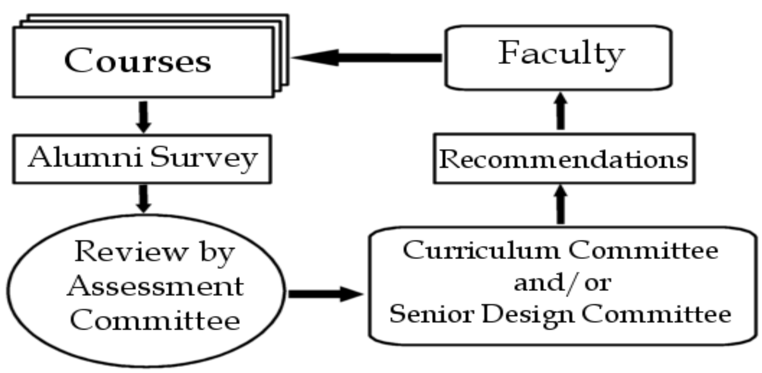
This survey consists of several questions that will provide the Assessment Committee with data and feedback to assess the achievement of the educational objectives of the computer engineering program at IPFW. A sample copy of this survey along with a cover letter can be found in Appendix I.

Frequency:

- Starting May 2006, the alumni survey is to be conducted every year (in May). It is sent to all alumni who have graduated three years before the date of the survey.

Action:

- Feedback is reviewed by the Assessment Committee.
- Any concerns or negative feedback are referred to the computer engineering Curriculum Committee and/or Senior Design Committee to act upon and provide recommendations to the faculty.



6.2.2.2 Admittance to Graduate School

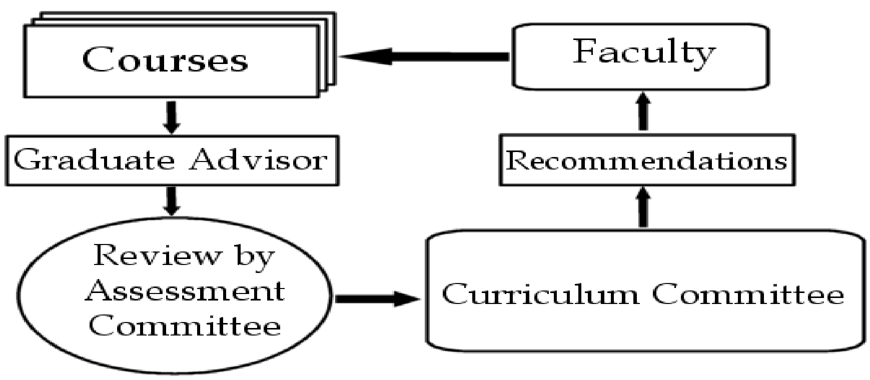
Some of our computer engineering graduates decide to pursue graduate study. The success of these students in gaining admittance to graduate schools and their performance therein can be used as an indirect measure for the achievement of our program educational objectives.

Frequency:

- Every year the Assessment Committee finds out the number of graduating seniors who have received offers from graduate schools and have accepted.
- The Assessment Committee will try to get some feedback from the graduate advisors regarding the preparedness of our graduates to pursue graduate study.

Action:

- The feedback is reviewed by the Assessment Committee.
- Any concerns or negative feedback are referred to the computer engineering Curriculum Committee to act upon and provide recommendations.



6.2.2.3 Industry Advisory Board

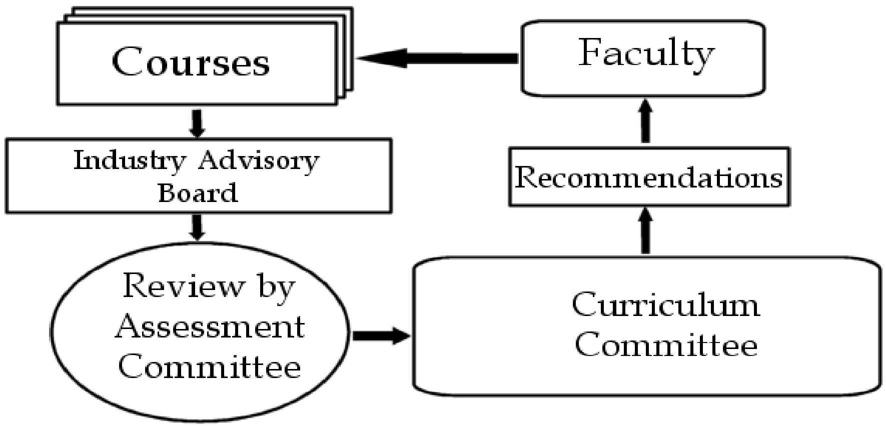
The Industry Advisory Board of the Department of Electrical and Computer Engineering consists of high-level executives from related industries in Northeastern Indiana. The purpose of this board is to advise and assist the department in maintaining strong engineering programs. The department consults with the board on issues such as industrial trends in the region, curriculum matters, cooperative education program, and assessment.

Frequency:

- The Chair of the department arranges for a meeting of the Industry Advisory Board with the faculty of the department at least once a year.

Action:

- Any concerns or advice shared with the faculty are referred to the Curriculum Committee to act upon and provide recommendations.



6.3 Student Learning Outcomes Assessment

6.3.1 Direct Measures

6.3.1.1 Interim Assessment by Faculty

Course Outcomes Assessment

A standard *Assessment Form* (see sample in Appendix II) developed by the Assessment Committee is used in the assessment of the Student Learning Outcomes by the faculty. Several rubrics have been developed for each ABET program outcome to help the faculty in the assessment of the outcomes. At the end of a given semester, each faculty must complete and submit a separate assessment form for the assigned Student Learning Outcomes for all of his/her courses offered in that semester.

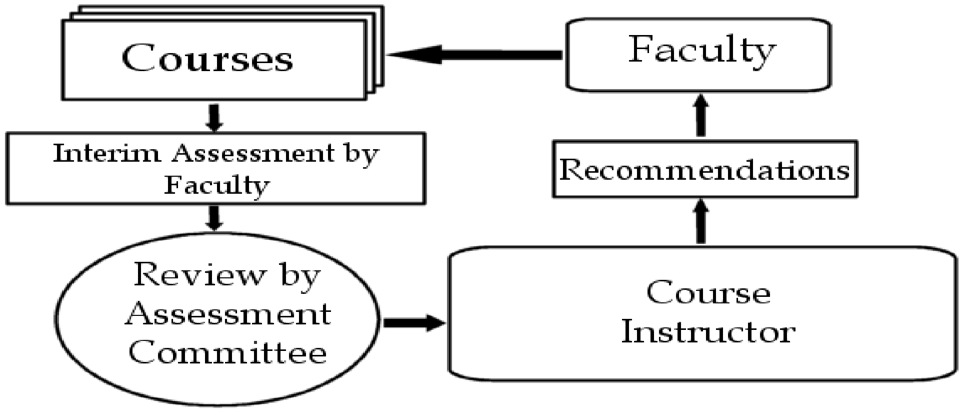
Frequency:

The Assessment Committee will use the following guidelines in determining which courses are to be assessed.

- Carry out the assessment of Student Learning Outcomes whenever a course is taught by a faculty for the first time.
- Each semester, carry out the assessment of Student Learning Outcomes for at least one course at each level: freshman, sophomore, junior, and senior.
- If the outcomes were achieved, the course is not to be assessed more than once in two years.
- All ABET Program Outcomes associated with the course being assessed in a given semester are to be assessed in that semester.
- ECE 405/406 are to be assessed each semester. Both the coordinator and advisors will be involved. For ECE 406 course outcome assessment, in fall 2013, it is recommended by EE/CPE Curriculum Committees and Assessment Committee that faculty advisor assess course outcomes (1)-(4) and the course coordinator assess course outcomes (5)-(8).

Action:

- The assessment forms are reviewed by the Assessment Committee. The results are shared with the rest of faculty.
- Any outcome in any given course that was not achieved is reassessed in the following semester in which the course is offered.
- According to the Assessment Form, if the outcome was not achieved, the faculty outlines a plan (i.e., solution) that helps in achieving the outcome. This plan is forwarded to the faculty member who will be teaching the course next time around.



Lab Evaluations

Laboratories are an integral part of the computer engineering program at IPFW. The computer engineering curriculum consists of two laboratories: ECE 208 – Electronic Devices and Design Laboratory, and ECE 207 – Electronic Measurement Techniques. In addition, laboratories are the integral parts of the following four courses: ECE 270 – Introduction to Digital Design, ECE 362 – Microprocessor Systems and Interfacing, ECE 437 - Computer Design and Prototyping, and ECE 485 – Embedded Real-Time Operating Systems.

To ensure that the laboratories are well equipped and up to the standards to fulfill their mission in achieving the related Student Learning Outcomes, the Assessment Committee has developed a laboratory evaluation form to help with this assessment. The laboratory evaluations are carried out by lab instructors. A copy of the instructor laboratory evaluation form can be found in Appendix II.

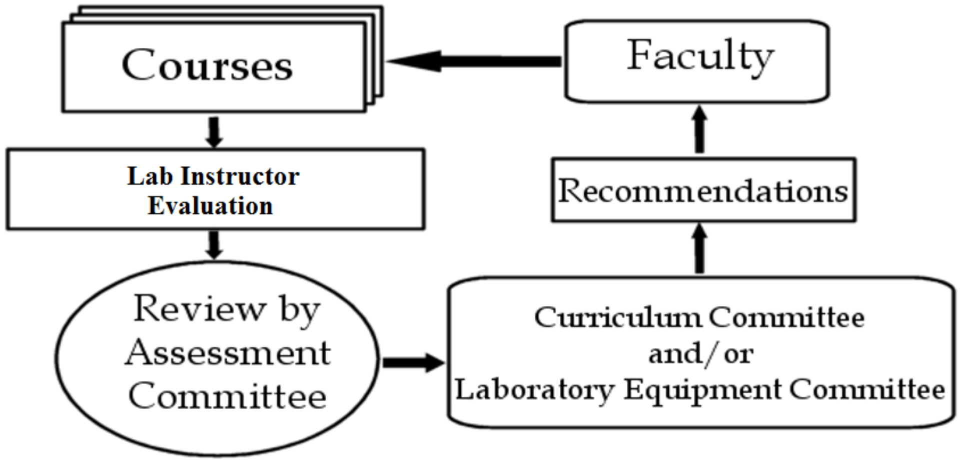
Frequency:

The Assessment Committee will use the following guidelines in determining which labs are to be evaluated.

- Carry out the evaluation whenever a lab is taught by an instructor for the first time.
- Each semester, carry out the evaluation for at least one lab.
- Evaluate a lab when the hardware and/or software have substantially changed.
- If the feedback is positive, then the laboratory evaluation will be conducted every other year.
- If the feedback for any laboratory is negative, then the laboratory evaluation is carried out after the recommendations of the appropriate committees are implemented.
- It is the same lab which is evaluated by students and instructor.

Action:

- The feedback is reviewed by the Assessment Committee.
- Any concerns or negative feedback are referred to the Curriculum Committee and the Laboratory Equipment Committee to act upon and provide recommendations.



6.3.1.2 Capstone Senior Design Assessment

6.3.1.2.1 Industrial Sponsor

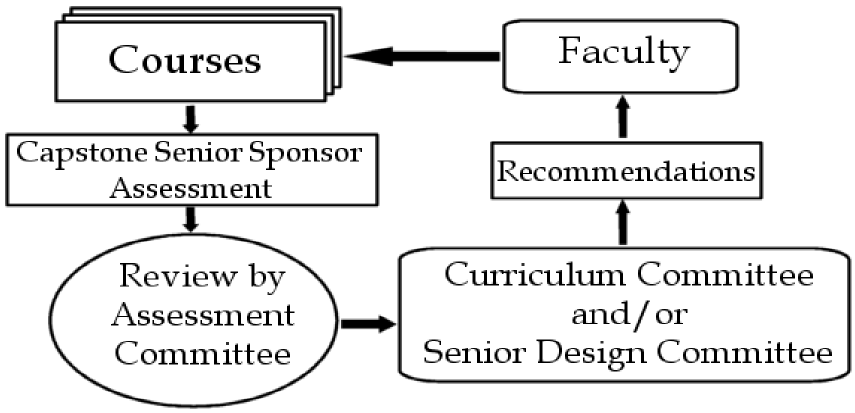
Capstone senior design projects are team projects and the majority of these projects are sponsored by the local industry. The achievement of the course outcomes of the capstone senior design is assessed by the project supervisors of the corresponding industrial sponsors. A sample copy of the assessment form that is completed by the supervisors can be found in Appendix II. In addition, the percentage of the senior design projects that are sponsored by the industry is also a measure of our Student Learning Outcomes.

Frequency:

- For senior design II (ECE 406), the Capstone Senior Design Coordinator sends the assessment form to all project supervisors of the corresponding companies by mid April of each spring semester or mid November of the fall semester. Completed assessment forms are returned to the coordinator before the senior design presentation.

Action:

- The feedback is reviewed by the Assessment Committee.
- Any concerns or negative feedback are referred to the Senior Design Committee and/or Curriculum Committee to act upon and provide recommendations.



6.3.1.2.2 Faculty Members

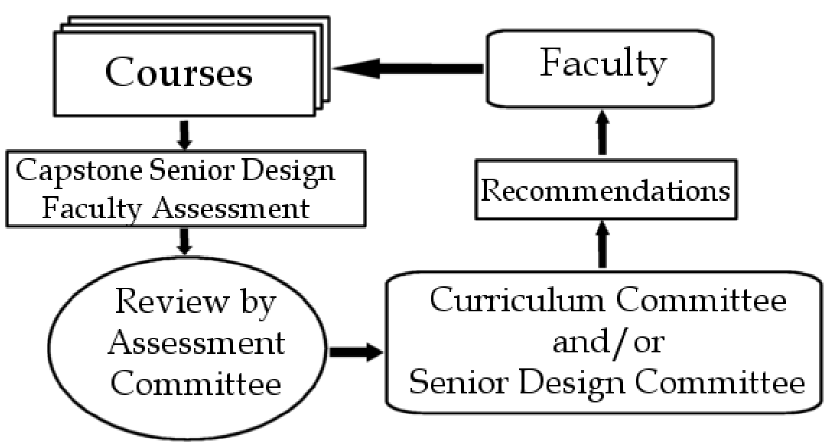
The achievement of the course outcomes of the capstone senior design is also assessed the faculty members of the Department of ECE. A sample copy of the assessment form that is completed by the supervisors can be found in Appendix II.

Frequency:

- Faculty members complete the Capstone Senior Design form after the senior design presentations.

Action:

- The feedback is reviewed by the Assessment Committee.
- Any concerns or negative feedback are referred to the Senior Design Committee and/or Curriculum Committee to act upon and provide recommendations.



6.3.2 Indirect Measures

6.3.2.1 Interim Assessment by Students

Course Outcomes

For each course, the achievement of the course outcomes are assessed by all of the students enrolled in the course. A sample form of this type of assessment can be found in Appendix II.

Frequency:

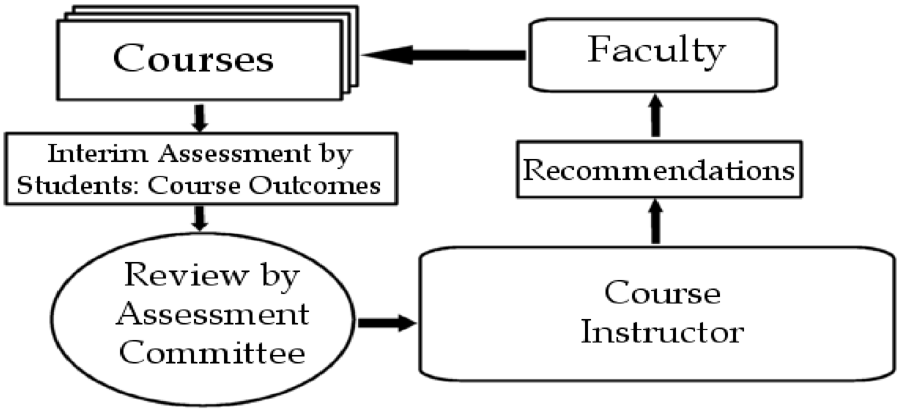
Student evaluation of the course outcomes is carried out by all students enrolled in a class at the end of the semester (during the week before the final exams week).

The Assessment Committee will use the following guidelines in determining which courses are to be assessed.

- Carry out the assessment of course outcomes whenever a course is taught by a faculty for the first time.
- Each semester, carry out the assessment of course outcomes for at least one course at each level: freshman, sophomore, junior, and senior.
- If the outcomes were achieved, the course is not to be assessed more than once in two years.
- ECE 405/406 are to be assessed each semester.
- The same set of courses are assessed by the course instructor and the students.

Action:

- The feedback is reviewed by the Assessment Committee.
- Any negative feedback is forwarded to the instructor of the course.
- The instructor, in turn, addresses the concern.
- Any course outcomes that were not achieved are reassessed in the following semester in which the course is offered.



Laboratory Evaluations

Laboratories are an integral part of the computer engineering program at IPFW. The computer engineering curriculum consists of two laboratories: ECE 208 – Electronic Devices and Design Laboratory, and ECE 207 – Electronic Measurement Techniques. In addition, laboratories are the integral parts of the following four courses: ECE 270 – Introduction to Digital Design, ECE 362 – Microprocessor Systems and Interfacing, ECE 437 - Computer Design and Prototyping, and ECE 485 – Embedded Real-Time Operating Systems.

To ensure that the laboratories are well equipped and up to the standards to fulfill their mission in achieving the related Student Learning Outcomes, the Assessment Committee has developed a laboratory evaluation form to help with this assessment. The laboratory evaluations are carried out by all students that are enrolled in a laboratory course. A copy of the laboratory evaluation form can be found in Appendix II.

Frequency:

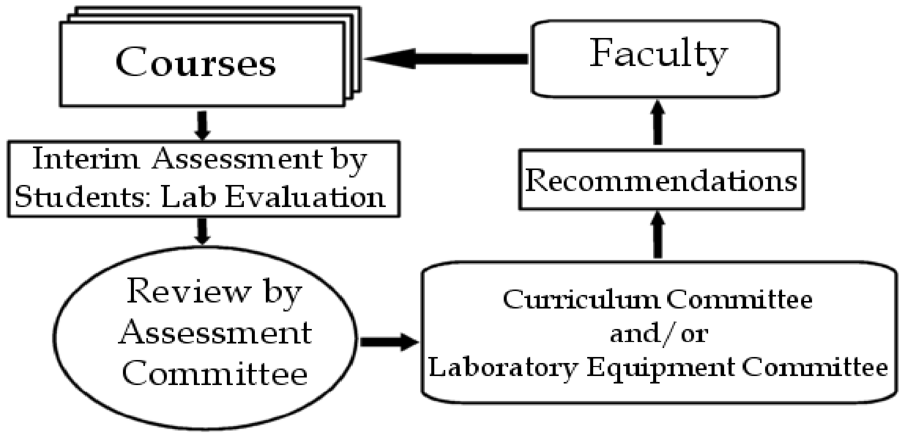
The Assessment Committee will use the following guidelines in determining which labs are to be evaluated.

- Carry out the evaluation whenever a lab is taught by a faculty for the first time.
- Each semester, carry out the evaluation for at least one lab.
- Evaluate a lab when the hardware and/or software have substantially changed.
- If the feedback is positive, then the laboratory evaluation will be conducted every other year.
- If the feedback for any laboratory is negative, then the laboratory evaluation is carried out after the recommendations of the appropriate committees are implemented.
- The same set of labs are assessed by the lab instructor and the students.

Action:

- The feedback is reviewed by the Assessment Committee.

- Any concerns or negative feedback are referred to the Curriculum Committee and the Laboratory Equipment Committee to act upon and provide recommendations.



ECE Students' Forums

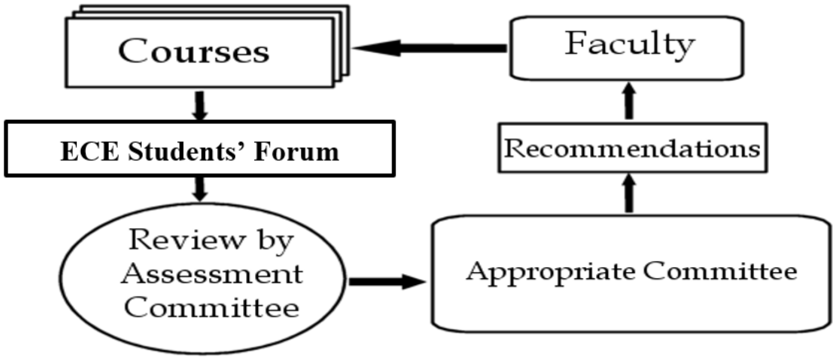
The student chapters of the engineering professional societies organize forums to which all ECE students are invited. The Chair of the department and the Dean of the School attend the meeting. The purpose of such forums is to bring up issues and concerns to the attention of the department and the school. This feedback is very important and can help the department to achieve the Student Learning Outcomes and hence the educational objectives.

Frequency:

- A forum is held once a semester.

Action:

- The Chair of the department conveys the students' feedback to the faculty.
- Any concerns or negative feedback are referred to the appropriate committee to act upon and provide recommendations.



6.3.2.2 Exit Survey

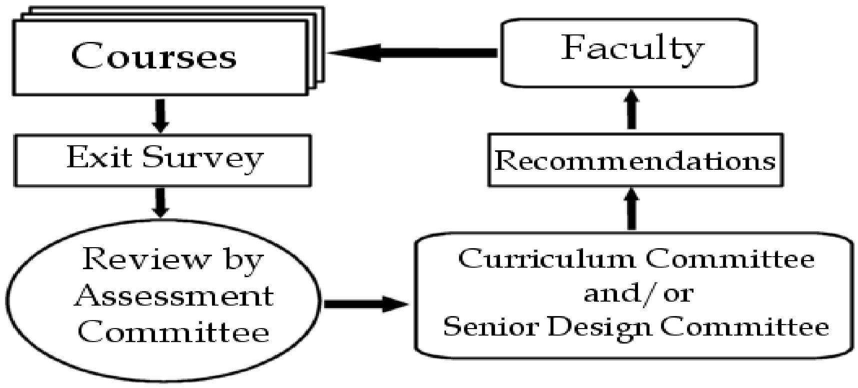
All graduating seniors are required to complete an Exit Survey at the end of their last semester. One component of the Exit Survey is devoted to assess the achievement of the Student Learning Outcomes. A copy of the exit survey can be found in Appendix II.

Frequency:

- The exit survey is conducted every fall and spring semester in which there are graduating senior(s).
- A part of the Exit Survey is devoted to assess the curriculum, the laboratories, and the achievement of the Student Learning Outcomes. A sample of the 2017 exit survey form can be found in the Appendix II.
- Starting fall 2015, the exit survey is conducted by IPFW Career Services. Usually the results are available a few months after students graduate. The fall exit survey data will be included in spring Assessment Report and spring exit survey data will be included in fall assessment report.

Action:

- The feedback is reviewed by the Assessment Committee.
- Any concerns or negative feedback are referred to the computer engineering Curriculum Committee and/or Senior Design Committee to act upon and provide recommendations.



6.3.2.3 Fundamentals of Engineering (FE) Examination

The FE exam is conducted by the National Council of Examiners for Engineering and Surveying (NCEES). It is held in two four-hour sessions: the AM session tests the lower division subjects and the PM session tests the upper division subjects.

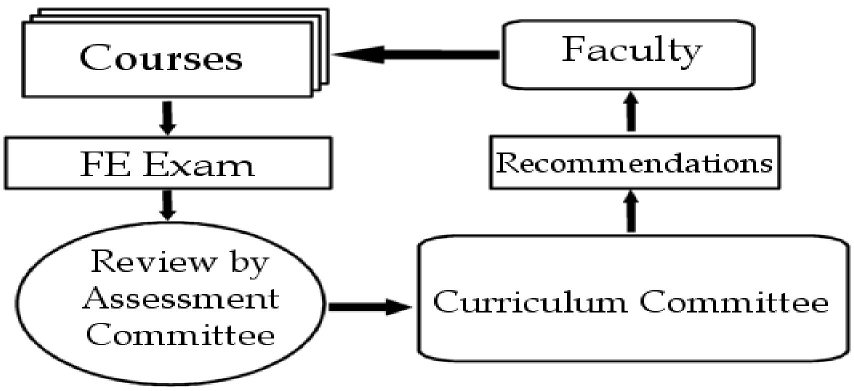
Subjects covered by the FE exam can be mapped or correlated to several ABET program outcomes such as *a, c, e,* and *f*. Thus, the performance our students on the FE exam can be used as a tool to assess the achievement of some of the Student Learning Outcomes.

Frequency:

- The graduating seniors of the computer engineering program at IPFW are strongly encouraged to take the Fundamentals of Engineering Examinations.
- NCEES sends the results to the corresponding institutions approximately three months after the exam.

Action:

- This feedback is reviewed by the Assessment Committee.
- Any concerns or negative feedback are referred to the Curriculum Committee to act upon them and provide recommendation.



6.3.2.4 Co-op Education Coordinator Report

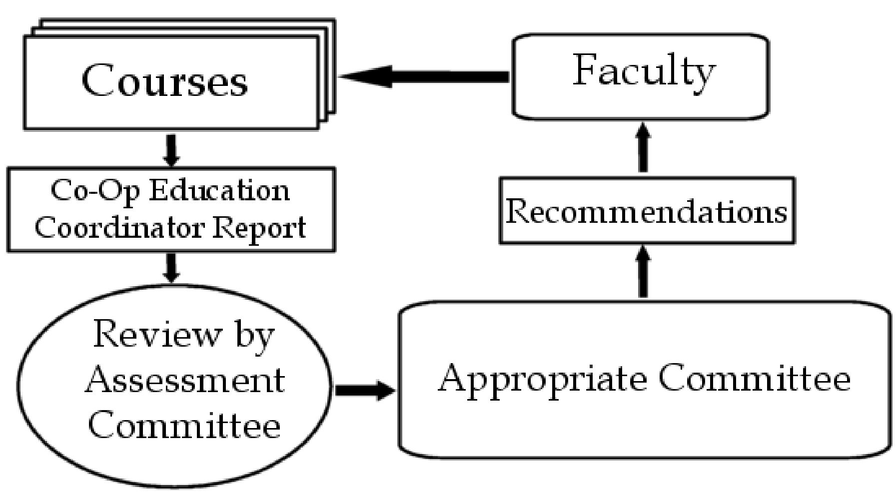
A number of computer engineering students are enrolled in the co-op education program. At the end of each session, the co-op students and their employers submit written reports about their experiences. Components of these reports relate to some Student Learning Outcomes. A faculty member in the department is designated as the co-op coordinator. Currently the number of computer engineering students enrolled in this program is very small.

Frequency:

- Because of the importance of industrial feedback the Co-Op coordinator will submit a summary report to the assessment committee every semester.

Action:

- This feedback is reviewed by the Assessment Committee.
- Any concerns or negative feedback are referred to the appropriate committee to act upon and provide recommendation.



APPENDIX I: Computer Engineering Program Alumni/Employer/IAB Surveys

- Alumni Letter and Survey
- Employer Letter and Survey
- Industry Advisory Board Letter and Survey

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
INDIANA UNIVERSITY–PURDUE UNIVERSITY FORT WAYNE
COLLEGE OF ENGINEERING, TECHNOLOGY, AND COMPUTER SCIENCE

Employer Survey – Spring 2016

Employer Information

Company

Contact Person

Email

Position (Title)

Number of IPFW Electrical and Computer Engineering graduates employed by your company:

Computer:__________ Electrical:__________

Primary function(s) of your company (please select all that apply):

Design ____ Sales ____ Consulting ____

Management ____ Manufacturing ____ Other ____

Research & Development ____ Testing ____

IPFW Electrical and Computer Engineering Graduates

Please select a typical IPFW Electrical and Computer Engineering (ECE) graduate (s) employed by your company and answer the following questions:

1. Overall rating of the education received by the student as it relates to his/her job preparation

Excellent _____ Fair _____ Poor _____

2. Compared with graduated of other universities, how well do IPFW ECE graduated perform?

Much better _____ Better _____ Same _____ Worse _____ Much Worse _____

3. Would you hire additional IPFW ECE graduates if there were openings? Yes _____ No _____

Comments:

Using the scale of 1 for Weak and 4 for Strong, please assess (where applicable) the performance of IPFW ECE graduates:

1. IPFW ECE graduates are prepared for a successful career in industry

   4 3 2 1 N/A

2. IPFW ECE graduates are proficient in the synthesis process with an emphasis on product and system design

   4 3 2 1 N/A

3. IPFW ECE graduates are able to function as part of a team and on multi-disciplinary projects

   4 3 2 1 N/A

4. IPFW ECE graduates possess a sound foundation in the mathematical, scientific and engineering fundamentals necessary to solve engineering problems

   4 3 2 1 N/A

5. IPFW ECE graduates demonstrate ethical responsibility and are aware of the need to engage in life-long learning

   4 3 2 1 N/A

(Space for additional comments on back)

Sample Cover Letter for Alumni Survey to Revise PEOs

April 12, 2016

Mr. Rodrigo Tamashiro
5622 Old Dover Blvd., #7
Fort Wayne, IN   46835

Dear Rodrigo:

The IPFW Department of Electrical and Computer Engineering is conducting a survey of alumni as part of our assessment process. Your input will help us understand the strengths and weaknesses of our programs so that we can adapt to better serve current and future students.

Unfortunately, the response to our on-line survey has been very low. Because alumni feedback is so very important to the future success of our programs, we are mailing you a hard copy of the survey and providing a postage paid return envelope for your use. Please complete the survey at your earliest convenience and return it to us by Friday, May 6th.

Please let me know if you have any question (260) 481-0273 and thank you, in advance, for your assistance.

Sincerely,

Chair
Department of Electrical and Computer Engineering

COMPUTER ENGINEERING

IPFW Department of Electrical and Computer Engineering

The intent of this survey is to obtain your feedback on the Computer Engineering (CmpE) program educational objectives. As a constituent of our program, your input is very critical and valuable in reviewing and evaluating our program objectives and will be used in the continuous improvement of our programs.

Part I - PERSONAL INFORMATION

Name (optional)

Graduating semester/year

Major

E-mail (optional)

Phone # (optional)

Current Position (title)

Company or Institution

Business Phone

Supervisor

Title

Supervisor e-mail

Phone

Current salary (range)

$0k - $40k	$41k - $50k	$51k - $60k	$61k - $70k	$71k - $80k	$81k - $90k	$91k - $100k	$101k or more
○	○	○	○	○	○	○	○

Immediately after graduation from IPFW

Position (title)

Company or Institution

Salary range

$0k - $40k	$41k - $50k	$51k - $60k	$61k - $70k	$71k - $80k	$81k - $90k	$91k - $100k	$100k or more
○	○	○	○	○	○	○	○

In your current position your primary job function is (select all that apply)

☐ Analysis

☐ Design

- Engineering support (drafting, field support, etc.)
- Engineering management
- Education
- Field Engineering
- Consultant
- Lab and Test engineering
- Non-engineering (sales, business, etc.)
- Other:

Current area of work in Computer Engineering (select all that apply)

- communication
- firmware engineer
- hardware engineer
- software engineer
- computer architecture and systems
- robotics
- other, please list:

PART II - ASSESSMENT OF EDUCATIONAL OBJECTIVES

The following are the set of educational objectives for the CmpE program at IPFW, Please rate how well your undergraduate education at the IPFW CmpE program met the following objectives:

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. I am prepared to function and communicate effectively both as individuals and in multidisciplinary teams to solve technical problems.				
2. I have been advanced professionally to roles of greater Computer engineering responsibilities and/or by transitioning into leadership positions in business, government, and/or education.				
3. I am able to participate in life-long learning through the successful completion of advanced degree(s), professional development, and/or engineering certification(s)/licensure.				
4. I have a commitment to community by applying technical skills and knowledge to support various service activities.				

Overall, the CmpE Program Education Objectives are adequate and do not require any modifications or changes.

Yes	No

If you answered No to the above question, please list all the changes that you recommend

PART III - FEEDBACK FOR CONTINUOUS IMPROVEMENT OF THE CmpE PROGRAM

Based on your experience at work so far, what do you recommend to better prepare our students in meeting the following program objectives. You may address issues related to curriculum, facilities including labs, teaching styles, technology use, etc.

1) CmpE graduates will function and communicate effectively both as individuals and in multidisciplinary teams to solve technical problems.

- ○ The program does not require any changes to improve his objective.
- ○ I recommend the following measures to prepare graduates better to meet this objective:

2) CmpE graduates will advance professionally to roles of greater computer engineering responsibilities and/or by transitioning into leadership positions in business, government, and/or education.

- ○ The program does not require any changes to improve his objective.
- ○ I recommend the following measures to prepare graduates better to meet this objective:

3) CmpE graduates will participate in life-long learning through the successful completion of advanced degree(s), professional development, and/or engineering certification(s)/licensure.

- ○ The program does not require any changes to improve his objective.
- ○ I recommend the following measures to prepare graduates better to meet this objective:

4) CmpE graduates will demonstrate a commitment to community by applying technical sills and knowledge to support various service activities.

- ○ The program does not require any changes to improve his objective.
- ○ I recommend the following measures to prepare graduates better to meet this objective:

Please provide any additional comments or suggestions:

Sample Cover Letter for IAB/Employer Survey

Dear Mr. xxx,

The purpose of this letter is to invite you to be on the Industrial Advisory Board (IAB) of the Department of Electrical and Computer Engineering and to provide you with information about our program.

The Department of Electrical and Computer Engineering (ECE) was newly established with the division of Department of Engineering on July 1, 2015 into two departments. This change is intended to reduce the managerial burden of a large, diverse department and allow each unit to better address discipline-specific matters and present a more focused image to students and the public. Currently, we have ten faculty members and approximately 200 active students. The department offers two undergraduate degree programs (computer and electrical), a first-year engineering program, and a graduate program. We are proud to announce that all of our undergraduate degrees received six-year ABET accreditation in 2012.

Input from the IAB members is important for our department to maintain our growth, meet the demand in industry in our region, and to retain our accreditation by ABET. Thus, we are hoping that each board member can make a three year commitment to serve on IAB. IAB usually meets once a year. Please let us know of your desire to serve on the board until 2018 via email to felgerh@ipfw.edu by August 7.

If you feel that you cannot or are unwilling to serve, perhaps you might suggest someone from your company to serve on the IAB by August 7.

Once the new board is constituted, we plan to hold an informational meeting sometime in September. We will be sending information about the meeting once we receive confirmation from you.

Feel free to email or call at 481- 0273 with questions.

Sincerely,

Abdullah Eroglu, Ph.D.
Chair of Department of Electrical and Computer Engineering
Professor of Electrical Engineering

Sample Cover Letter for Employer Survey

28 April 20XX

«name1»
«name2»
«address1»
«address2»
«citystzip»

Dear «name1»:

As part of our assessment process, the Department of ECE Engineering seeks information from the employers of our graduates. Your company has been identified as an employer of IPFW engineering graduates. Enclosed is a brief survey. Please complete this survey or pass it on to the person best qualified to answer the questions.

The results of this survey will be used in our continuing efforts to provide high quality engineering programs that serve the greater northeast Indiana area. Your input regarding IPFW engineering graduates' preparation and performance will greatly help us understand the strengths and weaknesses of our programs so that we can adapt them to better serve our current and future students. This information will be kept confidential.

Feel free to contact me at (260) 481-xxxx or xxx@ipfw.edu if you have any questions.

Please return the completed form by 20 May 20XX. Thank you, in advance, for your assistance.

Sincerely,

Chair, Department of ECE Engineering

Enclosure: Employer Survey

IPFW Department of Electrical and Computer Engineering
Computer Engineering PEO Appropriateness Survey – Fall 2015

As a framework for the continuous improvement policy, the computer engineering program has adopted a set of program educational objectives (PEOs) that describe the anticipated accomplishments of our graduates 3-5 years after graduation.

The intent of this survey is to obtain feedback concerning the appropriateness of the computer engineering program's PEOs. As a constituent of our program, your observations are very critical. Your responses will be used in the continuous improvement of our programs.

Name: ______________________________

Company: ______________________________

E-mail: ______________________________

Please assess the adequacy and appropriateness and adequacy of the PEOs.

1. IPFW CmpE graduates are prepared to function and communicate effectively both as individuals and in multidisciplinary teams to solve technical problems.

Please select one:

☐ PEO #1 is adequate and appropriate, and does not require any modifications or changes.

☐ PEO #1 should be removed or modified as follows:

____

____

____

2. IPFW CmpE graduates are prepared to advance professionally to roles of greater computer engineering responsibilities and/or by transitioning into leadership positions in business, government, and/or education.

Please select one:

☐ PEO #2 is adequate and appropriate, and does not require any modifications or changes.

☐ PEO #2 should be removed or modified as follows:

____

____

3. IPFW CmpE graduates are prepared to participate in life-long learning through the successful completion of advanced degree(s), professional development, and/or engineering certification(s)/licensure.

Please select one:

☐ PEO #3 is adequate and appropriate, and does not require any modifications or changes.

☐ PEO #3 should be removed or modified as follows:

____

____

____

4. IPFW CmpE graduates are prepared to demonstrate a commitment to community by applying technical skills and knowledge to support various service activities.

Please select one:

☐ PEO #4 is adequate and appropriate, and does not require any modifications or changes.

☐ PEO #4 should be removed or modified as follows:

____

____

____

Please suggest other PEOs:

☐ PEOs should be expanded to include:

____

____

☐ PEOs should be expanded to include:

____

____

Computer Engineering Program Educational Objectives (PEOs)

The following Computer Engineering PEOs were approved by the faculty of Department of Engineering in Feb 27, 2012:

As a framework for the continuous improvement policy, the computer engineering program has adopted a set of program educational objectives (PEOs) that describe the anticipated accomplishments of our graduates 3-5 years after graduation.

The computer engineering program educational objectives are to produce graduates who:

1. Function and communicate effectively to solve technical problems.
2. Advance professionally to roles of greater computer engineering responsibilities, and/or by transitioning into leadership position in business, government, and/or education.
3. Participate in life-long learning through the successful completion of advanced degree(s), professional development, and/or engineering certification(s)/licensure.
4. Demonstrate a commitment to community by applying technical skills and knowledge to support various service activities.

IPFW | DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
INDIANA UNIVERSITY–PURDUE UNIVERSITY FORT WAYNE
COLLEGE OF ENGINEERING, TECHNOLOGY, AND COMPUTER SCIENCE

Advisory Board Survey
Fall 2015

Please provide the following information

Name: ______________________ Company: ______________________

Position: ______________________ Email: ______________________

Primary function(s) of your company (you can choose more than one)

_____ Design _____ Management _____ Research & Development

_____ Sales _____ Manufacturing _____ Testing

_____ Consulting _____ Research _____ Other: ______________

Computer Engineering offers General Education courses in the following categories:

Category B5 – Social and Behavioral Ways of Knowing

Category B6 – Humanistic and Artistic Ways of Knowing

Category B7 – Interdisciplinary or Creative Ways of Knowing

In the next 3 sections of Categories B5, B6 & B7, please select all classes that you feel are beneficial to Computer Engineering students.

CATEGORY B5 – SOCIAL AND BEHAVIORAL WAYS OF KNOWING

ANTH E105 – Culture & Society	LING L103 – Introduction to the Study of Language	POLS Y252 – Sports & Public Policy	PSY 36900 – Development Across the Lifespan
ANTH L200 – Language & Culture	OLS 25200 – Human Relations in Organizations	POLS Y301 – Political Parties & Interest Groups	SOC S161 – Principals of Sociology
COM 25000 – Mass Communication & Society	OLS 26800 – Elements of Law	POLS Y319 – The United States Congress	SOC S163 – Social Problems
COM 30300 – Intercultural Communication	POLS Y101 – Introduction to Political Science	PSY 12000 – Elementary Psychology	SOC S317 – Social Stratification
CDFS 25500 – Introduction to Couple & Family Relationships	POLS Y103 – Introduction to American Politics	PSY 23500 – Child Psychology	SOC S325 - Criminology
ECON E200 – Fundamentals of Economics	POLS Y107 – Introduction to Comparative Politics	PSY 24000 – Introduction to Social Psychology	SOC S360 – Topics in Social Policy

GERN G231 – Introduction to Gerontology	POLS Y109 – Introduction to International Relations	PSY 33500 – Stereotyping & Prejudice	WOST W210 – Introduction to Women's Studies
IET 10500 – Industrial Management	POLS Y212 – Making Democracy Work	PSY 35000 – Abnormal Psychology	

Any suggestions regarding the Category B5 – Social and Behavioral Ways of Knowing, General Education Courses listed above?

CATEGORY B6 – HUMANISTIC AND ARTISTIC WAYS OF KNOWING

CLAS C205 – Classical Mythology	FINA H101 – Art Appreciation	HIST H201 – Russian Civilization I - II	PHIL 30400 – 19th Century Philosophy
COM 24800 – Introduction to Media Criticism & Analysis	FINA H111 – History of Art I: Prehistoric to Medieval	HIST H232 – The World in the 20th Century	PHIL 31200 – Medical Ethics
ENG L101 – Western World Masterpieces I	FINA H112 – History of Art II: Renaissance to Contemporary	MUS Z105 – Traditions in World Music	REL 23000 – Religions of the East
ENG L102 – Western World Masterpieces II	GER E371 – Special Topics in Germanic Studies	PHIL 11000 – Introduction to Philosophy	REL 23100 – Religions of the West
ENG L202 – Literary Interpretation	HIST H105 – American History I	PHIL 11100 - Ethics	REL 30100 - Islam
ENG L250 – American Literature Before 1865	HIST H106 – American History II	PHIL 30100 – History of Ancient Philosophy	SPAN S275 – Hispanic Culture & Conversation
ENG L251 – American Literature Since 1865	HIST H113 – History of Western Civilization I	PHIL 30200 – History of Medieval Philosophy	THTR 20100 – Theatre Appreciation
FILM K101 – Introduction to Film	HIST H114 – History of Western Civilization II	PHIL 30300 – History of Modern Philosophy	WOST W225 – Gender, Sexuality & Popular Culture

Any suggestions regarding the Category B6 – Humanistic and Artistic Ways of Knowing, General Education Courses listed above?

CATEGOGY B7 – INTERDISCIPLINARY OR CREATIVE WAYS OF KNOWING

ANTH B426 – Human Osteology	ENG R190 – Rhetorical Reading	JOUR J210 – Visual Communication	PHYS 13600 – Chaos and Fractals
ANTH P370 – Ancient Cultures of South America	ENG W103 – Introductory Creative Writing	LGBT 20000 – Introduction to Scholarship on LGBT Issues	PHYS 30200 – Puzzles, Strategy Games & Problem Solving
ANTH P421 – Moche Archaeology Seminar	ENG W203 – Creative Writing	LING L360 – Language on Society	POLS Y275 – Politics & Film

ARET 12300 – Digital Graphics for Built Environment I	FINA N108 – Introduction to Drawing for Nonmajors	MUS L153 – Introduction to Music Therapy	POLS Y285 – Science and Politics
ARET 21000 – Architecture & Urban Form	FINA S165 – Ceramics for Nonmajors	MUS Z140 – Introduction to Musical Expression	PSY 42600 – Language Development
ARET 22300 – Digital Graphics for Built Environment II	FINA S239 – Painting for Nonmajors	NELC A100 – Elementary Arabic I	PSY 44400 – Human Sexual Behavior
ARET 22500 – Creative House Design	FNN 40300 – Advanced Nutrition: Food from Farm to Fork	NELC A150 – Elementary Arabic II	REL 11200 – Religion & Culture
ARET 31000 – Arch. & Urban Form in the Modern World	FREN F111 – Elementary French I	OLS 45400 – Gender & Diversity in Management	REL 30000 – Religions of the Ancient World
ASTR 36400 – Stars & Galaxies	FREN F112 – Elementary French II	PACS P200 – Introduction to Peace & Conflict Studies	SOC S109 – Community & the Built Environment
BUS W100 – Principals of Business Administration	GEOG G315 – Environmental Conservation	PHIL 12000 – Critical Thinking	SOC S314 – Social Aspects of Health & Medicine
CS 11200 – Survey of Computer Science	GEOL G300 – Environmental & Urban Geology	PHIL 15000 – Principals of Logic	SPAN S111 – Elementary Spanish I
DANC 39000 – Introduction to Dance	GEOL G305 – Geologic Fundamentals in Earth Science	PHIL 27500 – The Philosophy of Art	SPAN S112 – Elementary Spanish II
EALC C101 – Elementary Chinese I	GER G111 – Elementary German I	PHIL 35100 – The Philosophy of Science	SPAN S113 – Accelerated First Year Spanish
EALC C102 – Elementary Chinese II	GER G112 – Elementary German II	PHIL 35200 – Topics in the History & Philosophy of Science	THTR 13400 – Fundamentals of Performance
EALC J101 – Elementary Japanese I	INTL I200 – Introduction to International Studies	PHIL 43500 – Philosophy of Mind	THTR 32510 – History of Modern Drama
EALC J102 – Elementary Japanese II	INTR 33000 – Cultures & Design: A Cross-Cultural Comp. of Arch.	PHIL 46500 – Philosophy of Language	WOST W240 – Topics in Feminism

Any suggestions regarding the Category B7 – Interdisciplinary or Creative Ways of Knowing, General Education Courses listed above?

____

____

____

____

Computer Engineering offers Technical Elective courses in the following categories:

Group 1

Group 2

In the next 2 sections of technical electives, please select all classes you feel are beneficial to Computer Engineering students.

TECHNICAL ELECTIVES – GROUP 1

ECE 42800 – Modern Communication Systems	CS 36000 – Software Engineering
ECE 54700 – Introduction to Computer Communication Networks	CS 36400 – Introduction to Database Systems
CS 32100 – Computer Graphics	CS 38400 – Numerical Analysis

TECHNICAL ELECTIVES – GROUP 2

ECE 31100 – Electric & Magnetic Fields	ECE 49701 – Research in Computer Engineering I	ME 25800 – An Introduction to Mechanics
ECE 32400 – Introduction to Energy Systems	ECE 49801 – Research in Computer Engineering II	PHYS 32200 - Optics
ECE 33300 – Automatic Control Systems	ECE 53800 – Digital Signal Processing I	PHYS 34200 – Modern Physics
ECE 43600 – Digital Signal Processing	SE 52000 – Engineering Economics	PHYS 34500 – Optics Laboratory I
ECE 48300 – Digital Control Systems: Analysis & Design	MA 41700 – Mathematical Programming	PHYS 55000 – Introduction to Quantum Mechanics
ECE 49601 – Computer Engineering Projects	MA 41800 – Computations Laboratory or MA 41700	

Any suggestions regarding any of the Technical Electives listed above?

APPENDIX II: Computer Engineering Student Learning Outcomes

- Sample Faculty Course Outcome Assessment Form
- Faculty Advisor/Coordinator Assessment of Course Outcomes (Senior Design II)
- Laboratory Evaluation by Instructor
- Industrial Sponsor's Assessment of Course Outcomes (Senior Design II)
- Faculty Assessment of Course Outcomes (Senior Design I)
- Faculty Assessment of Course Outcomes (Senior Design II)
- Sample Student Course Outcome Assessment Form
- Student Assessment of Course Outcomes (Senior Design I)
- Student Assessment of Course Outcomes (Senior Design II)
- Laboratory Evaluation by the Students
- Exit Survey

(note: ElecCmp questions from Page 98 to 104 in 1st Destination survey)

Faculty Assessment of Course Outcomes– ECE 255

Faculty Assessment of Course - SPRING 2014

Course: ECE 255
emester: SPRING 2014
Section: 1
Instructor: Todor Cooklev
Number of Students: 10

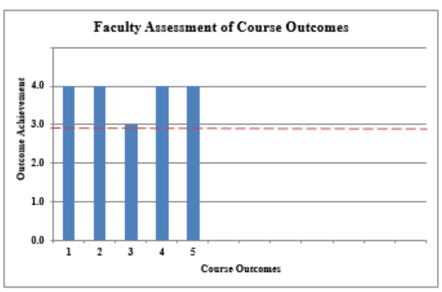
Outcomes			Faculty Assessment						
			Tools Used			Course	Criteria Used		
	Course	ABET	1	2	3	Outcome	criterion	Limit	Value
1)	An ability to identify and correctly utilize the external lead structure and basic electrical characteristics of common semiconductor devices (PN junctions, MOSFETs and BJTs).	a,k	Homework			Yes, strongly	criterion 1	**75%**	88%
2)	An ability to analyze and design DC bias circuits.	a,c,e,k	Midterm(s)			Yes, strongly	criterion 3	**75%**	80%
3)	An ability to utilize DC and AC models of semiconductor devices in both analysis and design.	a.c,e,k	Midterm(s)			Yes, adequate	criterion 4	**75%**	78%
4)	Understanding of frequency responses of transistor circuits in both analysis and design	a,c,e,k	Final Exam			Yes, strongly	criterion 4	**75%**	82%
5)	Understanding of power amplifiers in both analysis and design.	a,c,e,k	Final Exam			Yes, strongly	criterion 4	**75%**	82%

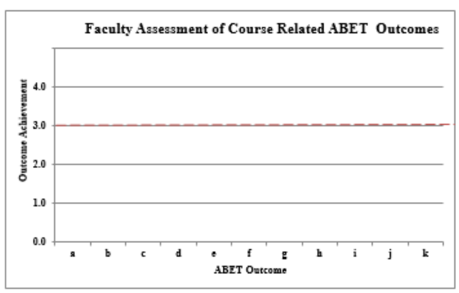
criterion 1: The average of students in the assessment tool is equal to or greate **75%**
criterion 2: The percentage of students with grade 70 or more is at least equal **70%**
criterion 3: The percentage of students passing the assessment tool is greater **75%**
criterion 4: The average grade of students passing the assessment tool is at le **75%**
criterion 5: Overall, students' participation in a team was effective.
criterion 6: Faculty observation of students' function in a team is satisfactory

Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.





Student Assessment of Course Outcomes
ECE 201 – Linear Circuit Analysis I
Instructor: xxx

Please be candid and use your best judgment in answering the questions.
If you think an outcome was strongly not achieved or not achieved, please elaborate

---

Check your degree program: CE ___ CmpE ___ EE ___ ME __ Expected Grade: ____

1 strongly not achieved, **2** not achieved, **3** achieved, **4** strongly achieved

1. An understanding of the basic concepts of linear circuit elements and measurement variables. *Comments:*	1	2	3	4
2. An ability to analyze simple resistive circuits using Ohm's law and Kirchhoff's laws. *Comments:*	1	2	3	4
3. An ability to solve circuit problems using the techniques of mesh current, node voltage, superposition, and Thevenin/Northon equivalent circuits. *Comments:*	1	2	3	4
4. A basic understanding of operational amplifiers. *Comments:*	1	2	3	4
5. An understanding of inductors and capacitors as energy storage elements. *Comments:*	1	2	3	4

6. An understanding of the natural and step responses of RL and R

Continues on back →

Comments:

7. An understanding of the natural and step responses of RLC circuits.	1	2	3	4

Comments:

8. An understanding of phasors and an ability to determine the sinusoidal steady-state response of linear circuits.	1	2	3	4

Comments:

9. An ability to calculate the sinusoidal steady-state power for linear circuits.	1	2	3	4

Comments:

10.	1	2	3	4

Comments:

Department of Electrical and Computer Engineering
Industrial Sponsor's Assessment

Capstone Senior Design Course Outcomes

NAME: ____________________________________

POSITION: ____________________________________

COMPANY: ____________________________________

SIGNATURE:____________________________________

Design Project Title:
Team Members:
Faculty Advisor:
Semesters:

Using the scale **1 for weak to 4 for strong**, please rate the following by circling a number.

1. The ability of the students to formulate a problem statement. **1 2 3 4**
   Comments:

2. The ability of the students to generate solutions. **1 2 3 4**
   Comments:

3. The ability of the students to evaluate the generated solutions. **1 2 3 4**
   Comments:

4. The ability of the students to obtain a final design including, safety, economic, ethical and engineering standards considerations. **1 2 3 4**
   Comments:

5. The ability of the students to function within a team. **1 2 3 4**
   Comments:

6. The ability of the students to communicate effectively. **1 2 3 4**
   Comments:

7. The ability of the students to build, test and evaluate their design. **1 2 3 4**
   Comments:

Department of ECE
Faculty Assessment
Senior Design I Course Outcomes

Faculty Name: ____

Signature: ____

Design Project Title: Design of a Universal Remotely Triggered Firing Actuator for Finger-Triggered Powered Hand-Piece
Team Members: David Gerber, Jacques Janssens, Dan Murphy
Faculty Advisor: Dr. Donald Mueller
Semester: Spring 2012

Using the scale **1 for weak to 4 for strong**, please rate the following by circling a number.

1. The ability to formulate a problem statement **1 2 3 4**
Comments:

2. The ability to generate solutions (conceptual designs) **1 2 3 4**
Comments:

3. The ability to evaluate conceptual designs using a well defined criteria **1 2 3 4**
Comments:

4. The ability to obtain a final design including safety, economic, ethical, and engineering standards considerations **1 2 3 4**
Comments:

5. The ability of the students to communicate effectively **1 2 3 4**
Comments:

Senior Design I Presentations

ECE 405

Spring 20xx

Score: 0 to 100

Project Title:

Evaluator: ________________________________

	Presentation Order			
	1	2	3	4
Clarity of presentation				
Level of organization				
Ability to follow the sequence of presentation				
Confidence level of the presenter in what he/she is presenting				
Ability of the presenter to answer questions				
Content of presentation				
Presentation overall				
Average				

Comments: ____

____

____

____

____

____

____

Department of ECE Engineering
Faculty Assessment
Capstone Senior Design Course Outcomes
(Second Semester)

Faculty Name:______________________________________

Signature: ______________________________________

Design Project Title:
Team Members:
Faculty Advisor:
Academic Year:

Using the scale **1 for weak to 4 for strong**, please rate the following by circling a number.

1. The ability of the students to build their design. **1 2 3 4**
Comments:

2. The ability of the students to test their design. **1 2 3 4**
Comments:

3. The ability of the students to evaluate their design. **1 2 3 4**
Comments:

4. The ability of the students to communicate effectively. **1 2 3 4**
Comments:

Senior Design II Presentations

ECE 406

Spring 20XX

Score: 0 to 100

Project Title:

Evaluator: ________________________________

	Presentation Order		
	1	2	3
Clarity of presentation			
Level of organization			
Ability to follow the sequence of presentation			
Confidence level of the presenter in what he/she is presenting			
Ability of the presenter to answer questions			
Content of presentation			
Presentation overall			
Average			

Comments: ____

____

____

____

____

____

____

Indiana University – Purdue University Fort Wayne
Department of ECE Engineering

Student Assessment of Course Outcomes (Senior Design I)

Course Code and Number: ____________ Term/Year: ________

Coordinator: _________________________ Advisor(s): ____________________________________

Your Major is, ☐ CmpE ☐ EE ☐ Other

For each of the outcomes listed below, please check the appropriate box that corresponds to the extent that you feel the course has helped you to achieve the outcome

Outcome (If you need more space for comments please use the back of the form)	1 *Very Low*	2	3	4 *Very High*
1. The ability to formulate a problem statement *Comments:*	☐	☐	☐	☐
2. The ability to generate solutions (conceptual designs) using brainstorming technique *Comments:*	☐	☐	☐	☐
3. The ability to evaluate conceptual designs using a well defined criteria *Comments:*	☐	☐	☐	☐
4. The ability to obtain a final design including safety, economic and ethical considerations *Comments:*	☐	☐	☐	☐
5. The ability to function within a team *Comments:*	☐	☐	☐	☐
6. The ability to present his/her work both written and orally *Comments:*	☐	☐	☐	☐

Please use the space below to bring to the attention of the Department any additional comments or suggestions for improving the effectiveness of the course. Also, include comments about issues such as the adequacy of your preparation in prerequisite courses, if applicable.

____

____

____

____

____

____

Indiana University – Purdue University Fort Wayne
Department of ECE Engineering

Student Assessment of Course Outcomes (Senior Design II)

Course Code and Number: ____________ Term/Year: ________

Coordinator: _________________________ Advisor(s): ____________________________________

Your Major is, ☐ CmpE ☐ EE ☐ Other

For each of the outcomes listed below, please check the appropriate box that corresponds to the extent that you feel the course has helped you to achieve the outcome

Outcome (If you need more space for comments please use the back of the form)	1 Very Low	2	3	4 Very
1. The ability to identify the various parameters that need to be determined in order to evaluate the prototype with the basic design that was obtained in the first semester *Comments:*	☐	☐	☐	☐
2. The ability to build, test and evaluate the basic design completed in the first semester *Comments:*	☐	☐	☐	☐
3. The ability to function within a team *Comments:*	☐	☐	☐	☐
4. The ability to present his/her work both written and orally *Comments:*	☐	☐	☐	☐
5. Knowledge of contemporary issues *Comments:*	☐	☐	☐	☐
6. Understanding of the ethical issues that are associated with the engineering profession *Comments:*	☐	☐	☐	☐
7. Understanding of the societal impact of engineering *Comments:*	☐	☐	☐	☐
8. Recognition of the need for life-long learning *Comments:*	☐	☐	☐	☐

Please use the space below to bring to the attention of the Department any additional comments or suggestions for improving the effectiveness of the course. Also, include comments about issues such as the adequacy of your preparation in prerequisite courses, if applicable.

Indiana University – Purdue University Fort Wayne
Department of ECE Engineering

Faculty Advisor/Coordinator Assessment of Course Outcomes (Senior Design II)

Faculty Assessment of Course - Fall 2016

Course:
emester: Fall 2016
Section: 1
Advsior:
Number of Students: 3

	Outcomes		Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	The ability to identify the various paramaters that need to be determined in order to evaluate the prototype with the basic design that was obtained in the first semester	c	S. Design Report	S. Design Present	Meeting(s)	Yes, strongly	criterion 1	75%	
2)	The ability to build, test and evaluate the basic design completed in the first semster	c	S. Design Report	S. Design Present	Meeting(s)	Yes, strongly	criterion 1	75%	
3)	The ability to function within a multidisciplinary team	d	Meeting(s)	Memo(s)		Yes, strongly	criterion 6		
4)	Knowledge of comtemporary issues	j							
5)	Understanding of the ethical issues that are associated with the engineering profession	f							
6)	Understanding of the societal impact of engineering	h							
7)	Recognition of the need for life-long learning	i							

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	

Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Lab Evaluation by the Students

Course #: ECE 20700 Course Title: Electronic Measurement Techniques
Semester: Fall Year: 2016
Instructor: K. Dey Section: 01 Number Enrolled: 14
Please indicate your major: CmpE _____ EE _____ Dual _____ Other _____ Expected Grade: _______________

Please indicate your overall experience with the labs that you took by circling a number.

1 (strongly disagree) *4 (strongly agree)*

1. The lab is well equipped. 1 2 3 4
   If not, what do you think is missing?

2. The lab equipment is functional. 1 2 3 4
   If not, please elaborate.

3. The lab experiments are reasonable in length. 1 2 3 4
   If not, how can we improve it?

4. The lab experiments are reasonable in content. 1 2 3 4
   If not, how can we improve it?

5. The lab manual adequately describes experiments. 1 2 3 4
   If not, please help us identify the shortcomings.

6. The general rules of lab safety were clearly explained at the start of the semester. 1 2 3 4
   If not, please elaborate.

7. Safety provisions pertaining to each experiment and/or lab activity were explained at the beginning of the associated lab session (if applicable/required/needed) 1 2 3 4
   If not, please elaborate.

Please feel free to use the back for additional comments

Electrical and Computer Engineering Program
Indiana University-Purdue University Fort Wayne
Lab Evaluation by the Instructor

Course #: _________ Course Title: ___________________________________
Semester: _________ Year: _______
Instructor: ________________ Section: _____ Number of Students: ____

Please indicate your overall experience with the labs that you took by circling a number.

	1			***4***
	(strongly disagree)			***(strongly agree)***
1. The lab is well equipped If not, what do you think is missing?	**1**	**2**	**3**	**4**
2. The lab equipment is functional. If not, please elaborate.	**1**	**2**	**3**	**4**
3. The use of the lab equipment and facilities is safe If not, please elaborate.	**1**	**2**	**3**	**4**
4. The lab technical support is adequate If not, please elaborate.	**1**	**2**	**3**	**4**
5. The level and type of interactions with the lab technician is adequate If not, please elaborate.	**1**	**2**	**3**	**4**

APPENDIX III. 1st Destination Survey Computer Engineering Questions

PURDUE UNIVERSITY FORT WAYNE

Department of Electrical and Computer Engineering

Computer Engineering Program

Assessment Report

Spring 2018

Prepared by: Carlos Pomalaza-Ráez

Date: September, 2018

TABLE OF CONTENTS

1. Introduction

The Department of Electrical and Computer Engineering (ECE) at Indiana University-Purdue University Fort Wayne (IPFW) has developed an Assessment Plan for the *computer engineering* program. A component of this plan is a semester-by-semester assessment report. This document is the report corresponding to the 2018 spring semester.

The current Computer Engineering Assessment Plan was approved by the faculty on February 21, 2005. On December 2, 2005 the faculty approved a modification of the Assessment Plan to include a process for the periodic evaluation of the *computer engineering* program objectives. The most recent version of the assessment plan was approved by the faculty on March 20, 2017.

According to the Assessment Plan, the educational objectives and Student Learning Outcomes (SLOs) of the *computer engineering* program are to be assessed using direct and indirect measures as summarized in Table 1.

Table 1
Direct and Indirect Measures

	Direct	Indirect
Educational Objectives	1) Employers (Supervisor) Survey and Feedback 2) Program Outcomes	1) Alumni Survey 2) Admittance to Graduate School 3) Industry Advisory Board
Program Outcomes	1) Interim Assessment by Faculty 2) Capstone Senior Design Assessment ▪ Industrial Sponsor ▪ Faculty Members	1) Interim Assessment by Students ▪ Course Outcomes ▪ Laboratory Evaluations ▪ Engineering Students' Forums 2) Exit Interview 3) FE Exam 4) Co-op Education Coordinator Report

2. Program Educational Objectives

The program educational objectives (PEOs) have gone through a review and update process during the 2017-2018 academic year. The following PEOs of the *computer engineering* program were approved by the faculty on September 11, 2017. A survey was sent to 30 IAB members and alumni for asking for their input. There were 12 responses, all recommending PEO update.

As a framework for the continuous improvement policy, the electrical engineering program has adopted a set of program educational objectives that describe the anticipated accomplishments of our graduates within a few years after graduation.

The computer engineering program educational objectives are to produce graduates who:

1. Function and communicate effectively to solve technical problems.
2. Advance professionally to roles of greater electrical engineering responsibilities and/or by transitioning into leadership positions in business, government, and/or education.
3. Participate in life-long learning through the successful completion of advanced degree(s), professional development, and/or engineering certification(s)/licensure.
4. Demonstrate a commitment to community by applying technical skills and knowledge to support various service activities.

3. Student Learning Outcomes

The following Student Learning Outcomes of the *computer engineering* program at IPFW were revised and approved by the faculty on February 13, 2017. These outcomes are in alignment with ABET learning outcomes as one-to-one mapping.

The graduates from the Computer Engineering Program will demonstrate that they have:

a. an ability to apply knowledge of mathematics, science, and engineering
b. an ability to design and conduct experiments, as well as to analyze and interpret data
c. an ability to design computer systems, components, or processes to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d. an ability to function as team members on engineering projects, laboratory experiments, and/or multidisciplinary activities
e. an ability to identify, formulate, and solve computer engineering problems
f. an understanding of professional and ethical responsibility
g. an ability to communicate effectively
h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context
i. a recognition of the need for, and an ability to engage in life-long learning
j. knowledge of contemporary issues
k. an ability to use the techniques, skills, and modern tools necessary for computer engineering practice.

4. Assessment Results

The assessment actions taken in the spring of 2018 were in accordance with the Assessment Plan for the *computer engineering program* in conjunction with the findings and recommendations made in previous assessment reports.

Starting fall 2016, based on the recommendation of the First-Year Engineering Committee, ENGR 127/128 will be assessed and reported by the First-Year Engineering Committee annually. ENGR127 will be assessed in fall semesters and ENGR128 will be assessed in spring semesters. The most recent First-Year Engineering Assessment Report (AY 2017-2018) can be found in Appendix A.

The following assessment results are divided in two parts: (1) assessment of educational objectives and (2) assessment of Student Learning Outcomes.

Note: In the assessment data where the numeric value 1-4 is used (1 for weak and 4 for strong, or 1-strongly disagree, 2- disagree, 3-agree, 4-strongly agree), the Assessment Committee recommended that target satisfactory score be >=3.

4.1. Assessment of the Computer Engineering Educational Objectives

4.1.1. Direct Measures

4.1.1.1 Employers Survey

The employer survey is sent to all employers of alumni who have returned the alumni survey sent to them earlier in the summer. At the time of writing this report no information has been received from alumni of whom to send the employer survey.

4.1.1.2 *Student Learning Outcomes*

Most of the student learning outcomes that were assessed during the spring of 2018 semester were reported as achieved. Details about these assessment results can be found in Section 4.2. Those cases where students and/or faculty have expressed concerns have been addressed and will be reassessed accordingly.

4.1.2. Indirect Measures

4.1.2.1 Alumni Surveys

There are six Computer Engineering students who graduated in 2013-2014 academic year. The survey forms were sent to them electronically. Also attempts were made to contact them via email about this survey. At the time of this report no one has returned the survey. During the fall 2018 semester a new attempt will be made to contact the alumni and send them again the survey.

4.1.2.2 Admittance to Graduate School

A CmpE student who graduated in spring 2018 has been accepted and is attending the MSE degree program at Purdue University Fort Wayne in the fall of 2018.

4.1.2.3 Industry Advisory Board

There was not ECE IAB meeting scheduled in the spring of 2018. These meetings are usually schedule in the fall semesters.

4.2. Assessment of the Computer Engineering Student Learning Outcomes

4.2.1. Direct Measures

4.2.1.1 Interim Assessment by Faculty

The faculty members of ECE Department at PFW have developed course outcomes for all the required and technical elective engineering courses.

In the spring of 2018, following the guidelines of the Assessment Plan for the computer engineering program, the ABET program outcomes associated with the courses shown in Table 2 were assessed by their instructors. The faculty assessment of senior design courses (ECE 405 and ECE 406) is included in Section 4.2.1.2.1. The completed assessment forms were reviewed by the ECE Assessment Committee and have been kept on file in the department.

Table 2
Faculty assessment of Course Outcomes - Regular ECE Courses – Spring 2018

Course	Course Outcomes Achieved	Course Outcomes not Achieved	Mapped ABET Student Outcomes	Note
ECE 20700	(1)(2)(3)(4)(5)		(a)(b)(c)(e)(g)(k)	
ECE 20800	(1)(2)(3)(4)(5)(6)(7)		(a)(b)(c)(e)	
ECE 27000	(1)(2)(3)(4)(5)(6)		(a)(b)(c)(e)(k)(g)	
ECE 30100	(1)(2)(3)(4)(5)(6)(7)(8)(9)	(10)	(a)(e)(k)	^
ECE 30200	(1)(2)(3)(4)(5)(6)(7)(8)(9)		(a)(e)	^
ECE 31100*	(1)(2)(3)(4)(5)(6)		(a)(c)(e)	^
ECE 33300*	(1)(2)(3)(4)(5)(6)		(a)(c)(e)(k)	
ECE 36200	(1)(2)(3)		(a)(b)(c)(e)(g)(k)	
ECE 46500	(1)(2)(3)(4)(5)(6)(7)		(a)(c)(e)(k)	^

Notes:

(^) Instructor also provided comments and/or recommendations

(*) ECE 31100 and ECE 33300 are Group II technical elective course; the rest are core courses in the computer engineering program.

Closing the loop

The comments from instructors are included in Appendix B.

- For all the courses listed in Table 2, but ECE 30100, the instructors' feedback is that all the outcomes have been achieved.
- **ECE 30100:** The instructor was unaware that knowledge of z-transforms is a course outcome (outcome #10) and suggested removing it from this course since it is covered in detail in ECE 43600. The assessment committee notes that ECE 43600 is not a required course for Computer Engineering majors and thus the removal of this topic from ECE 30100 is not possible.
- **ECE 30200**: The instructor commented that some students showed deficiencies in basic calculus skill, such as integration by parts.
- **ECE 31100**: The instructor recommended having available for students at least one of the Matlab tools dedicated to the topics of this course. This would allow students to work on meaningful computational electromagnetics type projects.
- **ECE 46500:** This course is a totally revised course with new labs and lectures. The instructor observed that students are not very well prepared in C programming and hardware design/troubleshooting skills. More time on review of these areas are recommended. Separate lecture and lab sessions are also suggested. The instructor also recommended on revising certain course outcomes.

4.2.1.2 Capstone Senior Design Assessment

4.2.1.2.1 SD Coordinators and Advisors Assessment

Table 3 shows the evaluations by course coordinators regarding the achievement of the program outcomes of ECE405 and ECE 406. From this table, the course coordinators and faculty advisors of the projects believe that all the outcomes were achieved.

Table 3
Faculty Advisor and Coordinator Assessment of Course Outcomes
ECE 405 and ECE 406 – Spring 2018

Course	Evaluator	Course Outcomes Achieved	Course Outcomes not Achieved	Mapped ABET Student Outcomes	Note
ECE 40500	Project Advisor[(1)]	(1)(2)(3)(4)(5)(6)		(a)(c)(d)(e)(f)(g)(h)	
	Project Advisor[(2)]	(1)(2)(3)(4)(5)(6)		(a)(c)(d)(e)(f)(g)(h)	^
	Project Advisor[(3)]	(1)(2)(3)(4)(5)(6)		(a)(c)(d)(e)(f)(g)(h)	
	Coordinator	(1)(2)(3)(4)(5)(6)		(a)(c)(d)(e)(f)(g)(h)	

(1) Air Rotational Unit (1 CmpE student, 2 EE students, and 1 dual CmpE/EE students) – Industry Sponsor: General Motors
(2) The Lighting of a Historic Building (1 CmpE/EE student and 1 ECE student) – Sponsor: Purdue University
(3) Plastic Extrusion Die Heating Element Analysis and Design (1 CmpE student and 1 EE student) – Industry Sponsor: Trelleborg Sealing Solutions

Course	Evaluator	Course Outcomes Achieved	Course Outcomes not Achieved	Mapped ABET Student Outcomes	Note
ECE 40600	Project Advisor(1)	(1)(3)(4)	(2)	(c)(d)(g)	^
	Project Advisor(2)	(1)(2)(3)(4)		(c)(d)(g)	
	Coordinator	(5)(6)(7)(8)		(f)(h)(i)(j)	

(1) Sound Level Management System for Group Exercises (2 CmpE students) – Industry Sponsor: YMCA
(2) Data Collection System for Identification of Production Line Mutilations (3 EE students and 1 CmpE student) – Industry Sponsor: General Motors

Notes:
(^) Project advisor also provided comments and/or recommendations
For ECE 406 the faculty advisors evaluate outcomes 1-4 and the coordinator evaluates outcomes 5 to 8.

Closing the loop

The comments from the faculty advisors are included in Appendix B.
The feedback from the faculty advisors as well as the coordinators of the senior design courses is that the course outcomes have been achieved, except for the first project in ECE 40600. The faculty advisor of this project reports that the project had a late start (about a month) when students took ECE 40500. This delay spilled over the second semester and the students were not able to build a complete prototype that could be tested. The advisor recommends that industry sponsored projects be properly defined and the funds secured before the start of ECE 40500. In this particular case the students and the advisor had to spend time convincing the sponsor that the project was of interest to them and worth funding. This is not the standard scenario of what an industry sponsored senior design project is all about.
A review and redesign of the format of the senior design course (involving both ECE 40500 and ECE 40600) is suggested by both the course coordinator of ECE 40600 and some faculty advisors. These suggestions are summarized below.

- Start the initial hardware building and software exploration at least a month before the end of the first semester.
- Incorporate the Scrum process that is based on iterative and incremental development cycles.

4.2.1.2.2 Industrial Sponsor

In spring 2018, all the ECE 406 senior design projects listed in Table 3 were sponsored by the industry. The ECE department followed a new guideline for the distribution and collection of the Industrial Sponsor Assessment Form that was approved in the fall of 2017. All three industry sponsors returned the survey. A copy of the returned survey forms and additional comments can be found in Appendix C. The results in Figure 1 show (for two projects) that on the average the industrial sponsors are barely positive regarding all survey questions.

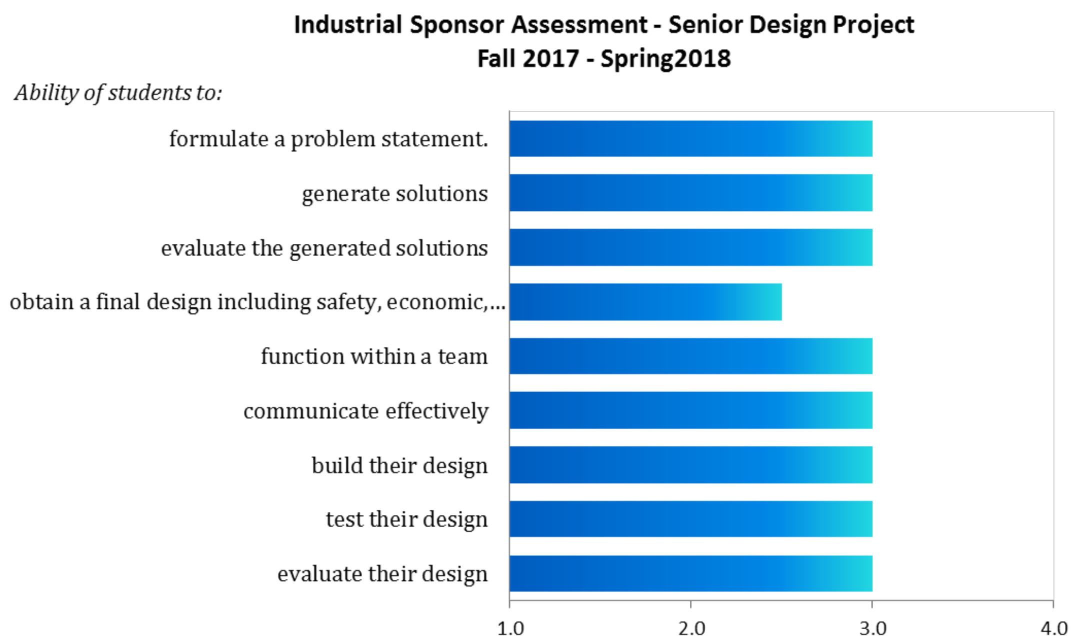


Figure 1. Industrial Sponsor Assessment of Senior Design II – Spring 2018

Closing the loop

- The new implemented guidelines on how to distribute and collect the feedback from the Industrial Sponsors has yielded a 100% return rate on the spring of 2018 semester. This return rate will continue to be monitored in the future to ensure a good return rate.

- ECE 40500 and ECE 40600 will undergo an overhaul process to address endemic concerns as the ones shown in Fig. 1.

4.2.1.2.3 Faculty Members

The achievements of senior design I (ECE 40500) and senior design II (ECE 40600) outcomes were assessed by the faculty members of the Department of Electrical and Computer Engineering who were in attendance at the Capstone Senior Design presentations at the end of the semester. The faculty members reported their evaluations using two forms (one of ECE40500 and the other for ECE40600). A copy of these forms can be found in the Assessment Plan. The questions in the ECE 40500 assessment form correspond to the ABET program outcomes {a,c,d,e,f,g,h} and the questions in the ECE40600 assessment form correspond to the ABET program outcomes {c, g}. The assessment results are shown in Figure 2 and Figure 3, respectively.

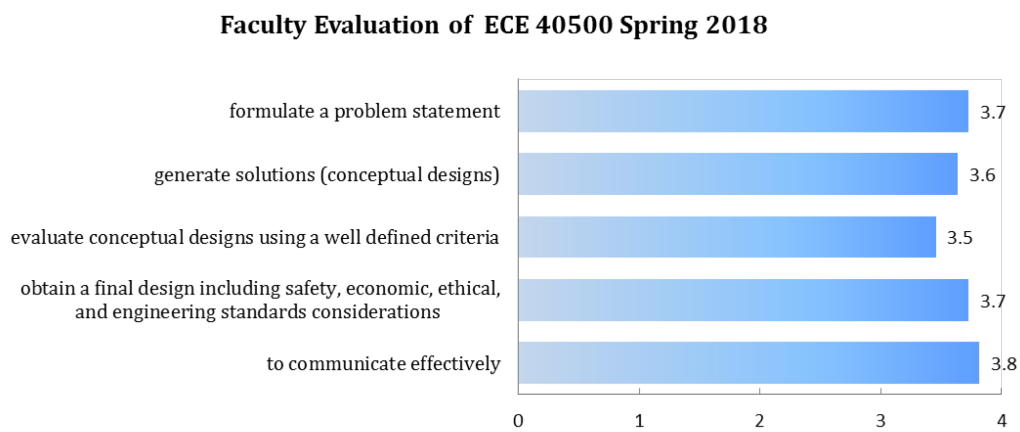


Figure 2. Faculty Assessment of ECE 40500 outcomes (3 projects) – Spring 2018

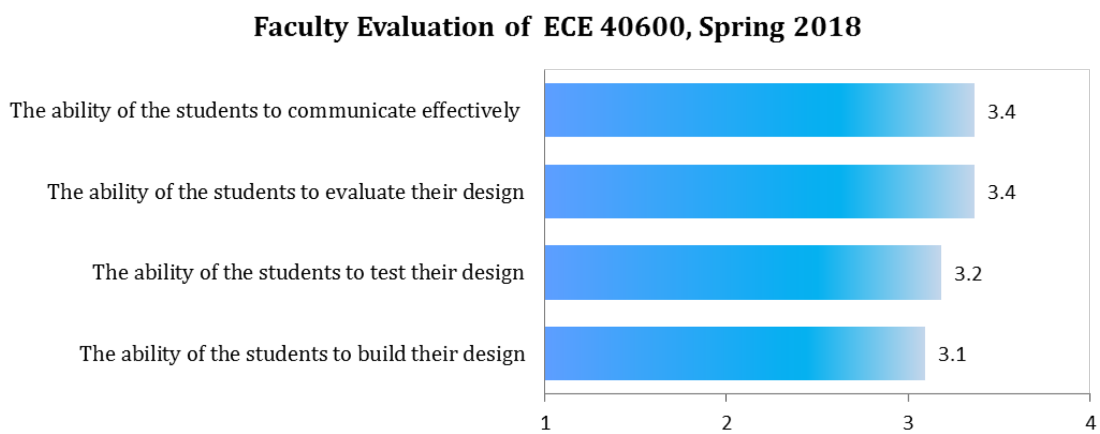


Figure 3. Faculty Assessment of ECE 40600 (3 projects) – Spring 2018

Closing the loop

- The results shown in this section indicate that the engineering faculty members, on the average, assessed that the outcomes of the senior design projects in ECE 40500 and ECE 40600 have been achieved.

4.2.2. Indirect Measures

4.2.2.1. Interim Assessment by Students

4.2.2.1.1 Courses' Outcomes

This assessment was carried out during the week before the finals exam week at the end of the semester. Based on the recommendations from the previous assessment report (Fall 2017), all the students enrolled in the following courses were asked to assess the course outcomes.

First-Year Engineering courses	ENGR 12800 (See Appendix A)
CmpE core courses	ECE 20700, ECE 20800, ECE 27000,ECE 30100, ECE 30200, ECE 36200, ECE 46500
Technical Elective courses	ECE 31100, ECE 33300 (Group II)
Senior Design Courses	ECE 40500, ECE 40600

Note: These are the same courses for which the ABET Program Outcomes were assessed by faculty (Section 4.2.1.1).

Students were asked to evaluate each outcome using a form that allows for scores to be integer values between 1 and 4 (1 for weak and 4 for strong). A sample of the evaluation form can be found in the CmpE Assessment Plan. The results for the regular ECE courses listed above are summarized in Table 4. The number of outcomes varies from course to course. The values in the table entries are the average of the responses.
The course outcomes of ECE 40500 and ECE 40600 were also assessed by the enrolled students before the end of semester. The questions in the forms correspond to the ABET program outcomes {a,c,d,e,f,g,h} for ECE 40500 and {c,d,f,g,h,i,j} for ECE 40600. The results of this assessment are included in Table 5.

Table 4
CmpE Student Evaluation of Courses' Outcomes – Spring 2018

Outcomes

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
ECE 20700 (1, 12)	3.0	3.0	3.0	3.0	3.0					
ECE 20800 (1,9)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			
ECE 27000 (4,19)	3.5	3.3	3.8	3.8	3.8	3.8				
ECE 30100 (3,13)	3.7	3.7	4.0	3.7	3.7	3.0	3.3	3.7	3.7	2.7
ECE 30200 (5,20)	3.4	3.4	3.6	3.6	3.8	3.4	3.8	2.6	3.0	
ECE 31100 (7,16)	3.9	3.3	3.3	3.7	3.0	3.4				
ECE 33300 (3,25)	4.0	4.0	4.0	3.3	3.0	4.0				
ECE 36200 (1,11)	3.3	3.1	3.0							
ECE 46500 (8,17)	3.3	3.3	3.1	2.3	2.9	2.4	3.5			

Notes:

- In the first column, the first number between the parentheses is the number of *computer engineering* students who filled the forms and the second number is the total number of students enrolled in the course.
- Computer engineering students are required to take ECE 20700, ECE 20800, ECE 27000, ECE 30100, ECE 30200, ECE 36200, and ECE 46500, and can take ECE 31100 and ECE 33300 as elective (Group II) courses. The values in the table correspond only to the CmpE majors enrolled in those courses.

Table 5
CmpE Student Assessment of ECE 40500 and ECE 40600 in Sprig 2018

	Outcomes							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
ECE 405 (3, 8)	3.7	4.0	4.0	2.7	3.0	3.7		
ECE 406 (3, 12)	2.3	2.3	2.7	2.3	2.7	3.3	3.3	3.0

Notes:

- In the first column, the first number between the parentheses is the number of *computer engineering* students who filled the forms and the second number is the total number of students enrolled in the course.
- Electrical engineering students are also required to take ECE 40500 and ECE 40600. The values in the table correspond only to the CmpE majors.

Comparison with historical data

Table 6 compares the students' assessment results in spring 2018 with those from the last time the course was assessed. This data shows that:

- For ECE 20700, ECE 20800, ECE 27000 all the outcomes have been assessed, by students, as achieved for both periods.
- For all the other courses the results are worse than the previous period.

Table 6
Historical Results for the Courses Assessed in Spring 2018– Student Assessment

Course	Last time assessed v.s. Spring 2018	Course Outcomes Achieved	Course Outcomes not Achieved
ECE 20700	Fall 2017	(1)(2)(3)(4)(5)	
	Spring 2018	(1)(2)(3)(4)(5)	
ECE 20800	Fall 2017	(1)(2)(3)(4)(5)(6)(7)	
	Spring 2018	(1)(2)(3)(4)(5)(6)(7)	
ECE 27000	Fall 2014	(1)(2)(3)(4)(5)(6)	
	Spring 2018	(1)(2)(3)(4)(5)(6)	
ECE 30100	Fall 2015	(1)(2)(3)(4)(5)(6)(7)(8)(9)(10)	
	Spring 2018	(1)(2)(3)(4)(5)(6)(7)(8)(9)	(10)
ECE 30200	Spring 2016	(1)(2)(3)(4)(5)(6)(7)(8)(9)	
	Spring 2018	(1)(2)(3)(4)(5)(6)(7)	(8)(9)
ECE 46500 ^	Spring 2016	(1)(2)(3)(4)(5)(6)	
	Spring 2018	(6)(7)(8)	(1)(2)(3)(4)(5)
ECE 40500	Fall 2017	(1)(2)(3)(4)(5)(6)	
	Spring 2018	(1)(2)(3)(5)(6)	(4)
ECE 40600	Fall 2017	(2)(3)(4)	(1)(5)(6)(7)(8)
	Spring 2018	(1)(3)(4)(5)(6)(7)(8)	(2)

Notes:

- **^** ECE 46500 has gone through a major revamp with new labs and lectures. The instructor has provided recommendations on how to improve this course in the future.
- The last time ECE 31100 and ECE 33300 were assessed (spring 2017) the number of computer engineering students taking those courses was not taken into account and thus it is not possible to compare those results with the ones in spring 2018. These two courses are technical electives (Group II) for the computer engineering program.

Closing the loop

In the courses where students raised concerns (average score less than 3), the student assessment results were forwarded to the instructor. The feedback from instructors is included in Appendix B.

- **ECE 30100:** The instructor was unaware that "*the ability to analyze discrete-time systems by Z-transform*" (outcome #10) is a course outcome and thus it was not covered. The instructor has been informed that it is an outcome, cannot be removed, and has to be covered.
- **ECE 30200:** This course was taught by a limited term lecturer for the first time. Regarding outcomes (8) and (9), the instructor commented that covering stochastic process in an introductory probability course is a challenge. The course coordinator is currently re-evaluating the content coverage and course outcomes. This course will be assessed again the next time it is offered.
- **ECE 46500:** This course has been totally re-designed with new lab and lectures. The instructor has provided detailed comments on revising the course outcomes and enhance the instruction. Please refer to **Section 4.2.1.1** for a summary of the recommendations. This course will be assessed again the next time it is offered.
- **ECE 40500 and ECE 40600:** These courses are evaluated every semester. A review and redesign of the format of the senior design is suggested by the course coordinator of ECE 40600 as well as some faculty advisors. Please refer to **Section 4.2.1.1** for a summary of the suggestions.

4.2.2.1.2 Laboratory Evaluation

Based on the recommendations from the previous assessment report (spring 2018), the instructor and students enrolled in the laboratory courses listed below were asked to do the lab evaluation. The students' assessment was carried out during the week before the final exam week at the end of the semester. The evaluation form used can be found in the Assessment Plan. The range of the allowed scores are integer values between 1 (strongly disagree) to 4 (strongly agree).

ECE 20800L, ECE 27000L, ECE 36200L

Summaries of the laboratory evaluations are shown in Table 7 and Table 8.

Table 7*
Instructor Evaluation of Laboratories' outcomes – Spring 2018

Questions	Laboratory		
	ECE 20800	**ECE 27000**	**ECE36200**
The lab is well equipped	3	4	3
The lab equipment is functional	3	4	4
The use of the lab equipment and facilities is safe	4	4	4
The lab technical support is adequate	4	4	4
The level and type of interactions with the lab technician is adequate	3	4	4

Note: * The results on this Table are **direct assessment measures.** The are included here to provide a clearer conection to the students assessments shown in this section.

Table 8
EE Student Evaluation of Laboratories' Outcomes – Spring 2018

Questions	**ECE 20800 (8,9)**	**ECE 27000 (13,19)**	**ECE 36200 (9,11)**
The lab is well equipped	2.8	4.0	3.6
The lab equipment is functional	2.4	4.0	3.4
The lab experiments are reasonable in length	2.4	3.8	2.9
The lab experiments are reasonable in content	2.6	3.7	2.7
The lab manual adequately describes experiments	2.5	3.8	2.0
The general rules of lab safety were clearly explained at the start of the semester	3.1	4.0	3.1
Safe provisions pertaining to each experiment and/or lab activity were explained	3.0	3.6	2.8

Note: In the first row, the first number between the parentheses is the number of engineering students who filled the form and the second number is the total number of students who filled the forms.

Comparison with historical data

The comparison of the student evaluation results in spring 2018 with those from the last time the same laboratory was evaluated is included in Table 9. It can be seen that for ECE 20800 Lab and ECE 36200 Lab, there are some new concerns regarding certain outcomes. ECE 27000 Lab was assessed because of recent lab manual and equipment upgrade. The results for that course show that all outcomes are still achieved as before.

Table 9
Historical Results for the Laboratories Evaluated in Spring 2018 – Student Evaluation

Lab	Last time evaluated v.s. Spring 2018	Lab Outcomes Achieved	Lab Outcomes not Achieved
ECE 20800 Lab	Fall 2017	(4)(6)	(1)(2)(3)(5)(7)
	Spring 2018	(6)(7)	(1)(2)(3)(4)(5)
ECE 27000 Lab	Spring 2017	(1)(2)(3)(4)(5)(6)(7)	
	Spring 2018	(1)(2)(3)(4)(5)(6)(7)	
ECE 36200 Lab	Spring 2016	(1)(3)(4)(5)(6)(7)	(2)
	Spring 2018	(1)(2)(6)	(3)(4)(5)(7)

Closing the loop

In the laboratories where students raised concern, the results were forwarded to the instructor for feedback. The responses from lab instructors are included in Appendix D. The students' evaluation results and the instructor's feedback are also forwarded to the instructor who teaches it the following semester as well as the course coordinator.

- **ECE 20800 Lab**: This is a laboratory courses taught by a GTA. He has provided specific inputs on how to make better use of lab equipment by adjusting certain lab content. He also gave suggestions on how to update the prelab and lab manual to better assist students before and during the lab. His comments are forwarded to the course coordinator. This lab will be assessed again in fall 2018.
- **ECE 36200 Lab**: This is a laboratory courses taught by a GTA. He has provided specific suggestions on updating the lab manual. His comments are forwarded to the course coordinator. This lab will be assessed again in fall 2018.

4.2.2.1.3 Students' Forum

No student forum was held in the spring of 2018.

An ECE student forum with Mr. Tirthak Saha as the Industrial guest speaker was held on January 12, 2018. Mr. Saha is a Gird Modernization Engineer at American Electric Power. During the forum, he shared with the students his personal and professional career history and insights on four Ts: Talking – The importance of communication; Tracking – The importance of a career goal; Translating – How what you learn in class relates to the outside world and industry; Tackling – How to face adversity, challenges and negativity in a professional manner.

4.2.2.2. Exit Survey

All graduating seniors are required to complete an exit survey at the end of their last semester. A component of the Exit Survey is devoted to assess the curriculum, the laboratories, and the achievement of the Student Learning Outcomes. A sample of the exit survey form can be found in the Assessment Plan.

Starting fall 2015, the exit survey is conducted by the IPFW office of Career Services. Usually the results are available a few months after students graduate. There are total of 6 computer engineering students who graduated in fall of 2017 and spring of 2018. As of today, four of them have filled the exit survey. Figures 4, 5, and 6 show the exit survey results for the Computer Engineering program.

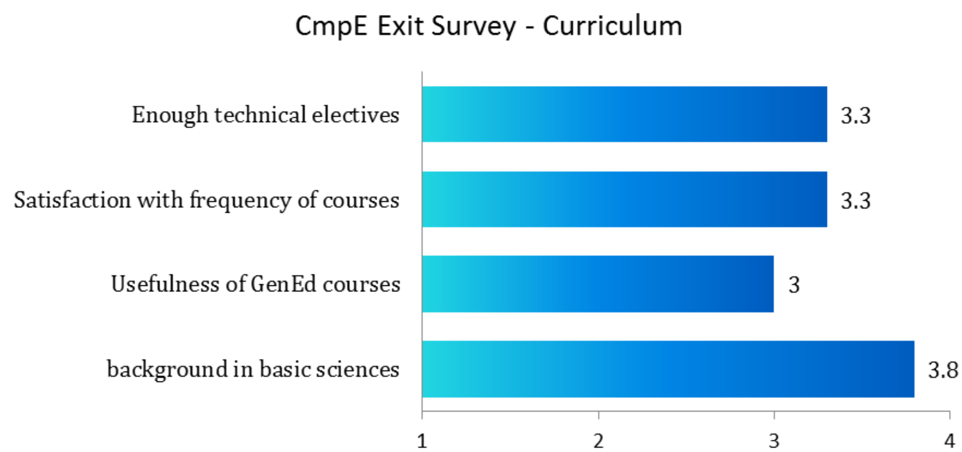


Figure 4. Fall 2017 – Spring 2018 CmpE Exit Survey – **Curriculum**

Comments

What topics would you recommend to be given more emphasis or to be introduced in the curriculum?

- Programming languages

Closing the loop

- Computer engineering students have consistently suggested more in-depth studies of programming languages. The CmpE curriculum committee is currently evaluating the quality and amount of programming language that the students are required to take.

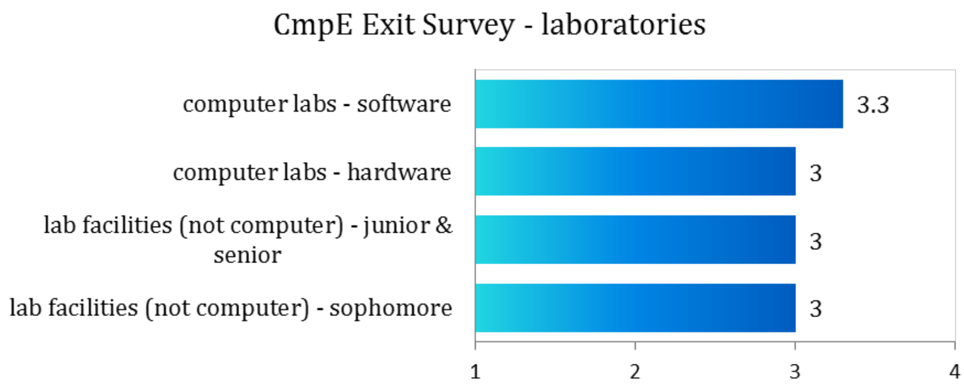


Figure 5. Fall 2017 – Spring 2018 CmpE Exit Survey – **Laboratories**

Closing the loop

- The computer engineering student satisfaction with the laboratories is barely acceptable. The ECE department will continue its efforts to improve the quality of its laboratory facilities.

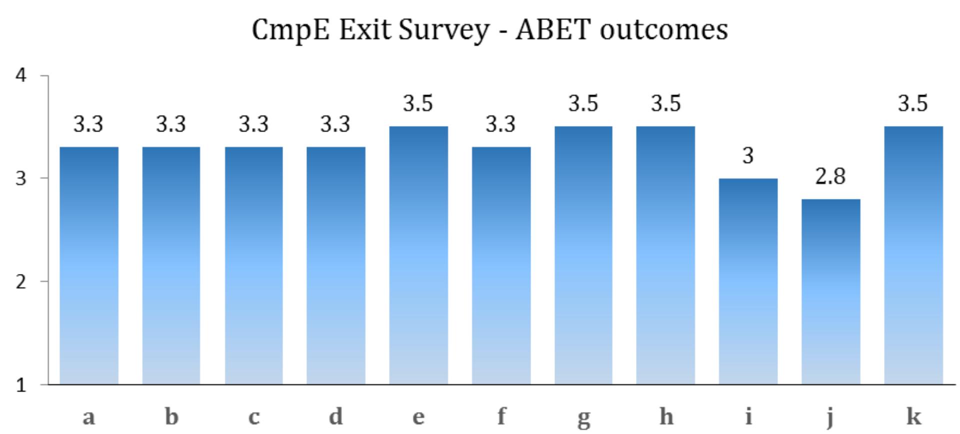


Figure 6. Fall 2017 – Spring 2018 CmpE Exit Survey – **ABET Outcomes**

Closing the loop

- These results are similar to the ones from previous assessment results.
- Outcome (j) - *familiarized you with the knowledge of contemporary issues* – will be monitored closely in future exit surveys.

4.2.2.3. FE (Fundamentals of Engineering) Exam

No CmpE student took FE exam in spring 2018.

4.2.2.4. EE Co-Op report

The report filed by the Coordinator of the Co-Op program in May 2018 lists one CmpE student participated in Co-Op program in the spring of 2018. The evaluation of the student's performance, as measured by the student themselves and their industrial sponsor, is summarized in Table 8.

Table 10
Rating of Co-Op student's performance

Employer	Student's rate of the overall performance	Employer's rate of the overall performance
Duesenburg	Outstanding	Outstanding

The Coordinator of the Co-Op program has also evaluated the students' performance in the report. The Coordinator states: "*The Electrical & Computer Engineering curriculums are preparing students very well for the Cooperative Education jobs. Overall, Regal Beloit and Duesenburg are very satisfied with the students' performance*."

A copy of the ECE Co-Op Report can be found in Appendix E.

5. Summary of Continuous Improvement

The ECE Department has utilized the fall 2017 Assessment Report as input for the continuous improvement of the CmpE Program. Table 11 summarizes several major actions implemented for improving the program during the spring 2018 semester.

Table 11
Spring 2018 Continuous Improvement Actions and Status

Continuous Improvement Action	**Type**	**Measurement Instrument or Reason for Action**	**Actions taken / Status**
GTA training	Program	Student Assessment	To help the coordination between the faculty and the GTA, comments from the lab instructor have been forwarded to the lecture instructor as well as the course coordinator.
Lab equipment	Program	Student Assessment	Most lab equipment has been upgraded in fall 2017. Some lab equipment was re-configured in the Energy Conversion Laboratory during spring 2018. The student assessment of lab equipment has been improved.

Industry sponsor feedback on senior design projects	Program	Low return rate	The new implemented guidelines on how to distribute and collect the feedback from the Industrial Sponsors has yielded a rapid increase in the spring 2018 semester.
Alumni survey	Program	Low participation	First annual ECE alumni luncheon was held on March 30, 2018. This luncheon will enhance the connection with ECE alumni.

6. Summary of Recommendations for Future Assessments

The complete set of assessment artifacts (evaluations from instructors and students, exit surveys, etc.) used in this report are archived in the department. Instructors are encouraged to review them, in particular if they are teaching courses where concerns have been identified.

Highlights from the results of the assessment process described in this report include:

- **Alumni survey:** There has been very low participation rate in alumni survey in recent years. The ECE department has tried to reconnect to our students and alumni through different channels such as Facebook and LinkedIn. The first annual ECE alumni luncheon has been held in March 30, 2018 with more than 30 alumni attendances. These attempts are expected to enhance the communication with our alumni and increase the alumni survey participation rate in the future.
- **Lab manual update**: Lab equipment overall is no longer a major concern after the major upgrade in fall 2017 semester. The lab instructors (GTAs) of ECE 20800 lab and ECE 36200 lab provided very valuable suggestions on how to adjust lab content and update lab manual. It is suggested that the course coordinators examine those recommendations and update lab manual if needed. Close monitoring of outcomes regarding lab equipment in the coming semesters is recommended.
- **ABET Student Outcome Update and Assessment Procedure:** Since ABET has announced new student outcomes, the mapping from course outcomes to ABET student outcomes should be updated for each course. The Assessment Committee is developing a detailed plan to address this concern.

    - Step 1: Revise all ECE course outcomes to be mapped into new ABET student outcomes.
    - Step 2: For each ECE course, develop assessment instruments (homework, report, exam, etc.) for each course outcome.
    - Step 3: Develop a detailed assessment plan to assess all ABET student outcomes in a two-year cycle.

Table 12 summarizes the main concerns/weaknesses, as well as the recommendation resulting from this current assessment process. These concerns will be evaluated and closely monitored in future semesters.

Table 12
Summary of Spring 2018 Concerns/Weaknesses and Recommendations

Program Concerns/ Weaknesses	**Type**	**Measurement Instrument or Reason for Action**	**Recommendations or Actions**
ECE 31100	Course	Faculty Assessment	Instructor recommended having available one of the Matlab tools dedicated to the topics of this course.
ECE 30200	Course	Faculty Assessment and Student Assessment	Instructor commented that covering stochastic process is a challenge in this course. The course coordinator is re-evaluating the content coverage and outcomes.
ECE 46500	Course	Faculty Assessment and Student Assessment	This is a totally revised course with new labs and lectures. The instructor recommended revising certain outcomes.
Capstone senior design	Course	Faculty Assessment and Student Assessment	A review and redesign of the format of the senior courses is suggested. Coordinators of ECE 40500 and ECE 40600 are currently working on revising these courses.
ECE 20800 lab	Lab	Faculty Assessment and Student Assessment	Lab instructor noted that some equipment is missing or needs calibration. Suggestions are also given on how to adjust some lab content and updating lab manual.
ECE 36200 lab	Lab	Student Assessment	Lab instructor provided specific suggestions on updating the lab manual.
Alumni Survey	Program	Low alumni participation	Continue effort to reconnect and maintain communication channels with Alumni. An annual alumni luncheon is one way but otherways should be explored and implemented as well.

Based on the assessment results in this report as well as the guideline in the Assessment Plan, the courses and laboratories shown in Table 13 are scheduled for assessment at the end of fall 2018 semester.

Table 13
Courses and Laboratories to be Assessed in fall 2018

Courses	ENGR 12700, ECE 20700, ECE 20800, CS 229, ECE 31300, ECE 32400,
	ECE 43600, ECE 40500, ECE 40600
Labs	ECE 20700 Lab, ECE 20800 Lab, ECE 36200 Lab

Table 14 lists those courses and laboratories to be evaluated the next time they are offered (these courses are not offered in the fall 2018).

Table 14
Courses to be Assessed the Next Time They are Offered

Courses	ECE 30200, ECE 46500

Appendix

Appendix A. Assessment Report First Year Engineering Program

Click here to open the FYE 2017-2018 Assessment Report

Appendix B: Instructors' Feedback: Course Outcome Assessment

ECE 20700

Comments from the Instructor in the Faculty Assessment Form:

In this semester we did not face any problem with lab instruments. But sometimes some ICs were burnt. For that we were disturbed.

Comments from the Instructor regarding:

- Course Outcome 3 - An ability to layout, wire and troubleshoot electronic circuits

In the lab session, there were adequate circuits to practice circuit layout and troubleshoot electronic circuits. In lab class students can get idea about a single topic or circuit. Before the lab students should have theoretical idea about the topic. But I saw that, in most cases, they did not have any idea about most of the topics. I tried to discuss some topics in class. In two experiments, one or two group did not get the desired output. Maybe for that, there were low points in this section. Sometimes we got bad IC, sometimes wrong connections spoiled the lab time. My suggestions for improvement are as follows,

If anyone can't proceed the lab, he or group should knock instructor immediately so that instructor can help them.

Theory course should be done before the lab class. *

Every student should work by hand in lab, otherwise he/ she can't get proper idea about circuit layout and troubleshooting.

Note from the assessment committee: * ECE 20100 is pre-requisite to ECE 20700 so all the students taking the lab have completed the semester with the theory.

ECE 30100

Comments from the Instructor in the Faculty Assessment Form:

I was unaware that z-transforms was a course outcome for this course. This has been added since the last time I taught the course. I cover z-transforms extensively in ECE 436 and did not cover it this semester in ECE 301. Please consider removing it as a course outcome from ECE 301 since it is covered extensively in ECE 436.

Note from the assessment committee: That outcome has been there since at least 2011. The course syllabus in the 2011 ABET Self-Study report includes that outcome. It is also listed in the department website in the "Courses" content.

ECE 30200

Comments from the Instructor in the Faculty Assessment Form:

Some students showed deficiencies in basic calculus skill, such as integration by parts.

Comments from the Instructor regarding:

- Course Outcome 8 - An understanding of the basic concepts of stochastic processes
- Course Outcome 9 - An understanding of the Poisson process and its properties

Outcomes 8 and 9 deal with the subject of stochastic processes.
Stochastic processes is chapter 13 in the text. The Poisson process is covered in Chapter 13. I briefly covered stochastic processes in one lecture at the end of the semester because that is all the time I had left. I did cover the Poison process in the context of a Poison random variable (discrete)and had 1 exam question on it.

The short answer is that I ran out of time.

Covering stochastic process with any depth in a 1 semester introductory probability course is a challenge, considering all the other basic material that needs to be covered to get there.

ECE 31100

Comments and recommendations from the Instructor in the Faculty Assessment Form:

The textbook was too expensive so I asked the students to not buy it and instead I provided as much as possible material that they could access from the course website. Unfortunately, my slides were then full of text and equations. Those are not the type of slides that students like, hopefully they were not too unhappy. Next time I will not use those slides and instead just have them available online. During the lecture time I would use much simpler slides and work out problems on the board.

It would have been good to have available one of the Matlab tools dedicated to the topics of this course. Half of the students taking the course were computer engineering majors. Not only them but the entire class would have benefitted from a computational electromagnetics type project without having to code from scratch.

ECE 40500

Comments in the Faculty Assessment Form from the faculty advisor of the project "The Lighting of a Historic Building":

> This project was out of my area of expertise, and the topic is not covered in our undergraduate curriculum. Therefore, I spent quite a bit of time and effort with the students consulting with architectural/engineering and lighting firms, including Frank Razinger, P.E., Barton Coe Vilamaa, Design Collaborative, Martin Riley, Dave Baker Agency, as well as consultation with Tim Hamilton, an adjunct faculty member at Purdue Fort Wayne. Some of these firms spent substantial time with us. Martin Riley provided a laser scan of the building for us, at no cost. We are grateful for their assistance and could not have done the project without them.

ECE 40600

Comments and recommendations from the Instructor in the Faculty Assessment Form:

> The topics of the lectures and assignments given by the coordinator are not directly related to the building and testing of a working prototype. This creates a level of apathy among students and also the feeling that they are wasting their time.
>
> The format of this course needs to be completely overhauled. to address:
> 1) New set of ABET outcomes
> 2) Students are having problems properly completing the building a working prototype.
> 3) Move the topics that the coordinator lectures and assess to a one credit course and just focus on the building and testing of a prototype in ECE 406

Comments and recommendations in the Faculty Assessment Form from the faculty advisor of the project "Sound Level Management System for Group Exercises":

> Comments:
> The late start, by at least a month, that this particular project had in the first semester, spilled over the second semester. The students were not able to build a complete prototype that could be properly tested.
>
> Recommendations:
> 1) Make sure a project is properly defined and funded before the first semester starts. This project was not correctly setup from the start as pointed out on my assessment comments of ECE 405.

2) Start the hardware building and software development at least a month before the end of the first semester. There is not enough time in the second semester to complete those tasks if the objective is to have a working prototype.

Comments and recommendations in the Faculty Assessment Form from the faculty advisor of the project “Kiosk Based Water Pumping System”:

Comments:
Students had to make several major design changes due to the mismatch between the hardware platform and the peripheral devices as well of lack of technical support from the seller. This has put students under tremendous stress of time. The students did successfully finish the redesign, building and testing process, and meet the design requirements with compliments from the sponsor. However, I would recommend review the ECE405/406 course sequence - see some suggestion below.

Recommendations:
I would recommend having the parts ordered and the circuit board made (if needed) at least one month before the end of first semester (ECE 405). So that students can do some initial exploration on the hardware and make sure that hardware and software would work and interface with no problem.
If this can be done, then at the beginning of the second semester (ECE 406), there is less chance of further design errors/changes and more time for actual development and testing.

Another suggestion is to remove or reduce the time for test plan in ECE 405, and incorporate in ECE 406 the Scrum process that is based on iterative and incremental development cycles.

ECE 46500

Recommendations from the Instructor in the Faculty Assessment Form:

1) Students are NOT very well prepared and some of them forgot some C language programming. It is suggested that several weeks with lecture and labs be spent to help student pickup their programming C skills.

2) Students need to be assisted with basic hardware design/troubleshooting in analog and digital circuit design and some reviews and practice problems will be helpful in their areas.

3) A separate lecture and lab sessions were suggested by students.

Comments from the Instructor regarding:

- Course Outcome 2 - An ability to learn the hardware of the modern family of microcontrollers

- Course Outcome 4 - An ability to understand and utilize the serial communications protocols, such as RS232, I2C, CAN and SPI
- Course Outcome 5 - An ability to develop the ability of embedded system co-design or both hardware and software
- Course Outcome 6 - An ability to design a PCB circuit board

General comments:

ECE 46500- embedded system is a totally revised course with new lab and lectures, usually it will take several cycles to polish it.

Outcome 2 (EE): ECE 46500 is mainly focused on the application of ARM MCU family system, therefore a strong foundation in the previous course ECE 36200-Microprocessor and Interface is necessary. We don't review too much of ARM MCU in this course, and assumed that students have a solid knowledge. It seemed that we may have to review some topics/subjects from ECE 36200 in the future.

Outcome 4: Due to time limits, we only covered and did some projects on UART serial communication, and not on others. From the comments, students assumed to learn all of them. It is suggested to change the outcome as: "*An ability to understand and utilize some serial communication protocols, such as RS232, etc.*"

Outcome 5: We plan to do another project on hardware and software co-design, however, students were not strong in programming and circuit designs, and they had to spend much more time on other previous projects. It is suggested to change this course outcome to: "*An understanding of the codesign of hardware and software of embedded systems.*"

Outcome 6: Due to time constraints, we only did one project on PCB. It is suggested to change this outcome course to: "*An understanding of PCB design.*"

Appendix C: Evaluation of Senior Design Projects by Industrial Sponsors

Industry sponsor feedback form #1:

Name	Position	Company
Kirk Weesner	Former Sr. Program Director	YMCA
Project title		
Data Collection System for Identification of Production Line Mutilations		

question	ranking
The ability of the students to formulate a problem statement	3
The ability of the students to generate solutions	3
The ability of the students to evaluate the generated solutions	3
The ability of the students to obtain a final design including, safety, economic, and ethical considerations	3
The ability of the students to build their design	4
The ability of the students to test their design	4
The ability of the students to evaluate their design	4
The ability of the students to function within a team	3
The ability of the students to communicate effectively	3

Industry sponsor feedback form #2:

Industrial Sponsor's Assessment
Capstone Senior Design Course Outcomes

The faculty of the Department of Electrical and Computer Engineering has developed the following course outcomes for the capstone senior design course sequence. We are in the process of assessing the degree of achievement of these outcomes. This academic year, your company sponsored one of our capstone senior design projects. With this form, we seek your valuable feedback. Your input will greatly help us improve our electrical engineering programs. Thank you for your assistance and support.

NAME: __Richard Sartiano_____________ POSITION: _Sr Program Manager___________
COMPANY: _Franklin Electric___________ DATE: _____5/15/2018______________________
SIGNATURE: _____Richard Sartiano_________________________________
Project Title *Kiosk Based Water Pumping System*
Team Members: Cooper Hill, Philip Oprie, and Chris Stratton
Faculty Advisor: Dr. Chao Chen
Academic Year: Fall 2017 – Spring 2018

Using the scale **1 for weak to 4 for strong**, please rate the following by circling a number.

1. The ability of the students to formulate a problem statement. **1 2 3 4**
   Comments:
Students clearly identified customer needs and developed the pertinent Use Cases.

2. The ability of the students to generate solutions. **1 2 3 4**
   Comments:
Students created a product diagram delineating their solution.

3. The ability of the students to evaluate the generated solutions. **1 2 3 4**
   Comments:
Students completed and documented multiple trade studies describing how they evaluated each solution from top level system to individual components.

4. The ability of the students to obtain a final design including safety, economic, ethical and engineering standards considerations. **1 2 3 4**
   Comments:
Students regarded multiple criteria besides requirements when considering their final design.

5. The ability of the students to build their design. **1 2 3 4**

Comments:
Students created a proof of concept that functional emulated the final production design.

6. The ability of the students to test their design. **1 2 3 4**
Comments:
Besides piece-meal integration testing, the students created an end-to-end validation test that demonstrated the full functionality of the Kiosk.

7. The ability of the students to evaluate their design. **1 2 3 4**
Comments:
The students allowed others to use the Kiosk to evaluate their UI with the final test being able to discharge the exact amount of water requested by the user.

8. The ability of the students to function as a team. **1 2 3 4**
Comments:
Each member of the team took on what appeared to be a natural role for that individual. They worked exceptionally well as a team. One reason why they were able to accomplish so much in such a short period of time.

9. The ability of the students to communicate effectively. **1 2 3 4**
Comments:
Besides communicating effectively by collaboration tools internally, the team had to work with members of Franklin Electric to execute the project. They did this very effectively.

Industry sponsor feedback form #3:

Name	Position	Company
Adam Clark	GM Mutilation Coordinator	General Motors

Project title	
Sound Level Management System for Group Exercises	
question	**ranking**
The ability of the students to formulate a problem statement	3
The ability of the students to generate solutions	3
The ability of the students to evaluate the generated solutions	3
The ability of the students to obtain a final design including, safety, economic, and ethical considerations	2
The ability of the students to build their design	2
The ability of the students to test their design	2
The ability of the students to evaluate their design	2
The ability of the students to function within a team	3
The ability of the students to communicate effectively	3

Appendix D: Instructors' Feedback: Lab Evaluation

ECE 20800 Lab

Comments from the Instructor in the Instructor Lab Evaluation regarding:

- The lab is well equipped. If not, what do you think is missing?

Measuring Probes for High Frequencies.

- Question 2 - The lab equipment is functional

Measuring probes all of them have missing cap grip.
Uncalibrated Signal Generator-Serial# AFG10221731345-Model: AFG1022

Comments from the Instructor regarding Students Lab Evaluation for:

- Question 1 - The lab is well equipped
- Question 2 – The lab equipment is functional
- Question 3 - The lab experiments are reasonable in length
- Question 4 – The lab experiments are reasonable in content
- Question 5 – The lab manual adequately describes experiments

Question #1. The Test Bench table only provides one power supply and one signal generator. The power supply provides two DC sources of +/- 12V and one 5V fixed source. Signal generator is a dual channel with a Peak to Peak AC voltage of 10V.The reason the students are concerned in respect of the need of more power supply is because in a couple of labs it is require to use 4 sources of DC voltage. So, they need to take the power supplies from the next table bench and sometimes they need to wait because they are unable to reach the power supply from the opposite side of the test bench table. One solution that can I provide is to create a separate circuit using op-amps to provide the two additional variable sources needed for the respected labs. In that way they are able to use four sources of DC from the power supply.

Question #2. The use of the decadence resistor boxed is needed for the beginning of the labs. Most of those Decadence resistor boxes doesn't have the nuts to tight the cables and other doesn't work properly. But it wasn't a factor to limit the work of the experiment. The lab have a lot of decadence boxes and they are easy to test and change it for a good one. Sometimes they blame the functionality of the equipment however much of the time these are by reasons of bad circuit setups, bad oscilloscope parameters and non-proper cable connections.

Question #3. The labs are reasonable in time. The main factor of why a lab may take more time of the required, is because of the lack of preparation before the lab. I mean by that, to read and try the circuit diagram before the lab time. Therefore, they can come prepared to work and know what they need to do. Otherwise, I spend a fraction of the time explaining how to work on the experiment. The solution that I implemented when I noted this behavior was to clarify that was crucial to work on the prelab before the lab time. Also, there are students that build the circuit faster leading to finish early than the rest of the class.

Question #4. The labs are reasonable in content. A behavior that I noted was that they were doing the prelab just minutes before the section lab. So, I provided to the students the equations and formulas, so they can be updated with the content of the experiment. A solution to the lack of content can be to provide the equations and formulas in the modules.

Question #5. All the modules clearly explain the experiment with circuit diagrams and steps to follow. A solution could be to review each one and update it with more relevant information.

ECE 36200 Lab

Comments from the Instructor regarding Students Lab Evaluation for:

- Question 3 - The lab experiments are reasonable in length
- Question 4 – The lab experiments are reasonable in content
- Question 5 – The lab manual adequately describes experiments
- Question 7 – Safety provisions pertaining to each experiment and/or lab activity were explained at the beginning of the associated lab session (if applicable/required/needed)

Question #3. The majority of the labs are reasonable in time. But there are a couple of labs that are more in content, leading to a longer lab section. A solution could be updating the lab manual to short the content. For example, there is one lab that require to build three separate codes and run the three codes individually. It could be improved by providing the first code and left the second and third code to the students.

Question #4. Students concern about the lack of content. To attend this behavior, I provide additional material for each lab. I provide list of instructions calls, example codes and instructions definitions. A solution to attend this behavior can be instead of giving this material separated it can be integrated to the Lab Manual.

Question #5. The Lab manual describe the experiments. The students concern about the description or explanation of the experiment. A solution could be review and update the lab manuals.

Question #7. The Lab Safety Rules are mentioned at the beginning. But they don’t apply to the kind of experiments realized in the lab. The majority of the time they work directly with the computer and a couple time they used a development board in which is powered by a USB cable.

Appendix E: ECE Co-Op Coordinator Report

TO: Assessment Committee

FROM: Elizabeth A. Thompson, Ph.D.
ECE Co-Op Coordinator

DATE: May 3, 2018

SUBJECT: ECE Co-Op Report (Spring 2018)

Table 1. Rating of Co-Op students' performance

Student (class)	Employer	Student's rate of the overall performance	Employer's rate of the overall performance
1. Student X (CmpE)	Duesenburg	Outstanding	Outstanding
2. Student Y (EE)	Regal Beloit	Average	Very Good

<u>External Assessment</u>:

Table 1 above lists the Spring 2018 Co-Op student's self-rating of his performance as well as his rating as reported by his supervisor.

Table 2 below indicates performance factors and areas of competence the student has achieved through the Co-Op experience during the current work term as reported by the supervisor. The column numbers in Table 2 correspond to the student numbers listed in Table 1 above. That is, student X' information is listed in column 1 of Table 2 below, student Y's is in column 2. The items of Table 2 can be mapped to the electrical engineering and the computer engineering program outcomes.

During the March 22, 2018 visit to Duesenburg, student X's supervisor, Hunar Sakri, Vice President of Engineering, indicated his high opinion of X's work. In his end-of-semester evaluation, Mr. Sakri stated that X has the foundation and attitude to be a successful engineer.

During the March 13, 2018 visit to Regal Beloit, student Y's supervisor, Kerry Shelton, Chief Analytical Engineer, indicated that Y is doing well and that he has a good work ethic. Mr. Shelton also stated that one advantage of Purdue Fort Wayne students is that they have work experience. He also said that Regal Beloit has hired co-ops exclusively from Purdue Fort Wayne for approximately the last four years. In his end-of-semester evaluation, Kerry

Shelton reiterated Y's great work ethic and added that his maturity in working with others helps his professional development.

Conclusion: Based on:

- Student evaluation
- Student report
- Employer evaluation
- My company visit and meeting with the student and his supervisor

The Electrical & Computer Engineering curriculums are preparing the students very well for the Cooperative Education jobs. Overall, Regal Beloit and Duesenburg are very satisfied with our students' performance.

Table 2. Performance factors and areas of competence as reported by Co-Op supervisors

1 = Outstanding, 2 = Very Good, 3 = Average, 4 = Marginal, 5 = Unsatisfactory, – = Not Applicable

Measurements Related to the Program Outcomes	**1**	**2**
Ability to integrate theory (academic learning) and practice (co-op experience)	1	2
Academically prepared for this job (course preparation)	---	2
Communicates clearly in written form	2	3
Communicates clearly verbally	2	2
Demonstrates ability to use decision making skills	1	2
Demonstrates analytical problem solving skills	2	2
Demonstrates necessary technical skills	---	2
Demonstrates ability to apply technical knowledge/skills	2	2
Demonstrates the necessary computer skills	1	2
Demonstrates ability to design	3	2

TO: Guoping Wang, Interim Chair

FROM: ETCS Assessment Committee

SUBJ: 2017-2018 Assessment Report for CPE

DATE: January 25, 2019

The ETCS Assessment Committee has received and reviewed CPE's 2017-2018 Assessment Report. Our comments below follow the rubrics derived from the revised Senate Document 98-22. Appendix D.

<u>Reporting results</u>

- The CPE program follows an assessment plan that is well planned and uses both direct and indirect measures.
- It is recommended that clarification is provided as to why some student outcomes are not measure/reported for the spring semester. For example, there is no indication that ABET Student Outcomes b, I, j, or k are being measured/reported in the current report.
- A recommendation to improve the assessment report is to provide details on the reliability of measures used. One way to achieve this recommendation is to demonstrate consistent results across different types of measures (i.e. direct versus indirect measures) over time.

<u>Report Dissemination and Collaboration:</u>

- It is recommended to make an effort to involve stakeholders more extensively and beyond the feedback provided on senior design projects. One way to involve stakeholders would be get feedback related to assessment information during industry advisory meetings.
- The CPE program clearly involves the faculty in the assessment process demonstrating a commitment from the department towards assessment.
- Valuable historical data are provided.

<u>Programmatic Change to Improve Student Learning, Achievement and Success:</u>

- It is recommended that more explicit information is provided on how programmatic changes positively influenced student learning.

Please contact us if you have any questions.

BS CS Assessment Report
2017-2018

PURDUE
UNIVERSITY®
FORT WAYNE

Department of Computer Science

College of Engineering, Technology, and Computer Science
Indiana University-Purdue University Fort Wayne

November 1, 2018

Section 1. Program Educational Objectives and Student Learning Outcome

The BS Computer Science program is accredited by Computing Accreditation Commission (CAC) of ABET, Inc. CAC-ABET requires Program Educational Objectives and Student Outcomes (i.e. Student Learning Outcomes).

A. BS CS Program Education Objectives

As a framework for the continuous improvement policy, the Computer Science program has adopted a set of Program Educational Objectives (PEOs) that describe the anticipated accomplishments of our graduates 3-5 years after graduation. It was approved by the Assessment Committee on December 8, 2015 and approved by the faculty of the Department of Computer Science on Jan 29, 2016.

The Computer Science program educational objectives are to produce graduates who:

1. are able to apply the theoretical and technical computer science knowledge to analyze, design, implement, test, and maintain high quality computer-based solutions; [Professional Quality]
2. hold professional computer science/information systems positions or pursue graduate studies in computer science or other related degrees; [Career Success]
3. exhibit skills in effective oral and written communication, leadership, and are able to work individually and in diverse teams; [Communication, Team & Diversity]
4. contribute to Fort Wayne and the greater northeast Indiana region economy as productive and successful professionals in computing and information systems; [Economic Impact]
5. pursue lifelong learning in their computing professions; [Lifelong Learning]
6. demonstrate commitment to high ethical and professional standards within the community and profession. [Professionalism, Ethics]

B. BS CS Student Learning Outcome

The learning outcomes for Computer Science were reviewed and approved by the faculty of the Department of Computer Science on January 20, 2012 and was confirmed by the faculty on August 21, 2016.

The program enables students to attain, by the time of graduation:

a. An ability to apply knowledge of computing and mathematics appropriate (to the program's student outcomes and) to the discipline.
b. An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
c. An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.
d. An ability to function effectively on teams to accomplish a common goal.
e. An understanding of professional, ethical, legal, security and social issues and responsibilities.
f. An ability to communicate effectively with a range of audiences.
g. An ability to analyze the local and global impact of computing on individuals, organizations, and society.
h. Recognition of the need for and an ability to engage in continuing professional development.
i. An ability to use current techniques, skills, and tools necessary for computing practice.

j. An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.
k. An ability to apply design and development principles in the construction of software systems of varying complexity.

Section 2. Curriculum Maps

A. Map of Student Outcomes to IPFW Baccalaureate Framework

Table 1. Map of Student Outcomes to Baccalaureate Framework

SO	Acquisition of knowledge	Application of knowledge	Personal and Professional Values	A Sense of Community	Critical Thinking & Problem Solv.	Communication
a	x	x			x	
b	x	x			x	
c	x	x			x	
d				x		x
e			x	x		
f						x
g			x	x		
h			x		x	
i	x	x			x	
j	x	x			x	
k	x	x			x	

B. Map of Student Outcomes to the Core Courses in the curriculum

Table 2. Map of CS Courses to SOs

Relationship between CS Courses and Student Outcomes

Core Course	Stundet Outcomes										
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
CS160	X	X	X						X	X	X
CS160	X	X	X						X	X	X
CS161	X	X	X					X	X	X	
CS232	X	X	X	X	X			X	X		X
CS260	X	X	X						X	X	X
CS271	X	X	X						X	X	X
CS274	X	X	X		X						X
CS321	X	X						X	X	X	X
CS350	X	X	X						X	X	X
CS360	X	X	X	X	X		X	X	X	X	X
cs364	X	X	X			X	X	X	X		
CS460	X	X	X	X		X			X		X
CS465	X	X	X	X		X			X		X
CS472	X	X	X						X	X	X
CS486	X	X	X	X	X	X	X	X	X	X	X
Concentration Area	A	B	C	D	E	F	G	H	I	J	K
CS321	X	X	X					X	X	X	X
CS331		X	X	X					X		X
CS365	X	X	X	X	X	X	X	X		X	X
CS368	X	X	X	X	X	X	X	X	X	X	
CS372	X	X	X					X	X	X	X
CS374	X		X		X				X		X
CS380	X	X	X					X	X	X	
CS384	X	X	X						X	X	
CS421	X	X							X	X	
CS445	X		X		X				X		X
CS467	X	X	X	X	X	X	X	X	X	X	
CS474	X	X	X	X					X	X	X
CS488	X	X	X			X			X	X	
Electives Course	A	B	C	D	E	F	G	H	I	J	K
CS112	X	X	X	X	X	X	X	X	X		
CS306					X	X	X	X	X		
Total	**28**	**27**	**27**	**11**	**11**	**10**	**8**	**14**	**28**	**20**	**20**

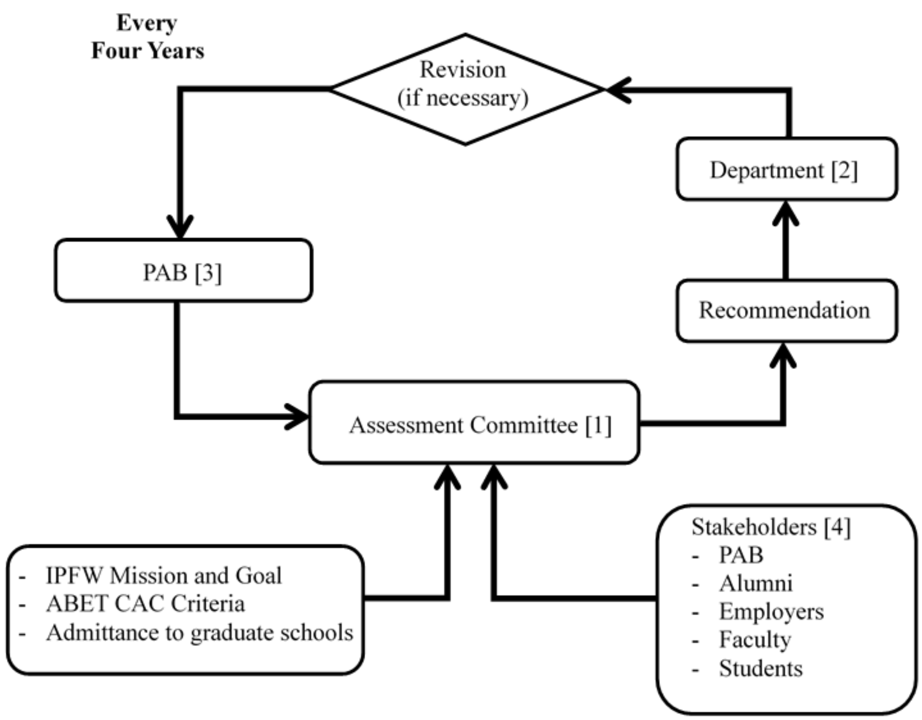
Section 3. Assessment Plan

A. Description of Department's Assessment Model

A.1 Program Education Objectives Review

A revised PEO review process was adopted by the CS department on January 29, 2016 (Figure 1). The fundamental process for reviewing the PEOs is unchanged from the process described in the Self-Study Report that can be found in Appendix Item 1.2. However, updates have been made incorporating the involvement of constituents of the CS program, emphasizing roles of the CSAC, and adding the review of the PAB to the PEOs review process.

Figure 1. Revised Process to Review the Program Educational Objectives



Note for **Figure 1**

Tasks:

[1] Collect and analyze data, and create a recommendation report to the CS department.
[2] Make decisions and execute required actions to the CSAC recommendation.
[3] Review and provide feedback.
[4] Various constituents of the CS program provide input.

The PEO review process consists of a four year cycle that mainly focuses on program level goals, and an annual cycle that focuses on course level outcomes. For the review of the PEOs, the CSAC utilizes information from multiple sources and feedback from stakeholders of the CS program, which is listed in Figure 1. The evaluation of the assessment data, input from PAB, survey results from constituents, the institutional mission statement, and the CAC-ABET Criteria are considered part of the review process.

To collect feedback on levels of attainment of the PEOs from stakeholders beyond IPFW, the CS department will conduct an alumni and employers' survey every four years. The survey includes evaluation questions to gauge their levels of satisfaction on achieving the PEOs and the SOs, preparedness for career, and the quality of CS programs. The questionnaire will also ask their needs and expectations to improve the CS program. In addition, the CS department will utilize the admittance to graduate school and assessment data collected to evaluate the SOs for the PEOs' review process.

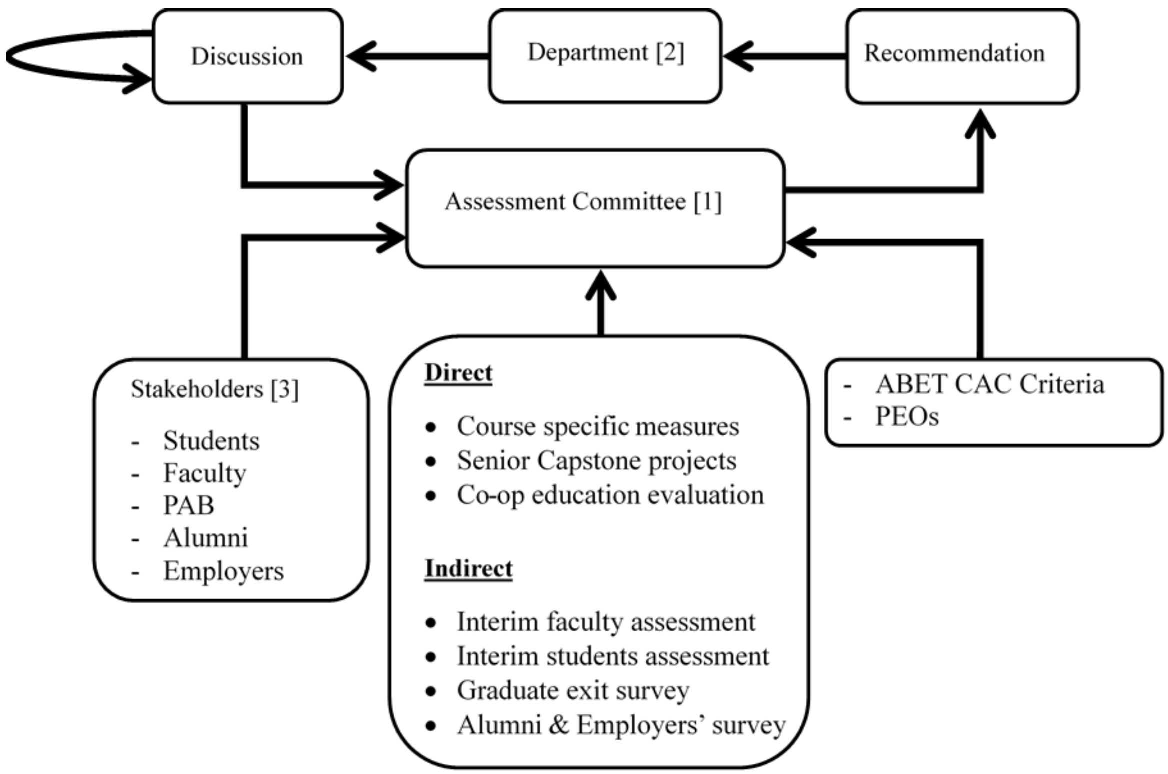
A short PEO review cycle is annually executed with the evaluation of the SOs. The CSAC regularly meets every semester to assess and evaluate the SOs. During the SOs' evaluation, the CSAC also reviews whether the SOs continue to prepare graduates to attain the PEOs. The CSAC presents the committee recommendation about the review of the PEOs to the CS department. If the CSAC doesn't suggest any changes to the PEOs, then the CS department keeps the PEOs until the next evaluation cycle. If the CSAC recommends revision of the PEOs that can be triggered by changes in the institution's mission, constituent needs, or relevant CAC-ABET criteria, then the CS department discusses proposed PEO changes.

Before the CSAC presents new PEOs, the committee makes sure that the PEOs are consistent with the institutional mission statement, constituent needs, and the CAC-ABET Criteria. The revision of PEOs kicks off the review of the SOs' process, so that the SOs are properly defined to attain new PEOs. The CS department informs the PAB about the PEO changes for their feedback to ensure that these changes still support the needs of major program constituents. After collecting PAB comments, if there are no concerns, the CS department adopts revised PEOs that are posted on the CS department web site. This closes the loop in the PEO review process. If the annual PEO review cycle doesn't trigger changes, the CS department executes a comprehensive review of the PEOs every four years with data collected after the last revision of the PEOs.

A.2 Student Outcome Establishment and Periodic Review

The Department revised and established the following process for the establishment and periodic review of the Student Outcomes. The process was approved by the faculty of the Department of Computer Science on Jan 29, 2016.

Figure 2. Process for the Periodic Review of the Student Outcomes



Note for **Figure 2**

Tasks:
[1] Collect and evaluate data, and create a report with recommendations to the CS department.
[2] Make decisions and execute required actions to the CSAC recommendations.
[3] Review and/or provide feedback.

The periodic review of the SOs is executed every semester in five steps: Planning, Data Collection, Evaluation, Recommendation, and Improvement. The review process starts with collecting assessment data, which includes outcomes from three direct and four indirect measures gathered from various program constituents. Over the semester, the CSAC regularly meets to evaluate collected information and assess the level of attainment of the SOs. Along with assessment data collected from students and faculty, the CSAC references feedback and survey results from other program constituents, the CAC-ABET Criteria, and the PEOs to review the SOs. A detailed description about collecting and evaluating assessment data is described at Section 4 below.

At the beginning of each semester, the CSAC presents the SOs' assessment schedule for a semester and the assessment report of the past semester to the CS faculty members. The report includes outcomes after reviewing the assessment data for the SOs and the CSAC recommendations to improve the CS program. If any results indicate that the SOs have not been properly attained, the CSAC analyzes reasons and presents possible solutions to achieve the SO to the CS department. After reviewing the CSAC reports, the CS department requests subcommittees of the CS department to carry out follow-up actions to the CSAC recommendations.

During the SOs' review process, if SO revision is required, which can be caused by concern about not having the right SOs, or changes of the PEOs or the CAC-ABET criteria, the SO revision process is initiated by the CSAC. As depicted in Figure 2, the CSAC proposes new SOs to the CS department. Before recommending SO changes, the CSAC confirms that all PEOs are covered by the SOs, so that the SOs continue to prepare graduates to attain the PEOs. Otherwise, the CSAC triggers the PEOs' revision process, which is described in Section 2 above. The CSAC also reviews measures for evaluating the SOs listed at Table 5 in Section 4. If needed, the CSAC properly revised these measures. Any changes to SOs will be presented at the annual PAB meeting with supporting information, such as how these changes still support the attainment of the PEOs and the needs of the PAB. The revised SOs are posted on the CS department website. Meanwhile, when the CSAC reports that no changes are needed to the SOs, the CS department maintains the SOs until the next evaluation cycle. This will close the periodic evaluation loop in the SOs' review process.

A.3 Student Outcome Assessment at Key Common Points

The following table shows how the department assesses student progress from the freshman level courses to the senior level courses and capstone courses towards graduation in terms of student outcomes a – k.

Table 3. Student Outcome Assessment at Key Common Points

Courses	Student Outcomes										
	a	b	c	d	e	f	g	h	i	j	k
CS 10000 level courses	x	x	x		x	x	x	x	x	x	x
CS 20000 level courses	x	x	x	x	x			x	x	x	x
CS 30000 level courses	x	x	x	x	x	x	x	x	x	x	x
CS 40000 level courses	x	x	x	x	x	x	x	x	x	x	x
CS capstone courses	x	x	x	x	x	x	x	x	x	x	x

B. Student Outcome Assessment

In Spring 2016, the Department revised instruments for assessing the SOs. The attainment of the SOs is measured by three direct and four indirect measures with time intervals that range from every semester up to four years. The CS department evaluates the attainment of SOs by using multiple measures that comprehensively assess activities of the CS program and collects feedback from stakeholders of the CS program, including students, faculty, PAB members, alumni, and employers in local industry. Table 5 summarizes revised measures for assessing the SOs and associated implementation schedules.

Table 4. Direct and Indirect Measures for Evaluating the Attainment of the SOs

Direct Measures	Indirect Measures
1) Course specific direct measures on selected programming and written assignments, exams, term papers, presentations, etc. (1-3 years; at least once every three years) • Review of samples of students' work (every semester - 3 years) 2) The assessment of Senior Capstone projects by sponsors and faculty (every year) • Presentation evaluations by project sponsors, faculty, graduate students, PAB members, and guests from local industry (every semester) 3) Cooperative education employer evaluation (Whenever there is a co-op student)	1) Interim assessment by faculty • Course Learning Outcome Assessment (CLOA) survey (every semester) 2) Interim assessment by students • CLOA survey (every semester) 3) Graduate exit survey and interview (every semester) 4) Alumni and Employers' survey (Every four years)

B.1 Course Specific Direct Measures on Students' Activities in a Course

Since Fall 2016, the CS department has used student performances in a course to assess the attainment of the SOs. Student performances in a course are evaluated by individual faculty members of the course using instruments that s/he designed. Each CS course has a standard set of the Course Learning Outcomes (CLOs) that are uniformly used by instructors no matter who teaches the course. The instructor selects certain programming assignments, homework, and/or exam questions to quantitatively measure student performances for the CLOs. Instructors of CS courses mapped a number of CLOs to the SOs. The average scores of students' work are used as direct measures to evaluate the extent to which the CLOs and the SOs are being attained. For these measures, the CS department developed a formula-embedded Excel worksheet. The worksheet is designed to incorporate students' performances of their coursework, the interim assessment of a course by students and faculty, and assessment results in the same file. Thus, all course related assessment material is in a file to assist the CSAC in evaluating individual courses comprehensively.

The CSAC determined that the chosen CLOs of CS courses to be assessed cover all SOs of the CS program. The mapping table at Appendix Item 3.2 shows the relationship between the SOs and CS courses. Course specific direct measures are executed based on a strategically designed timetable to assess the SOs periodically with proper time intervals. All lecture-based CS courses will be evaluated at least once every three years. Table 5 summarizes a guideline for selecting courses to be assessed using direct measures for the SOs' assessment (DMSO). At the beginning of each semester, the CSAC presents a schedule of courses to be assessed at the department meeting. At the end of each semester, the instructor submits collected data, a course assessment report including proposed improvement actions and results from completed actions.

Table 5. Guideline for Implementing Course Specific Direct Measures

Core Course	• IF (Faculty teaches a course for the first time OR any of the previous DMSO results < 70%), THEN collect DMSO data. • IF (All DMSO results from previous data collection > 70%), THEN do NOT collect DMSO data for ONE course offering. • IF (All DMSO results from previous two (2) data collections > 70%), THEN do NOT collect DMSO data for TWO course offerings.
Concentration Course	• IF (Faculty teaches a course for the first time OR any of the previous DMSO results < 70%), THEN collect DMSO data. • IF (All DMSO results from previous data collection > 70%), THEN do NOT collect DMSO data for TWO course offerings.
Special Case	• Certain courses, such as the Senior Capstone course, may need to be assessed more frequently. For example, in order to regularly measure students' communication and presentation skills, assessment of these measures will be needed regardless of the implementation schedule explained above.
Note	• CS core courses are expected to be offered every semester. • CS concentration courses are expected to be offered at least once during the academic year.

B.2 Interim Assessment by Students and Faculty

Since fall 203, the CS Department has implemented the interim assessments by students and the faculty for evaluating the SOs. Based on the course assessment schedule, the CSAC conducts Course Learning Outcome Assessment (CLOA) surveys. Students complete CLOA surveys of selected courses at the end of every semester via an IPFW online survey system. The survey results are presented to the instructor. After reviewing the CLOA of students, the instructor adds their observations and recommendations to an interim assessment report before presenting it to the CSAC. Detailed procedures to execute interim reports are available in the Self-Study Report. As described in item (a) above, course specific direct measures and interim assessments are added to a formula-embedded Excel worksheet. The resulting worksheet included interim assessments by students and the instructor, course specific direct measures, and assessment results survey. The minimum required score for each measured SO should be 3 out of the scale 1 to 5.

B.3 Senior Capstone Projects Assessment

Effective communication and presentation skills; accomplishing a common goal as team members; and designing, implementing, and evaluating a computer-based system are three SOs set by the CS department and the CAC-ABET. The CS department assesses these SOs from a summative course: Senior Capstone Project I/II. The Senior Capstone Project is a two-semester sequence course. Each capstone team designs and implements either an industry-sponsored or a research-oriented project with project sponsor(s) and a faculty advisor. During the course, the capstone teams deliver at least five presentations mainly to peers in the classroom and the faculty. At the end of each semester, capstone teams present their work to project sponsors, faculty, alumni, PAB members, guests from local industry, and graduate students. During the presentation, attendees –

excluding undergraduate students – evaluate students' communication and presentation skills, the quality of their work, and teamwork skills. In addition, project sponsors and faculty advisors evaluate items related to project design and implementation to assess the attainment of the SOs from senior level students. The course director of the Senior Capstone course collects assessment data, reviews, adds feedback, and submits an assessment report to the CSAC for their evaluation.

B.4 Cooperative Education Employer Evaluation

The CS department has utilized co-op programs to collect employers' feedback on student performance at local companies and their expectations for improving the CS program. The Cooperative Education Employer Evaluation is implemented by a designated IPFW office. The Office of Academic Internships, Cooperative Education, and Service Learning (OACS) administers all co-op related tasks such as initiating co-op positions at local companies, recruiting students, conducting co-op site visits, and evaluating activities associated with the co-op program. As part of the course evaluation, the IPFW OACS surveys the co-op employer to collect feedback on the performance of students. The current survey includes evaluation questions to measure student's problem solving skills, professionalism, teamwork, communication skills, and technical knowledge and computer skills. These performance indicators are used to assess the attainment of the SO items b, c, d, e, f, and i set by the CS department

B.5 Graduate Exit Survey

The CS department collects feedback from graduates of CS programs in two ways: A graduate exit survey administered by a designated IPFW office and exit interviews conducted by the CS department chair. To prevent duplicated work in collecting data and to increase the response rate from the graduates, since Fall 2015 the IPFW Career Services Center has collaboratively conducted a graduate exit survey with the CS department. The Career Services Center sends online surveys to recent graduates to gather information about employment status and their experiences at IPFW. The questionnaire also asks about students' perceptions of their preparedness for career, the quality of the CS program, available facilities, and several items used for assessing the SOs. Every spring semester, the Career Services Center sends a summary of graduate exit surveys of the past AY to the CS department.

The CS department also collects the opinions of graduates through an exit interview. Around the end of each semester, the chair of the CS department meets with prospective graduates. During the meeting, students share their experiences with the CS department, their expectations of programs, and their recommendations for improving the CS curriculum. The discussion content is anonymous and confidential until students graduate. A student prepares a document of meeting minutes that is presented to the CS faculty and the CSAC. The CS department has conducted graduate exit interviews every semester since Spring 2016

B.6 Alumni and Employers' survey

The CS department collects feedback from alumni and employers on the SOs and PEOs in two ways. First a small scale survey is conducted at the annual PAB meeting. The majority of PAB members hire or hired CS graduates At least four current PAB members are graduates of the CS department. Although the data collection pool is not large enough, by discussing and conducting a survey at the annual PAB meeting, the CS department is able to regularly gather feedback on the attainment of the SOs and the PEOs. The CS department executes a larger scale survey to evaluate the attainment of the PEOs and the SOs from alumni and employers every four years.

Section 4. Continuous Improvement

The CS Assessment Committee submitted 2016-2017 AY Assessment Report to the CS department and to the Assessment Committee of the college in Fall 2017. The CS department has utilized the Assessment Report as input for the continuous improvement of the program. The following table summarizes a number of major actions implemented by the CS department for improving the program during 2017-2018 AY.

Table 6. Summary of the Continuous Improvement of the CS program

Semester	Trigger	Action Taken	Results
Fall 2017	Findings from PAB meetings and graduate exit interviews that recommended skill sets and areas that needed to be improved.	• Offered new courses and revised existing courses to introduce cutting edge technology. • Develop dual-credit courses for high school students that will increase students' understanding of CS. • To enhance collaboration with local industry, the CS department chair continued to administer co-op courses.	• Introduced up-to-date technology and provide students skillsets requested by the local industry. • Invited one faculty from Communication Department, one IT manager and one HR specialist from a local company to give talks in area of Communication and Presentation Skills, Agile Project Management, and Career Opportunities to CS 4600 and CS 3600 students.
Spring 2018	The CSAC recommendation in Fall 2017 CS Assessment Report: • Concentration courses will be strategically grouped, so that whichever concentration areas a student chooses, the achievement of the SOs will be properly assessed using performance indicators associated with a group of concentration courses. • Reorganize existing concentration areas to offer broad and in depth CS subjects,	• Recommended that SOs will be assessed mainly base on CS core courses • Created a new course in data science	• Mapped SOs to CS core course and make sure all SOs are covered by CS core courses. • A new course CS 45700 Introduction to Data Science was approved in Spring 2018

	technical skill demanded by professional fields, and to incorporate subject areas describe in proposed CAC criteria changes		

Section 5. Assessment Results

A. Current Year Assessment Findings

A.1. Program Education Objectives Review

The Computer Science Department and its Assessment Committee got feedback and recommendations from PAB (Professional Advisor Board) and followed up and took actions.

A.2 Period Review Student Outcomes

The Department Assessment Committee reviewed the potential ABET-CAC Student Outcome criteria updates and decided to keep the current student outcomes a to k.

A.3. Student Outcome Assessment

A.3.1 Course Learning Outcome Assessment through Student Survey

From Fall 2017 to Spring 2018, total 7 CS courses are assessed through Course Learning Outcome Student Survey. All courses passed the minimum requirement of 3 of 5 in all Student Outcomes.

Table 7. Fall 2017 Course Learning Outcome Assessment (Survey)

Course	Student Outcome (out 5)										
	a	b	c	d	e	f	g	h	i	j	k
CS 11200	3.75	3.93	3.75	4.20	3.75	3.75	3.75	3.60	3.75		
CS 23200	4.27	4.47	4.54	4.27	4.67			4.67	4.57		4.27
CS 29200*	3.50	3.67	3.00	3.00					4.00	3.67	

* CS 29200 Python Program for Data Analytics

Table 8. Spring 2018 Course Learning Outcome Assessment (Survey)

Course	Student Outcome (out of 5)										
	a	b	c	d	e	f	g	h	i	j	k
CS 11200	4.16	4.22	4.16	4.31	4.20	4.20	4.20	4.75	4.65	4.75	
CS 16100	4.00	4.50	4.54					4.79	4.51	4.71	
CS 23200	4.25	4.25	4.21	4.25	4.00			4.12	4.19		4.25
CS 38400	4.29	4.29							4.29	4.29	

A.3.2 Direct Measure Assessment

From Fall 2017 to Spring 2018, total 7 CS courses are assessed through Course Learning Outcome Student Survey. All courses passed the minimum requirement 70% in all Student Outcomes.

Table 9. Fall 2017 SO Course Direct Measure Assessment

Course	Student Outcome (%)										
	a	b	c	d	e	f	g	h	i	j	k
CS 11200	77.5	83.1	86.8	83.2	80.9			82.5	86.8		
CS 23200	90.0	85.3	89.0	90.0	82.4			79.1	81.4		90.0
CS 22900	96.4	93.8	100	100					94.8	95.8	

Table 10. Spring 2018 SO Course Direct Measure Assessment

Course	Student Outcome %)										
	a	b	c	d	e	f	g	h	i	j	k
CS 11200	85.7	88.6	95.6	97.8	78.7			97.2	94.2		
CS 16100	88.4	87.5	85.3					91.8	88.0	91.0	
CS 23200	84.0	85.0	83.2	89.7	83.5				87.1		89.7
CS 38400	88.0	88.0							88.0	86.3	

A3.3 Senior Capstone Projects Assessment

- 2017-2018 Senior Capstone courses (CS460 at Fall 2017 and CS465 at Spring 2018) are accessed based on advisor evaluations, presentation evaluations, and sponsor evaluations.
- All evaluations scores are above 3.5 (out of 5), which indicates the success of these courses.
- All scores from sponsor evaluations to CS465 at Spring 2018 are above 4.0, which reflects that sponsors are very satisfied with our students and projects. The comments by sponsors also indicate their appreciations to our senior capstone projects

Table 11. Senior Capstone Presentation Evaluations (Spring 2018)

Criteria	Average Score (out 5)
Content and Organization of Presentation	4.32
Presentation Skills (Confident, Professional)	4.12
Team Work	4.24
Ability to Answer Questions	4.35
Describing Problem, Requirements, Solutions	4.29
Completeness of Project Requirements	4.38
Overall Presentation	4.24

A3.4 Cooperative Education Employer Evaluation

- Many CS students take internships directly through companies and do not take co-op courses.
- The Department may ask evaluations from these companies in the future to get feedbacks.

A3.5 Graduate Exit Survey

The graduate exit survey was conducted in spring 2018. The finding and recommendation for fall 2018 are listed in the Table 11.

Table 11. Spring 2018 Graduate Exit Survey Finding and Recommendation

Finding	Recommendation
CS 11200 should be a pre-req to enter the department. It provides a good foundation to computer science and helps students determine if they want to be a CS student	Department Curriculum Committee will investigate it
CS 1600 and CS 16100 should be combined. If GUI is taught in CS 16100, it should be using a more contemporary library instead Java Swing.	Department Curriculum Committee will investigate it
Python could be a user-friendly and clean introductory language to orient students. It would be an especially valuable language for CS 11200.	CS 11200 will be revised in fall 2018 to be language independent and Python may be used.
Use real-word examples for each type of data structure when introducing them in CS 26000. Also include examples of when to use and when not to use each kind of data structure	Suggestions will be forwarded to CS 26000 instructors for consideration
Adjust concentration areas, currently Software Engineering area seems to vastly outnumber the other concentration areas	Department Curriculum Committee is in the process of reorganize the concentration areas
In CS 37200 Web App Dev, use more modern technologies: Do not use PHP, Use AngularJS, ReactJS, or anything on the Node stack	Suggestions will be forwarded to CS 37200 instructors for consideration

CS 37200 Web App should be a core class	Department Curriculum Committee will consider the suggestion
Create a class for Integrated Application Development. It should teach ways to use various technologies together to produce an effective system. This would help bridge the gap between course studies and working with mature applications in the industry	Department Curriculum Committee will consider the suggestions
Version control should be taught somewhere before CS 36000 Software Engineering, possibly in CS 16000 or CS 16100 briefly	Department Curriculum Committee will consider the suggestions
CS 35000 Program Language Design needs updated. It would be more valuable to learn about motivation for MODERN languages such as Go, Swift or Rust instead of ancient languages like COBOL	Suggestions will be forwarded to CS 35000 instructors for consideration
Remove CS 27400 as a core class and make it a concentration or elective course	CS 37400 Computer Networks will replace CS 27400 Data Communications.
Don't use Oracle for CS364-365 database. Use a more popular framework.	Suggestions will be forwarded to CS 35000 instructors for consideration

A3.6 Alumni Survey and Employers Survey

The Department revised the Alumni Survey and Employers Survey in Spring 2017. In October 20, 2017, ABET CAC changed the Student Outcomes (SOs), the Department will adopt the new SOs and review and update Program Educational Objectives (PEOs) accordingly. The Alumni Survey and Employers Survey will be revised according to the revised PEOs. The surveys will be conducted in Spring 2019.

Section 6. Conclusions, Next Steps, and Communication

The CS Assessment Committee (CSAC) recommends the following actions to the CS Department to be practiced during 2018-2019 AY.

- The Department adopts new ABET CAC new SOs and maps Course Learning Outcomes to SOs for each CS course.
- The Department uses the new SOs for course direct and indirect assessments
- The Department revises PEOs and the Alumni Survey and Employers Survey and conduct the survey in Spring 2019.
- The Department makes sure that SOs can be measured through Computer Science core courses since students may take different concentration courses.
- The CS Curriculum Committee needs to revise the curriculum to meet ABET CAC curriculum requirements.
- THE Department follows up Spring 2018 Professional Advisory Board (PAB) recommendations.

TO: Beomjin Kim, Chair
FROM: ETCS Assessment Committee
SUBJ: 2017-2018 Assessment Report for CS
DATE: January 23, 2019

The ETCS Assessment Committee has received and reviewed the CS's 2017-2018 Assessment Report. Our comments below follow the rubrics derived from the revised Senate Document 98-22. Appendix D.

Overall, the report is comprehensive and shows that previous results were used to improve assessment procedures.

Reporting results:

- The Course Learning Outcome Assessment is clearly presented.
- The evaluation of the SD projects as illustrated in Table 11 doesn't clearly indicate how individual SLOs are being achieved, e.g. there is no correspondence to SLOs
- In general, past iterations (results from previous assessment cycles) are not provided for historical comparison.

Report dissemination and collaboration:

- It is not clear, reading the report, the level of involvement of the faculty in producing the report and if they receive a copy of the final report. Who wrote the report?
- It is not clear if other stakeholders, such as member of the Industry, receive a copy of the report.

Use of results for programmatic change to improve student learning, achievement and success:

- The lack of details of past assessment iterations makes it unclear why some programmatic changes are needed or not.

Other recommendations:

- The date of the report is November 1, 2018, for an assessment cycle that comprises the previous two semesters ending in May 2018. Any recommendations to improve the curriculum at best can be implemented in the spring of 2019, i.e. they are not used for the fall of 2018. It would be beneficial if, at minimum, important recommendations be available to faculty as soon as the fall semester starts.

Please contact us if we can provide any assistance as you move forward with your assessment process.

Indiana University-Purdue University Fort Wayne

Department of Electrical and Computer Engineering

Electrical Engineering Program

Assessment Plan

Spring 2017

Revision History

Background: The Electrical Engineering Assessment Plan has gone through several revisions as follows. In July 2015, the Department of Engineering split into two departments: Electrical and Computer Engineering, and Civil and Mechanical Engineering. The Assessment Plan has been revised to reflect those changes.

0. Original document – approved by faculty on December 1, 2004
1. New measures table and SD forms updated – approved by faculty on February 21, 2005
2. Procedure to update PEOs – approved by faculty on December 2, 2006
3. Original schedule of program & course outcomes assessment (now obsolete) removed; guidelines for frequency of assessment updated – approved by faculty on September 25, 2006
4. PEOs modified – approved by faculty on February 25, 2010
5. Due date of reports changed and SD assessment emphasized – approved by faculty on April 18, 2011
6. PEOs modified – approved by faculty on February 27, 2012
7. Lab evaluations by both instructor and students emphasized on lab safety – approved by faculty on April 23, 2012
8. Student Outcomes updated to align with ABET outcomes – approved by faculty on November 18, 2013
9. SDII course outcomes recommended to be assessed by faculty advisor(s) and course coordinator separately, with faculty advisors assessing (1) to (4) and course coordinator assessing (5)-(8). approved by faculty in November 18, 2013
10. SDI outcomes and assessment questions revised - approved by faculty in spring 2014
11. Mapping of IPFW Baccalaureate framework to EE SLO added in Section 4.2, Table 2b, approved by faculty on March 20, 2017
12. Table 3a and Table 3b: Mapping of course outcomes revised: Mapping from course outcomes to SLOs/ABET Program outcome with degree of mapping, spring 2017
13. Freshman Engineering Courses Assessment Cycle revised in Section 6.1, spring 2017
14. Exit Survey Procedure updated in Section 6.3.2.2, spring 2017
15. "Program Outcomes" is changed into "Student Learning Outcomes (SLOs)", spring 2017

Note: When courses are added, changed or removed from the curriculum, Table 3 is modified accordingly. This table was done most recently in spring 2017.

Table of Contents

1 Introduction

The Department of Electrical and Computer Engineering (ECE) in the College of Engineering, Technology, and Computer Science (ETCS), at Indiana University – Purdue University Fort Wayne (IPFW) serves the needs of students, industry, and government of northeastern Indiana. This department was split from the Department of Engineering and established on July 1, 2015. The department offers Bachelor of Science (B.S.) degrees in the following fields:

- Electrical Engineering (B.S.E.E.)
- Computer Engineering (B.S.CPE.)

The Electrical Engineering and Computer Engineering programs are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone: 410-347-7700.

The major aim of the ECE Department is to ensure its graduates understand basic concepts of mathematics and sciences, have studied one engineering field in sufficient depth to appreciate its methodologies of analysis and design, and have acquired a solid basis for life-long learning. These goals are accomplished through the establishment of courses in:

- science and mathematics
- required technical topics in the major area
- elective technical topics that combine breadth of subject matter with specific study in depth
- general education

Laboratory and design experience are an essential part of the curricula.

The ABET criteria are based on the principles of total quality management and continuous improvement. The criteria require that each program's mission be consistent with the institutional mission. The mission must be translated into specific program educational objectives and Student Learning Outcomes that are expected as a result of the educational process. The Student Learning Outcomes should be measurable and must be assessed regularly. The results of outcomes assessment should be used as feedback to make program improvements. Finally, a quality assurance and management process must be in place to achieve success.

2 Department Mission

Our mission is to support the needs of northeast Indiana through education, scholarship and service. We are committed to providing quality educational opportunities to both traditional and non-traditional students and seek to equip our students with the knowledge, skills, and experience to pursue productive engineering careers. Our faculty is also dedicated to excellence in scholarship and service to the community and the profession.

This department mission is consistent with the mission of the college and the university.

3 Electrical Engineering Program Educational Objectives

The faculty members of the ECE Department continuously work with the alumni, their employers, and the department's Industry Advisory Board on the formulation of the educational objectives.

The original educational objectives were established and approved by the faculty of the Department of Engineering in fall 2001. They were developed based on the alumni survey conducted in 2001 and on recommendations from the department's Industry Advisory Board. They are consistent with the missions of the university, the school, and the department. In 2009, the educational objectives were revised slightly, following an alumni survey conducted in summer 2009 and with input from employers, industrial sponsors of capstone senior design projects, and members of the department's Industry Advisory Board. Based on the feedback, the objectives are relevant and appropriate. These modified objectives were recommended by the Assessment Committee and approved by the faculty at the 22 February 2010 department meeting. During 2011-2012 academic year, the EE program educational objectives (PEOs) have gone through another round of review and update process. As a result, the following PEOs of the electrical engineering program were approved by the faculty of the ECE Department on February 27, 2012. In fall 2015, the EE PEOs went through another round of review, assessment results demonstrate that no revisions was necessary.

As a framework for the continuous improvement policy, the department has adopted a set of program educational objectives that describe the anticipated accomplishments of our graduates 3-5 years after graduation.

The Electrical Engineering Program's educational objectives are to produce graduates who:

1. Function and communicate effectively to solve technical problems.
2. Advance professionally to roles of greater electrical engineering responsibilities and/or by transitioning into leadership positions in business, government, and/or education.
3. Participate in life-long learning through the successful completion of advanced degree(s), professional development, and/or engineering certification(s)/licensure.
4. Demonstrate a commitment to community by applying technical skills and knowledge to support various service activities

---

3.1 Procedure to Update Program Educational Objectives

The educational objectives of the electrical engineering program at IPFW are to be periodically evaluated every five years starting in the fall of 2007. This evaluation is to be performed by seeking input from the following constituencies: 1) Alumni, 2) Industrial Sponsors of the Capstone Senior Design Projects, 3) Employers, and 4) Industry Advisory Board.

Input:

- ⇨ During the fall semester of every fifth academic year, the Assessment Committee will develop appropriate surveys and send them to all the alumni (who have graduated in the last five years), their employers, and the industrial sponsors of the capstone senior design projects. The surveys are in Appendix I.
- ⇨ The feedback from the surveys is to be shared with the Industry Advisory Board members when seeking their input.

Action:

- ⇨ All the input is reviewed by the Assessment Committee.
- ⇨ The committee prepares a report. If the report recommends a change of the educational objectives it will also include a draft of the new educational objectives. The revised educational objectives shall also be consistent with the mission and goals of IPFW.
- ⇨ The report is presented to the faculty of the ECE Department for discussion and approval. This final step takes place before the end of the spring semester following the fall semester of the fifth year of the evaluation cycle.

The process for the periodic evaluation of the educational objectives of the electrical engineering program is illustrated in the figure below.

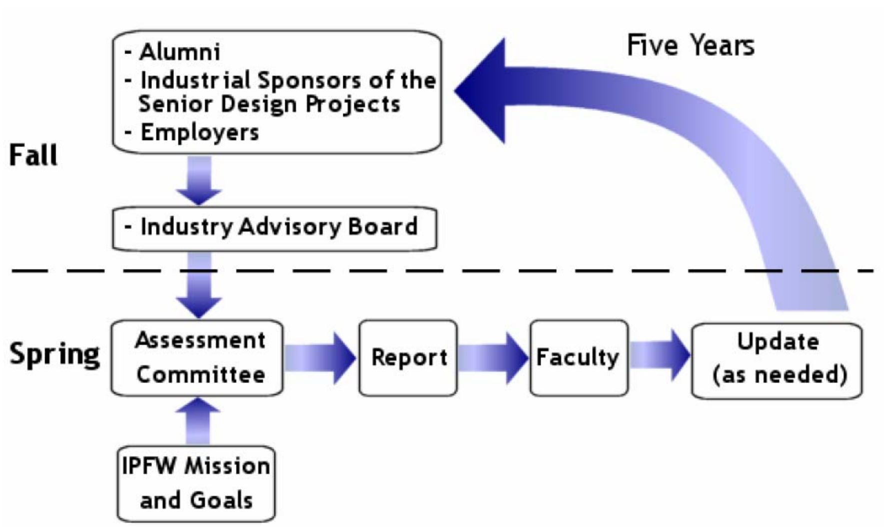


Figure 1: Process for the periodic evaluation of the program educational objectives.

4 Electrical Engineering Student Learning Outcomes and IPFW Baccalaureate Framework

The electrical engineering Student Learning Outcomes lead to the achievement of the program educational objectives as illustrated in Table 1. The following Student Learning Outcomes of the electrical engineering program at IPFW were established and approved by the faculty of the ECE Department on March 20, 2017:

The graduates from the Electrical Engineering Program will demonstrate that they have:

a. an ability to apply knowledge of mathematics, science, and engineering

b. an ability to design and conduct experiments, as well as to analyze and interpret data

c. an ability to design electrical systems, components, or processes to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

d. an ability to function as team members on engineering projects, laboratory experiments, and/or multidisciplinary activities

e. an ability to identify, formulate, and solve electrical engineering problems

f. an understanding of professional and ethical responsibility

g. an ability to communicate effectively

h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

i. a recognition of the need for, and an ability to engage in life-long learning

j. a knowledge of contemporary issues

k. an ability to use the techniques, skills, and modern tools necessary for electrical engineering practice.

Table 1: Relation between Electrical Engineering Student Learning Outcomes and Program Educational Objectives

		Student Learning Outcomes										
		a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
Program Educational Objectives	**1**	X	X	X	X	X		X				X
	2					X	X	X	X		X	
	3	X								X	X	
	4						X		X		X	

4.1 ABET Program Outcomes

Engineering programs must demonstrate that their students attain the following outcomes:

a. an ability to apply knowledge of mathematics, science, and engineering

b. an ability to design and conduct experiments, as well as to analyze and interpret data

c. an ability to design electrical systems, components, or processes to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

d. an ability to function on multidisciplinary 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. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

i. a recognition of the need for, and an ability to engage in life-long learning

j. a knowledge of contemporary issues

k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

The Electrical Engineering Student Learning Outcomes at IPFW are one-to-one mapped to ABET a-k outcomes as illustrated in Table 2a.

Table 2a: Relation between ABET a-k Outcomes to Electrical Engineering Student Learning Outcomes

ABET	a	b	c	d	e	f	g	h	i	j	k
Electrical Engineering	a	b	c	d	e	f	g	h	i	j	k

4.2 IPFW Baccalaureate Framework Mapping from EE Program Outcome

IPFW has developed a framework for its Baccalaureate Degree in April 10, 2016 as the following:

> Students who earn a baccalaureate degree at IPFW will be able to apply their knowledge to the needs of an increasingly diverse, complex, and dynamic world. To that end, IPFW continually develops and enhances curricula and educational experiences that provide all students with a holistic and integrative education.

The IPFW faculty has identified six foundations of baccalaureate education.

- **Acquisition of Knowledge**

  Students will demonstrate breadth of knowledge across disciplines and depth of knowledge in their chosen discipline. In order to do so, students must demonstrate the requisite information- seeking skills and technological competencies.

- **Application of Knowledge**

  Students will demonstrate the ability to integrate and apply that knowledge, and, in so doing, demonstrate the skills necessary for life-long learning.

- **Personal and Professional Values**

  Students will demonstrate the highest levels of personal integrity and professional ethics.

- **A Sense of Community**

  Students will demonstrate the knowledge and skills necessary to be productive and responsible citizens and leaders in local, regional, national, and international communities. In so doing, students will demonstrate a commitment to free and open inquiry and mutual respect across multiple cultures and perspectives.

- **Critical Thinking and Problem Solving**

  Students will demonstrate facility and adaptability in their approach to problem solving. In so doing, students will demonstrate critical-thinking abilities and familiarity with quantitative and qualitative reasoning.

- **Communication**

  Students will demonstrate the written, oral, and multimedia skills necessary to communicate effectively in diverse settings.

These foundations provide the framework for all baccalaureate degree programs. The foundations are interdependent, with each one contributing to the integrative and holistic education offered at IPFW.

The mapping from Electrical Engineering program students' Learning Outcomes to IPFW Baccalaureate Degree Framework is shown in Table 2b.

Table 2b. Baccalaureate Framework Map from EE SLO

Electrical Engineering Students Learning Outcomes	IPFW Baccalaureate Degree Framework					
	Acquisition of Knowledge	Application of Knowledge	Personal and Professional Values	A Sense of Community	Critical Thinking and Problem Solving	Communication
(a) an ability to apply knowledge of mathematics, science, and engineering	X	X			X	
(b) an ability to design and conduct experiments, as well as to analyze and interpret data	X	X	X		X	
(c) an ability to design electrical systems, components, or processes to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	X	X	X	X	X	
(d) an ability to function as team members on engineering projects, laboratory experiments, and/or multidisciplinary activities		X	X		X	X
(e) an ability to identify, formulate, and solve electrical engineering problems		X	X		X	
(f) an understanding of professional and ethical responsibility			X	X		X
(g) an ability to communicate effectively						X
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context			X	X	X	
(i) a recognition of the need for, and an ability to engage in life-long learning			X			
(j) a knowledge of contemporary issues				X		
(k) an ability to use the techniques, skills, and modern tools necessary for electrical engineering practice.			X		X	

5 Electrical Engineering Course Outcomes

Outcomes for all required and technical elective electrical engineering courses have been developed by the faculty members of the electrical engineering program. The Assessment Committee assigned a primary faculty and a related faculty, based on their area of expertise and experience, to establish the outcomes for each course. The course outcomes are part of the syllabus for every course taught by an engineering faculty. The course outcomes are mapped to the ABET and electrical engineering programs outcomes as illustrated in Table 3a for the required courses, and in Table 3b, for the technical elective courses.

The learning objectives of the general education courses are assessed by campus-wide committees according to a specific schedule for each area.

Table 3a. Mapping of Required EE Course Outcomes to EE SLOs/ABET Outcomes

EE SLOs	Design Content	a	b	c	d	e	f	g	h	i	j	k
ABET Program Outcomes		a	b	c	d	e	f	g	h	i	j	k
ENGR 127	Low	H	M		H	L	H	M		L		H
ENGR 128	Medium	H		M	H	L	L	H				H
ECE 201	Low	H				M						
ECE 202	Low	H				H						M
ECE 255	Medium	H		L		M						M
ECE 207	High	H	H	L		L		H				H
ECE 208	High	H	H	L		L						
ECE 270	High	H	H	H		M		L				H
ECE 301	None	H				M						M
ECE 302	None	H				M						
ECE 311	Low	H		M		L						
ECE 313	High	H	H			M		H				H
ECE 324	Medium	H				H					L	M
ECE 333	High	H		H		M						H
ECE 362	High	H	H	L		M		M				H
ECE 428	Medium	H		M		M						H
ECE 436	High	H				H		M				M
ECE 460	High	H	H	L		H						H
ECE 405	High	M		H	M	H	M	H	L			
ECE 406	High			H	H		H	H	H	H	H	
CS 229^	Medium	H	M	M	L	M	L	L	M	L	L	H
ME 253^	None	H				H						
Overall Mapping Index*		62	22	25	12	43	10	23	6	5	5	40

Note:

* H: Outcome Assessed with High Degree, M: Outcome Assessed with Medium Degree, L: Outcome Assessed with Low degree
  Computed with values assigned to the indicators; i.e. H=3, M=2, and L=1

^ Courses not offered by ECE departments.

Table 3b. Mapping of Elective EE Course Outcomes to EE SLOs/ABET Outcomes

EE SLOs	Design Content	a	b	c	d	e	f	g	h	i	j	k
ABET Program Outcomes		a	b	c	d	e	f	g	h	i	j	k
ECE 478	Medium	H		M		M						H
ECE 465	High	H		L		H						H
ECE 474	Medium	H		L		H		L				H
ECE 483	High	H		H		M						H
ECE 547	None	H	M	L		H		L				
ECE 293	High	M	H					H				H
ECE 358	High	H	H	L								H
ECE 368	High	H	M	L		H		L				
ECE 437	High	H	H	L		H				L		H
ECE 485	High	H	H	L				M				H
Overall Mapping Index*		29	16	12		19		8		1		24

Note:

* H: Outcome Assessed with High Degree, M: Outcome Assessed with Medium Degree, L: Outcome Assessed with Low degree
Computed with values assigned to the indicators; i.e. H=3, M=2, and L=1

6 Assessment Process

The educational objectives and Student Learning Outcomes (SLOs) of the electrical engineering program at IPFW are assessed using direct and indirect measures as summarized in Table 4.

Table 4: Direct and Indirect Measures

	Measures	
	Direct	Indirect
Educational Objectives	1) Employers (Supervisors) survey and Feedback 2) Student Learning Outcomes	1) Alumni Survey 2) Admittance to Graduate School 3) Industry Advisory Committee
Program Outcomes	1) Interim Assessment by Faculty 2) Capstone Assessment • Industrial Sponsor • Faculty Members	1) Interim Assessment by Students • Courses Outcomes • Laboratory Evaluation • ECE Students' Forums 2) Exit Survey 3) FE Exam 4) Co-op Education Coordinator Report

6.1 Assessment Reports

The Assessment Committee prepares *Assessment Reports* for each engineering program summarizing the assessment results in each semester. The reports are due by February 15 and September 15 for the fall and spring semesters, respectively.

Starting fall 2016, based on the recommendation of the First-Year Engineering Committee, ENGR 127 and ENGR 128 will be assessed and reported by the First-Year Engineering Committee annually. ENGR127 will be assessed in fall semesters and ENGR128 will be assessed in spring semesters. The First-Year Engineering Assessment Report will be available around May and included in the spring assessment report in the same year.

6.2 Educational Objectives Assessment

6.2.1 Direct Measures

6.2.1.1 Employer (Supervisors) Survey and Feedback

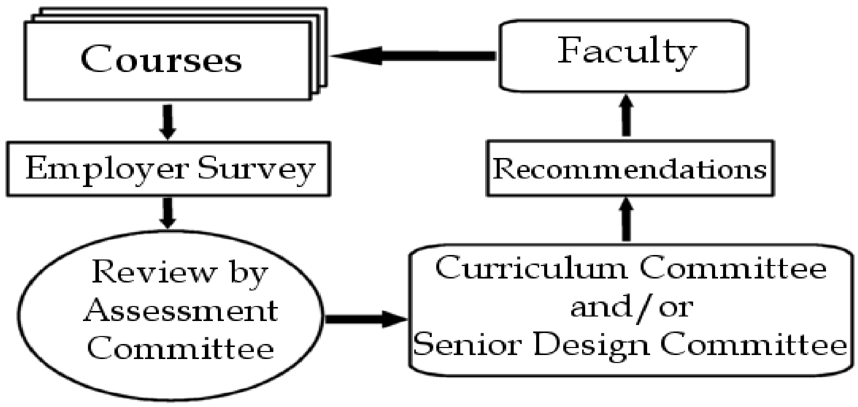
This survey consists of several questions that will provide the Assessment Committee with data and feedback to assess the readiness of our graduate to embark upon professional career in the area of electrical engineering and to assess the achievement of the educational objectives of the electrical engineering program at IPFW. A sample copy of this survey along with a cover letter can be found in Appendix I.

Frequency:

- The employer survey is sent in July to all the employers of alumni who return a survey, i.e. coincides with the alumni survey time table.

Action:

- Feedback is reviewed by the Assessment Committee.
- Any concerns or negative feedback are referred to the electrical engineering Curriculum Committee and/or Senior Design Committee to act upon and provide recommendations.



6.2.1.2 Student Learning Outcomes

According to ABET criteria *"program outcomes are statements that describe what students are expected to know or be able to do by the time of graduation from the program"*. The electrical engineering Student Learning Outcomes at IPFW were established to lead to the achievement of the programs educational objectives as illustrated in Table 1. Therefore, the achievement of the programs outcomes can be used as an indirect measure for the achievement of our programs educational objectives.

Frequency:

- See Student Learning Outcomes assessment section.

Action:

- See Student Learning Outcomes assessment section.

6.2.2 Indirect Measures

6.2.2.1 Alumni Survey

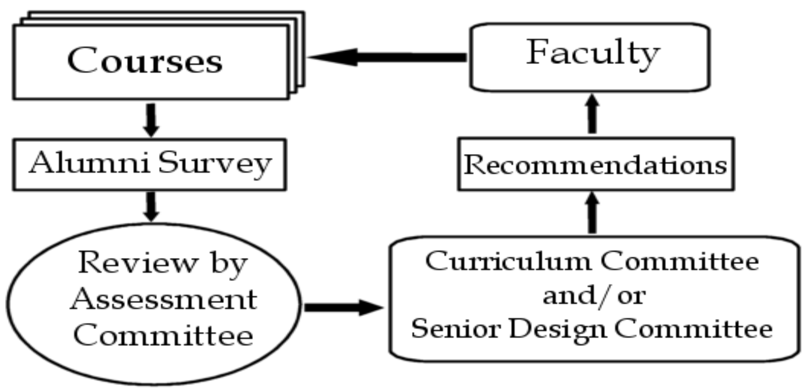
This survey consists of several questions that will provide the Assessment Committee with data and feedback to assess the achievement of the educational objectives of the electrical engineering program at IPFW. A sample copy of this survey along with a cover letter can be found in Appendix I.

Frequency:

- Starting May 2006, the alumni survey is to be conducted every year (in May). It is sent to all alumni who have graduated three years before the date of the survey.

Action:

- Feedback is reviewed by the Assessment Committee.
- Any concerns or negative feedback are referred to the electrical engineering Curriculum Committee and/or Senior Design Committee to act upon and provide recommendations to the faculty.



6.2.2.2 Admittance to Graduate School

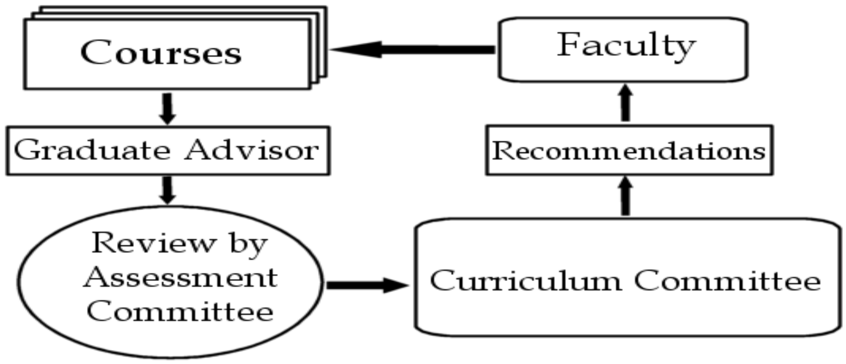
Some of our electrical engineering graduates decide to pursue graduate study. The success of these students in gaining admittance to graduate schools and their performance therein can be used as an indirect measure for the achievement of our program educational objectives.

Frequency:

- Every year the Assessment Committee finds out the number of graduating seniors who have received offers from graduate schools and have accepted.
- The Assessment Committee will try to get some feedback from the graduate advisors regarding the preparedness of our graduates to pursue graduate study.

Action:

- The feedback is reviewed by the Assessment Committee.
- Any concerns or negative feedback are referred to the electrical engineering Curriculum Committee to act upon and provide recommendations.



6.2.2.3 Industry Advisory Board

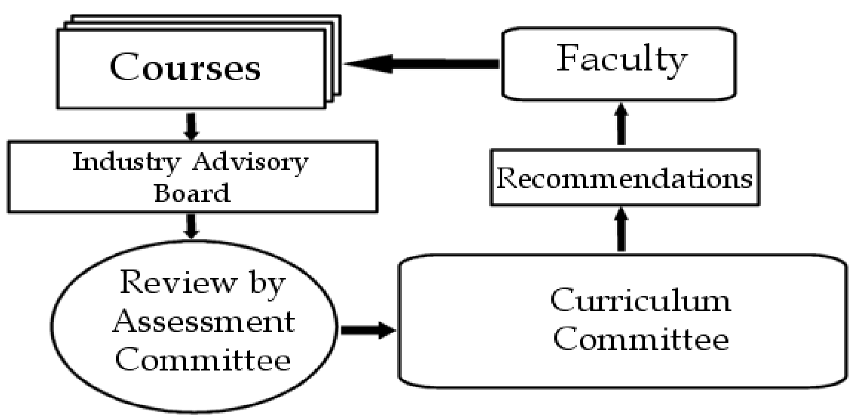
The Industry Advisory Board of the ECE Department consists of high-level executives from related industries in Northeastern Indiana. The purpose of this board is to advise and assist the department in maintaining strong engineering programs. The department consults with the board on issues such as industrial trends in the region, curriculum matters, cooperative education program, and assessment.

Frequency:

- The Chair of the department arranges for a meeting of the Industry Advisory Board with the faculty of the department at least once a year.

Action:

- Any concerns or advice shared with the faculty are referred to the Curriculum Committee to act upon and provide recommendations.



6.3 Student Learning Outcomes Assessment

6.3.1 Direct Measures

6.3.1.1 Interim Assessment by Faculty

Course Outcomes Assessment

A standard *Assessment Form* (see sample in Appendix II) developed by the Assessment Committee is used in the assessment of the Student Learning Outcomes by the faculty. Several rubrics have been developed for each ABET program outcome to help the faculty in the assessment of the outcomes. At the end of a given semester, each faculty must complete and submit a separate assessment form for the assigned Student Learning Outcomes for all of his/her courses offered in that semester.

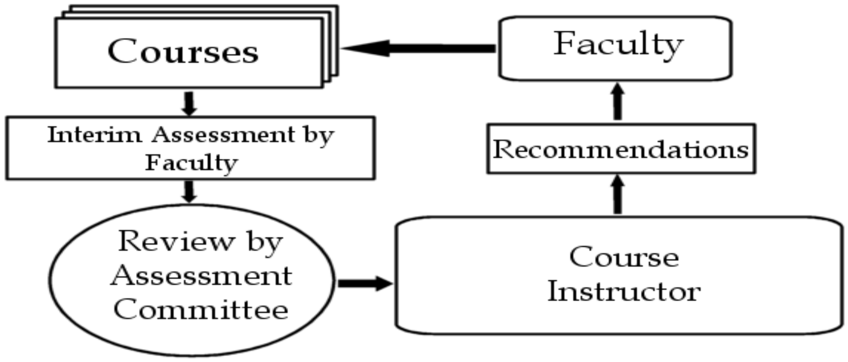
Frequency:

The Assessment Committee will use the following guidelines in determining which courses are to be assessed.

- Carry out the assessment of Student Learning Outcomes whenever a course is taught by a faculty for the first time.
- Each semester, carry out the assessment of Student Learning Outcomes for at least one course at each level: freshman, sophomore, junior, and senior.
- If the outcomes were achieved, the course is not to be assessed more than once in two years.
- All ABET Program Outcomes associated with the course being assessed in a given semester are to be assessed in that semester.
- ECE 405 and ECE 406 are to be assessed each semester. Both the course coordinator and faculty advisors are involved in assessing the outcomes. For ECE 406 course outcome assessment, in fall 2013, it is recommended by the EE and CPE Curriculum Committees and Assessment Committee that faculty advisors assess course outcomes (1)-(4) and the course coordinator assesses course outcomes (5)-(8).

Action:

- The assessment forms are reviewed by the Assessment Committee. The results are shared with the rest of faculty.
- Any outcome in any given course that was not achieved is reassessed in the following semester in which the course is offered.
- According to the Assessment Form, if the outcome was not achieved, the faculty outlines a plan (i.e., solution) that helps in achieving the outcome. This plan is forwarded to the faculty member who will be teaching the course next time around.



Lab Evaluations

Laboratories are an integral part of the electrical engineering program at IPFW. The electrical engineering curriculum consists three laboratories: ECE 207 - Electronic Measurement Techniques, ECE 208 - Electronic Devices and Design Laboratory, and ECE 313 - Energy Conversion Laboratory. In addition, laboratories are the integral parts of the following four courses: ECE 270 – Introduction to Digital Design, ECE 362 – Microprocessor Systems and Interfacing, and ECE 460 - Power Electronics.

To ensure that the laboratories are well equipped and up to the standards to fulfill their mission in achieving the related Student Learning Outcomes, the Assessment Committee has developed a laboratory evaluation form to help with this assessment. The laboratory evaluations are carried out by the lab instructor. A copy of the laboratory evaluation form can be found in Appendix II.

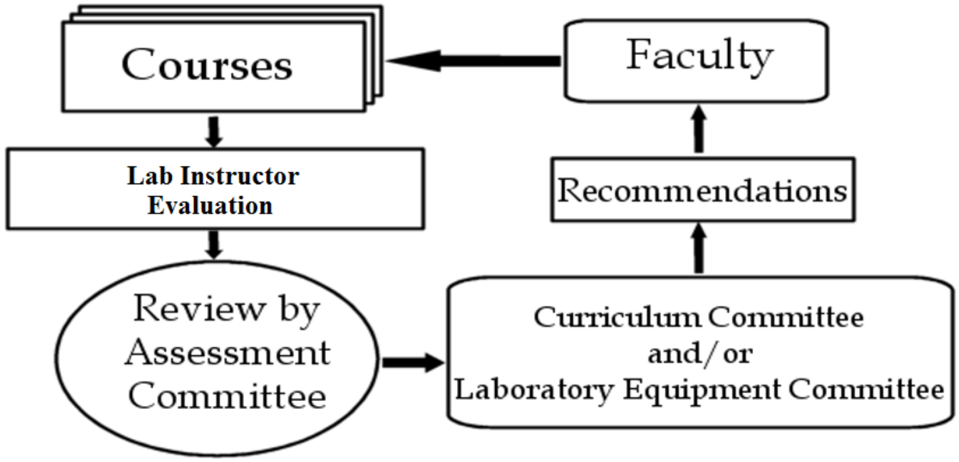
Frequency:

The Assessment Committee will use the following guidelines in determining which labs are to be evaluated.

- Carry out the evaluation whenever a lab is taught by an instructor for the first time.
- Each semester, carry out the evaluation for at least one lab.
- Evaluate a lab when the hardware and/or software have substantially changed.
- If the feedback is positive, then the laboratory evaluation will be conducted every other year.
- If the feedback for any laboratory is negative, then the laboratory evaluation is carried out after the recommendations of the appropriate committees are implemented.

Action:

- The feedback is reviewed by the Assessment Committee.
- Any concerns or negative feedback are referred to the Curriculum Committee and the Laboratory Equipment Committee to act upon and provide recommendations.



6.3.1.2 Capstone Senior Design Assessment

6.3.1.2.1 Industrial Sponsor

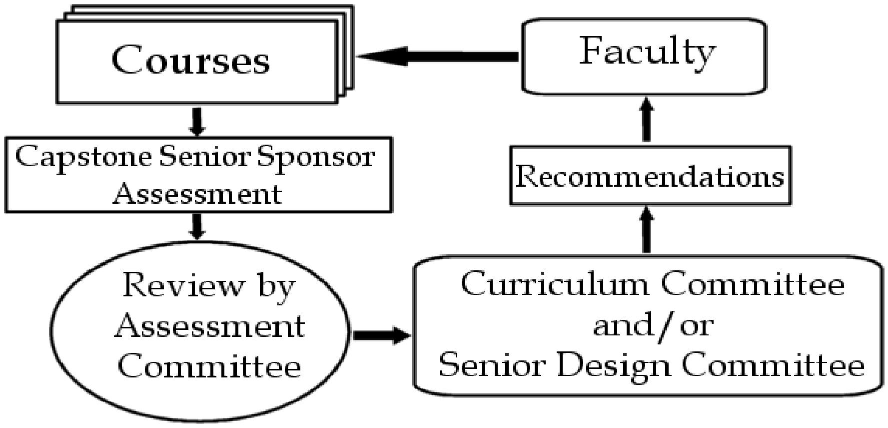
Capstone senior design projects are team projects and the majority of these projects are sponsored by the local industry. The achievement of the course outcomes of the capstone senior design is assessed by the project supervisors of the corresponding industrial sponsors. A sample copy of the assessment form that is completed by the supervisors can be found in Appendix II. In addition, the percentage of the senior design projects that are sponsored by the industry is also a measure of our Student Learning Outcomes.

Frequency:

- For senior design II (ECE 406), the Capstone Senior Design Coordinator sends the assessment form to all project supervisors of the corresponding companies by mid April of each spring semester or mid November of the fall semester. Completed assessment forms are returned to the coordinator before the senior design presentation.

Action:

- The feedback is reviewed by the Assessment Committee.
- Any concerns or negative feedback are referred to the Senior Design Committee and/or Curriculum Committee to act upon and provide recommendations.



6.3.1.2.2 Faculty Members

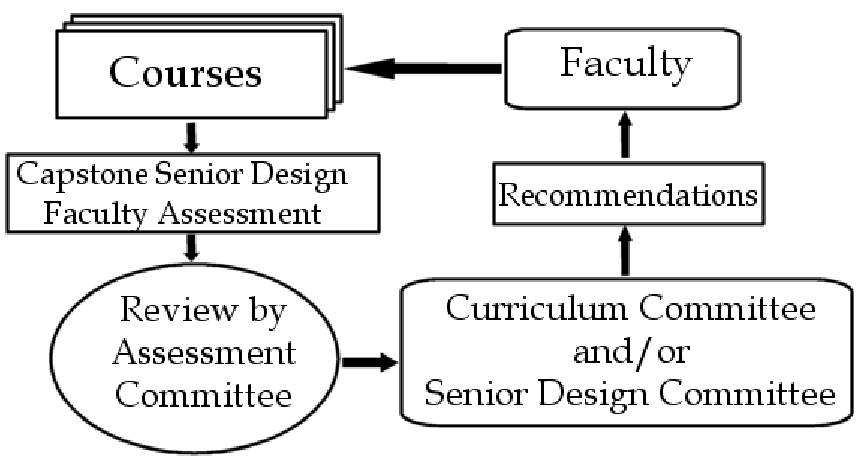
The achievement of the course outcomes of the capstone senior design is also assessed the faculty members of the ECE Department. A sample copy of the assessment form that is completed by the supervisors can be found in Appendix II.

Frequency:

- Faculty members complete the Capstone Senior Design form after the senior design presentations.

Action:

- The feedback is reviewed by the Assessment Committee.
- Any concerns or negative feedback are referred to the Senior Design Committee and/or Curriculum Committee to act upon and provide recommendations.



6.3.2 Indirect Measures

6.3.2.1 Interim Assessment by Students

Course Outcomes

For each course, the achievement of the course outcomes are assessed by all of the students enrolled in the course. A sample form of this type of assessment can be found in Appendix II.

Frequency:

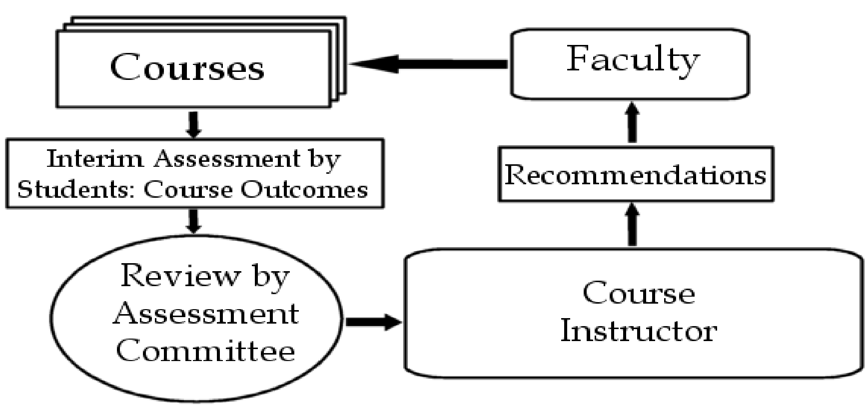
Student evaluation of the course outcomes is carried out by all students enrolled in a class at the end of the semester (during the week before the final exams week).

The Assessment Committee will use the following guidelines in determining which courses are to be assessed.

- Carry out the assessment of course outcomes whenever a course is taught by a faculty for the first time.
- Each semester, carry out the assessment of course outcomes for at least one course at each level: freshman, sophomore, junior, and senior.
- If the outcomes were achieved, the course is not to be assessed more than once in two years.
- ECE 405 and ECE 406 are to be assessed each semester.
- The same set of courses are assessed by the course instructor and the students.

Action:

- The feedback is reviewed by the Assessment Committee.
- Any negative feedback is forwarded to the instructor of the course.
- The instructor, in turn, addresses the concern.
- Any course outcomes that were not achieved are reassessed in the following semester in which the course is offered.



Laboratory Evaluations

To ensure that the laboratories are well equipped and up to the standards to fulfill their mission in achieving the related Student Learning Outcomes, the Assessment Committee has developed a laboratory evaluation form to help with this assessment. The laboratory evaluations are carried out by all students that are enrolled in a laboratory course. A copy of the laboratory evaluation form can be found in Appendix II.

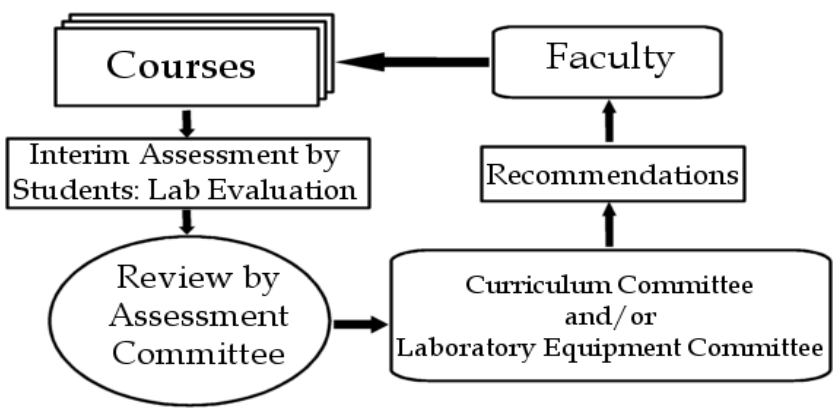
Frequency:

The Assessment Committee will use the following guidelines in determining which labs are to be evaluated.

- Carry out the evaluation whenever a lab is taught by a faculty for the first time.
- Each semester, carry out the evaluation for at least one lab.
- Evaluate a lab when the hardware and/or software have substantially changed.
- If the feedback is positive, then the laboratory evaluation will be conducted every other year.
- If the feedback for any laboratory is negative, then the laboratory evaluation is carried out after the recommendations of the appropriate committees are implemented.
- The same set of labs are assessed by the lab instructor and the students.

Action:

- The feedback is reviewed by the Assessment Committee.
- Any concerns or negative feedback are referred to the Curriculum Committee and the Laboratory Equipment Committee to act upon and provide recommendations.



ECE Students' Forums

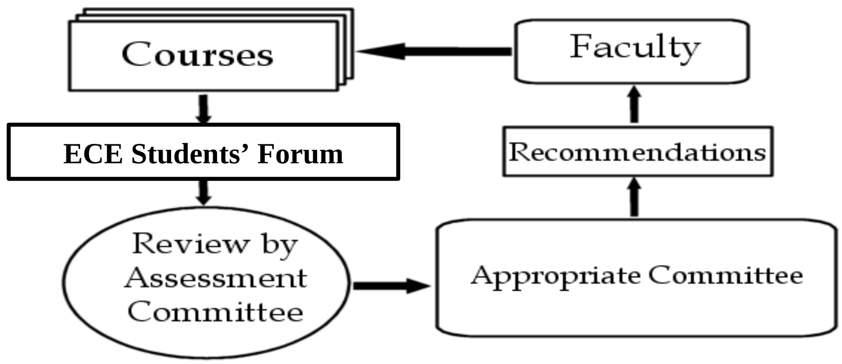
The student chapters of the engineering professional societies organize forums to which all electrical engineering and computer engineering students are invited. The Chair of the department and the Dean of the School attend the meeting. The purpose of such forums is to bring up issues and concerns to the attention of the department and the school. This feedback is very important and can help the department to achieve the Student Learning Outcomes and hence the educational objectives.

Frequency:

- A forum is held once a semester.

Action:

- The Chair of the department conveys the students' feedback to the faculty.
- Any concerns or negative feedback are referred to the appropriate committee to act upon and provide recommendations.



6.3.2.2 Exit Survey

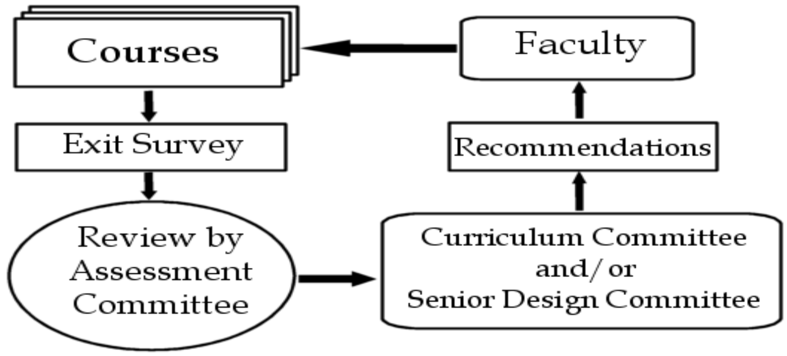
All graduating seniors are required to complete an Exit Survey at the end of their last semester. One component of the Exit Survey is devoted to assess the achievement of the Student Learning Outcomes. A copy of the exit survey can be found in Appendix II.

Frequency:

- The exit survey is conducted every fall and spring semester in which there are graduating senior(s).
- A part of the Exit Survey is devoted to assess the curriculum, the laboratories, and the achievement of the Student Learning Outcomes. A sample of the 2017 exit survey form can be found in Appendix II.
- Starting fall 2015, the exit survey is conducted by IPFW Career Services. Usually the results are available a few months after students graduate. The fall exit survey data will be included in spring Assessment Report in the next year and spring exit survey data will be included in fall assessment report in the same year.

Action:

- The feedback is reviewed by the Assessment Committee.
- Any concerns or negative feedback are referred to the electrical engineering Curriculum Committee and/or Senior Design Committee to act upon and provide recommendations.



6.3.2.3 Fundamentals of Engineering (FE) Examination

The FE exam is conducted by the National Council of Examiners for Engineering and Surveying (NCEES). It is held in two four-hour sessions: the AM session tests the lower division subjects and the PM session tests the upper division subjects.

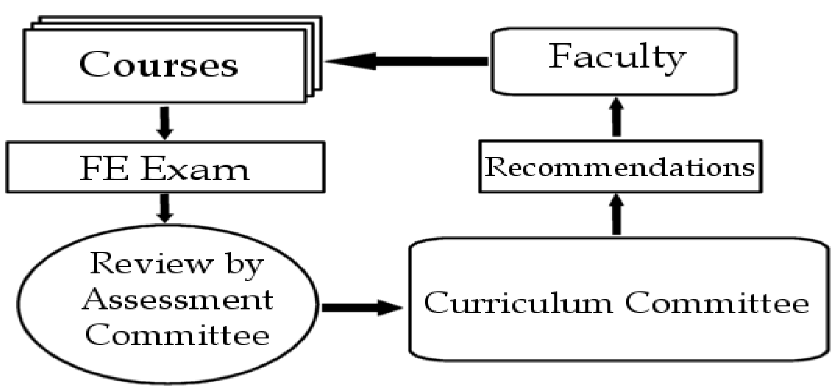
Subjects covered by the FE exam can be mapped or correlated to several ABET program outcomes such as *a, c, e,* and *f*. Thus, the performance our students on the FE exam can be used as a tool to assess the achievement of some of the Student Learning Outcomes.

Frequency:

- The graduating seniors of the electrical engineering program at IPFW are strongly encouraged to take the Fundamentals of Engineering Examinations.
- NCEES sends the results to the corresponding institutions approximately three months after the exam.

Action:

- This feedback is reviewed by the Assessment Committee.
- Any concerns or negative feedback are referred to the Curriculum Committee to act upon them and provide recommendation.



6.3.2.4 Co-op Education Coordinator Report

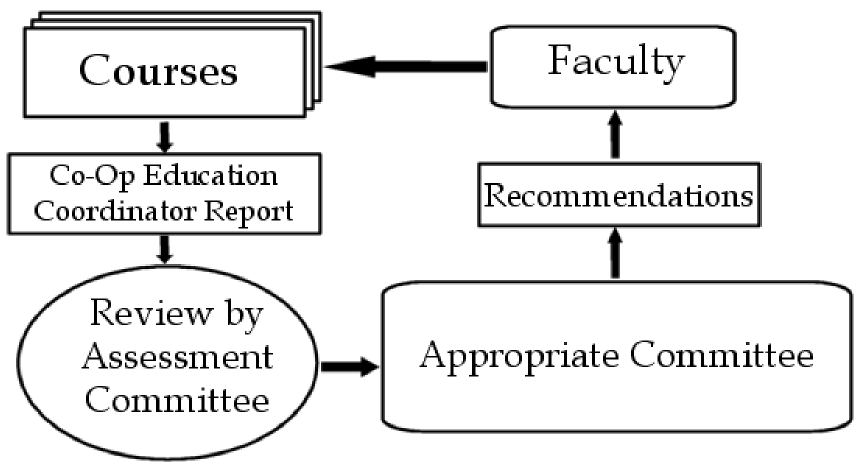
A number of electrical engineering students are enrolled in the co-op education program. At the end of each session, the co-op students and their employers submit written reports about their experiences. Components of these reports relate to some Student Learning Outcomes. A faculty member in the department is designated as the co-op coordinator. Currently the number of electrical engineering students enrolled in this program is very small.

Frequency:

- Because of the importance of industrial feedback the Co-Op coordinator will submit a summary report to the Assessment Committee every semester.

Action:

- This feedback is reviewed by the Assessment Committee.
- Any concerns or negative feedback are referred to the appropriate committee to act upon and provide recommendation.



APPENDIX I: Electrical Engineering Program Educational Objectives

- Alumni Letter and Survey
- Employer Letter and Survey
- Industry Advisory Board Letter and Survey

Sample Cover Letter for Alumni Survey

May xx, 20xx

«name»
«address1»
«address2»
«citystzip»

Dear «name»:

The IPFW Department of Electrical and Computer Engineering is conducting a survey of alumni as part of our assessment process. Your input will help us understand the strengths and weaknesses of our programs so that we can adapt to better serve current and future students.

Unfortunately, the response to our on-line survey has been very low. Because alumni feedback is so very important to the future success of our programs, we are mailing you a hard copy of the survey and providing a postage paid return envelope for your use. Please complete the survey at your earliest convenience and return it to us by Friday, May 6th.

Please let me know if you have any question (260) 481-xxxx and thank you, in advance, for your assistance.

Sincerely,

Chair, Department of Electrical and Computer Engineering

Enclosures

ELECTRICAL ENGINEERING

IPFW Department of Engineering

The intent of this survey is to obtain your feedback on the Electrical Engineering (EE) program educational objectives. As a constituent of our program, your input is very critical and valuable in reviewing and evaluating our program objectives and will be used in the continuous improvement of our programs.

Part I - PERSONAL INFORMATION

Name (optional)

Graduating semester/year

Major

E-mail (optional)

Phone # (optional)

Current Position (title)

Company or Institution

Business Phone

Supervisor

Title

Supervisor e-mail

Phone

Current salary (range)

\$0k - \$40k	\$41k - \$50k	\$51k - \$60k	\$61k - \$70k	\$71k - \$80k	\$81k - \$90k	\$91k - \$100k	\$101k or more
○	○	○	○	○	○	○	○

Immediately after graduation from IPFW

Position (title)

Company or Institution

Salary range

\$0k - \$40k	\$41k - \$50k	\$51k - \$60k	\$61k - \$70k	\$71k - \$80k	\$81k - \$90k	\$91k - \$100k	\$100k or more
○	○	○	○	○	○	○	○

In your current position your primary job function is (select all that apply)

- ☐ Analysis
- ☐ Design

- [ ] Engineering support (drafting, field support, etc.)
- [ ] Engineering management
- [ ] Education
- [ ] Field Engineering
- [ ] Consultant
- [ ] Lab and Test engineering
- [ ] Non-engineering (sales, business, etc.)
- [ ] Other:

Current area of work in Electrical Engineering (select all that apply)

- [ ] Signal Processing
- [ ] R/F Microwave Engineering
- [ ] Communications
- [ ] Control
- [ ] Robotics
- [ ] Power
- [ ] Other, please list:

PART II - ASSESSMENT OF EDUCATIONAL OBJECTIVES

The following are the set of educational objectives for the EE program at IPFW, Please rate how well your undergraduate education at the IPFW EE program met the following objectives:

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. I am prepared to function and communicate effectively both as individuals and in multidisciplinary teams to solve technical problems.	○	○	○	○
2. I have been advanced professionally to roles of greater electrical engineering responsibilities and/or by transitioning into leadership positions in business, government, and/or education.	○	○	○	○
3. I am able to participate in life-long learning through the successful completion of advanced degree(s), professional development, and/or engineering certification(s)/licensure.	○	○	○	○
4. I have a commitment to community by applying technical skills and knowledge to support various service activities.	○	○	○	○

Overall, the EE Program Education Objectives are adequate and do not require any modifications or changes.

Yes	No
○	○

If you answered No to the above question, please list all the changes that you recommend

PART III - FEEDBACK FOR CONTINUOUS IMPROVEMENT OF THE EE PROGRAM

Based on your experience at work so far, what do you recommend to better prepare our students in meeting the following program objectives. You may address issues related to curriculum, facilities including labs, teaching styles, technology use, etc.

1) EE graduates will function and communicate effectively both as individuals and in multidisciplinary teams to solve technical problems.

- ○ The program does not require any changes to improve his objective.
- ○ I recommend the following measures to prepare graduates better to meet this objective:

2) EE graduates will advance professionally to roles of greater electrical engineering responsibilities and/or by transitioning into leadership positions in business, government, and/or education.

- ○ The program does not require any changes to improve his objective.
- ○ I recommend the following measures to prepare graduates better to meet this objective:

3) EE graduates will participate in life-long learning through the successful completion of advanced degree(s), professional development, and/or engineering certification(s)/licensure.

- ○ The program does not require any changes to improve his objective.
- ○ I recommend the following measures to prepare graduates better to meet this objective:

4) EE graduates will demonstrate a commitment to community by applying technical sills and knowledge to support various service activities.

- ○ The program does not require any changes to improve his objective.
- ○ I recommend the following measures to prepare graduates better to meet this objective:

Please provide any additional comments or suggestions:

Sample Cover Letter for Employer Survey

28 April 20XX

«name1»
«name2»
«address1»
«address2»
«citystzip»

Dear «name1»:

As part of our assessment process, the Department of Electrical and Computer Engineering seeks information from the employers of our graduates. Your company has been identified as an employer of IPFW ECE graduates. Enclosed is a brief survey. Please complete this survey or pass it on to the person best qualified to answer the questions.

The results of this survey will be used in our continuing efforts to provide high quality engineering programs that serve the greater northeast Indiana area. Your input regarding IPFW ECE graduates' preparation and performance will greatly help us understand the strengths and weaknesses of our programs so that we can adapt them to better serve our current and future students. This information will be kept confidential.

Feel free to contact me at (260) 481-xxxx or xxx@ipfw.edu if you have any questions.

Please return the completed form by 20 May 20XX. Thank you, in advance, for your assistance.

Sincerely,

Chair, Department of Electrical and Computer Engineering

Enclosure: Employer Survey

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
INDIANA UNIVERSITY–PURDUE UNIVERSITY FORT WAYNE
COLLEGE OF ENGINEERING, TECHNOLOGY, AND COMPUTER SCIENCE

Employer Survey – Spring 2016

Employer Information

Company

Contact Person

Email

Position (Title)

Number of IPFW Electrical and Computer Engineering graduates employed by your company:

Computer:__________ Electrical:__________

Primary function(s) of your company (please select all that apply):

Design ____	Sales ____	Consulting ____
Management ____	Manufacturing ____	Other ____
Research & Development ____	Testing ____	

IPFW Electrical and Computer Engineering Graduates

Please select a typical IPFW Electrical and Computer Engineering (ECE) graduate (s) employed by your company and answer the following questions:

1. Overall rating of the education received by the student as it relates to his/her job preparation

Excellent _____ Fair _____ Poor _____

2. Compared with graduated of other universities, how well do IPFW ECE graduated perform?

Much better _____ Better _____ Same ______ Worse _____ Much Worse _____

3. Would you hire additional IPFW ECE graduates if there were openings? Yes _____ No _____

Comments:

Using the scale of 1 for Weak and 4 for Strong, please assess (where applicable) the performance of IPFW ECE graduates:

1. IPFW ECE graduates are prepared for a successful career in industry

   4 3 2 1 N/A

2. IPFW ECE graduates are proficient in the synthesis process with an emphasis on product and system design

   4 3 2 1 N/A

3. IPFW ECE graduates are able to function as part of a team and on multi-disciplinary projects

   4 3 2 1 N/A

4. IPFW ECE graduates possess a sound foundation in the mathematical, scientific and engineering fundamentals necessary to solve engineering problems

   4 3 2 1 N/A

5. IPFW ECE graduates demonstrate ethical responsibility and are aware of the need to engage in life-long learning

   4 3 2 1 N/A

(Space for additional comments on back)

Sample Cover Letter for Industry Advisory Board Survey

Dear «name»:

The purpose of this letter is to invite you to be on the Industrial Advisory Board (IAB) of the Department of Electrical and Computer Engineering and to provide you with information about our program.

The Department of Electrical and Computer Engineering (ECE) was newly established with the division of Department of Engineering on July 1, 2015 into two departments. This change is intended to reduce the managerial burden of a large, diverse department and allow each unit to better address discipline-specific matters and present a more focused image to students and the public. Currently, we have ten faculty members and approximately 200 active students. The department offers two undergraduate degree programs (computer and electrical), a first-year engineering program, and a graduate program. We are proud to announce that all of our undergraduate degrees received six-year ABET accreditation in 2012.

Input from the IAB members is important for our department to maintain our growth, meet the demand in industry in our region, and to retain our accreditation by ABET. Thus, we are hoping that each board member can make a three year commitment to serve on IAB. IAB usually meets once a year. Please let us know of your desire to serve on the board until 2018 via email to xxx@ipfw.edu by August 7.

If you feel that you cannot or are unwilling to serve, perhaps you might suggest someone from your company to serve on the IAB by August 7.

Once the new board is constituted, we plan to hold an informational meeting sometime in September. We will be sending information about the meeting once we receive confirmation from you.

Feel free to email or call at 481- xxxx with questions.

Sincerely,

Chair, Department of Electrical and Computer Engineering

Enclosures

IPFW Department of Electrical and Computer Engineering
Electrical Engineering PEO Appropriateness Survey – Fall 2015

As a framework for the continuous improvement policy, the electrical engineering program has adopted a set of program educational objectives (PEOs) that describe the anticipated accomplishments of our graduates 3-5 years after graduation.

The intent of this survey is to obtain feedback concerning the appropriateness of the electrical engineering program's PEOs. As a constituent of our program, your observations are very critical. Your responses will be used in the continuous improvement of our programs.

Name: ______________________________

Company: ______________________________

E-mail: ______________________________

Please assess the adequacy and appropriateness and adequacy of the PEOs.

1. IPFW EE graduates are prepared to function and communicate effectively both as individuals and in multidisciplinary teams to solve technical problems.

Please select one:

☐ PEO #1 is adequate and appropriate, and does not require any modifications or changes.

☐ PEO #1 should be removed or modified as follows:

____

____

____

2. IPFW EE graduates are prepared to advance professionally to roles of greater electrical engineering responsibilities and/or by transitioning into leadership positions in business, government, and/or education.

Please select one:

☐ PEO #2 is adequate and appropriate, and does not require any modifications or changes.

☐ PEO #2 should be removed or modified as follows:

____

____

3. IPFW EE graduates are prepared to participate in life-long learning through the successful completion of advanced degree(s), professional development, and/or engineering certification(s)/licensure.

Please select one:

☐ PEO #3 is adequate and appropriate, and does not require any modifications or changes.

☐ PEO #3 should be removed or modified as follows:

____

____

____

4. IPFW EE graduates are prepared to demonstrate a commitment to community by applying technical skills and knowledge to support various service activities.

Please select one:

☐ PEO #4 is adequate and appropriate, and does not require any modifications or changes.

☐ PEO #4 should be removed or modified as follows:

____

____

____

Please suggest other PEOs:

☐ PEOs should be expanded to include:

____

____

☐ PEOs should be expanded to include:

____

____

Electrical Engineering Program Educational Objectives (PEOs)

The following PEOs of the *electrical engineering* program were approved by the faculty of the Department of Engineering on February 27, 2012.

As a framework for the continuous improvement policy, the electrical engineering program has adopted a set of program educational objectives that describe the anticipated accomplishments of our graduates 3-5 years after graduation.

The electrical engineering program educational objectives are to produce graduates who:

1. Function and communicate effectively to solve technical problems.

2. Advance professionally to roles of greater electrical engineering responsibilities and/or by transitioning into leadership positions in business, government, and/or education.

3. Participate in life-long learning through the successful completion of advanced degree(s), professional development, and/or engineering certification(s)/licensure.

4. Demonstrate a commitment to community by applying technical skills and knowledge to support various service activities.

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
INDIANA UNIVERSITY–PURDUE UNIVERSITY FORT WAYNE
COLLEGE OF ENGINEERING, TECHNOLOGY, AND COMPUTER SCIENCE

Advisory Board Survey
Fall 2016

Please provide the following information

Name: ______________________ Company: ______________________

Position: ______________________ Email: ______________________

Primary function(s) of your company (you can choose more than one)

_____ Design _____ Management _____ Research & Development

_____ Sales _____ Manufacturing _____ Testing

_____ Consulting _____ Research _____ Other: ______________

Electrical Engineering offers General Education courses in the following categories:

Category B5 – Social and Behavioral Ways of Knowing

Category B6 – Humanistic and Artistic Ways of Knowing

Category B7 – Interdisciplinary or Creative Ways of Knowing

In the next 3 sections of Categories B5, B6 & B7, please select all classes that you feel are beneficial to Electrical Engineering students.

CATEGORY B5 – SOCIAL AND BEHAVIORAL WAYS OF KNOWING

ANTH E105 – Culture & Society	ECON E200 – Fundamentals of Economics	POLS Y109 – Introduction to International Relations	PSY 33500 – Stereotyping & Prejudice
ANTH L200 – Language & Culture	EDUC H340 – Education & American Culture	POLS Y208 – Scandals & Conspiracy Theories	PSY 35000 – Abnormal Psychology
ANTH P200 – Intro to Prehistoric Arch.	GERN G231 – Introduction to Gerontology	POLS Y212 – Making Democracy Work	PSY 36900 – Development Across the Lifespan
ANTH E445 – Medical Anthropology	IET 10500 – Industrial Management	POLS Y213 – Intro to Public Policy	SOC S161 – Principals of Sociology
ANTH E470 – Psychological Anthropology	LING L103 – Introduction to the Study of Language	POLS Y252 – Sports & Public Policy	SOC S163 – Social Problems
COM 21200 – Study of Interpersonal Comm.	OLS 25200 – Human Relations in Organizations	POLS Y301 – Political Parties & Interest Groups	SOC S317 – Social Stratification
COM 25000 – Mass	OLS 26800 – Elements of	POLS Y319 – The United	SOC S325 - Criminology

Communication & Society	Law	States Congress	
COM 30300 – Intercultural Communication	POLS Y100 – American Political Controversies	PPOL V170 – Intro to Public Affairs	SOC S360 – Topics in Social Policy
CDFS 25500 – Introduction to Couple & Family Relationships	POLS Y101 – Introduction to Political Science	PSY 12000 – Elementary Psychology	WOST W210 – Introduction to Women's Studies
CSD 11500 – Intro to Communication Disorders	POLS Y103 – Introduction to American Politics	PSY 23500 – Child Psychology	
ECON E101 – Survey of Economic Issues & Prob.	POLS Y107 – Introduction to Comparative Politics	PSY 24000 – Introduction to Social Psychology	

Any suggestions regarding the Category B5 – Social and Behavioral Ways of Knowing, General Education Courses listed above?

CATEGORY B6 – HUMANISTIC AND ARTISTIC WAYS OF KNOWING

CLAS C205 – Classical Mythology	FINA H112 – History of Art II: Renaissance to Contemporary	MUS Z105 – Traditions in World Music	PHIL 30500 – Philosophical Theories of Feminism
COM 21000 – Debating Public Issues	FOLK F101 – Intro to Folklore	MUS Z201 – History of Rock & Roll Music	PHIL 31200 – Medical Ethics
COM 24800 – Introduction to Media Criticism & Analysis	FOLK F111 – Intro to World Folk Music	PHIL 11000 – Introduction to Philosophy	PHIL 32700 – Environmental Ethics
ENG L101 – Western World Masterpieces I	GER E371 – Special Topics in Germanic Studies	PHIL 11009 – Intro to Philosophical Topics	PHIL 32800 – Ethics and Animals
ENG L102 – Western World Masterpieces II	HIST H105 – American History I	PHIL 11100 - Ethics	REL 23000 – Religions of the East
ENG L202 – Literary Interpretation	HIST H106 – American History II	PHIL 11101 – Contemporary Moral Prob.	REL 23100 – Religions of the West
ENG L250 – American Literature Before 1865	HIST H113 – History of Western Civilization I	PHIL 24000 – Social & Political Philosophy	REL 30100 - Islam
ENG L251 – American Literature Since 1865	HIST H114 – History of Western Civilization II	PHIL 30100 – History of Ancient Philosophy	SPAN S275 – Hispanic Culture & Conversation
FILM K101 – Introduction to Film	HIST H201 – Russian Civilization I - II	PHIL 30200 – History of Medieval Philosophy	THTR 20100 – Theatre Appreciation
FINA H101 – Art Appreciation	HIST H232 – The World in the 20th Century	PHIL 30300 – History of Modern Philosophy	WOST W225 – Gender, Sexuality & Popular Culture
FINA H111 – History of Art I: Prehistoric to Medieval	MUS Z101 – Music for the Listener	PHIL 30400 – 19th Century Philosophy	

Any suggestions regarding the Category B6 – Humanistic and Artistic Ways of Knowing, General Education Courses listed above?

CATEGOGY B7 – INTERDISCIPLINARY OR CREATIVE WAYS OF KNOWING

ANTH B426 – Human Osteology	FINA P133 – Metalsmithing for Non-majors	MUS L153 – Introduction to Music Therapy	POLS Y285 – Science and Politics
ANTH P370 – Ancient Cultures of South America	FINA S165 – Ceramics for Non-majors	MUS Z140 – Introduction to Musical Expression	PPOL E162 – Environment and People
ANTH P421 – Moche Archaeology Seminar	FINA S239 – Painting for Non-majors	NELC A100 – Elementary Arabic I	PSY 42600 – Language Development
ARET 12300 – Digital Graphics for Built Environment I	FNN 40300 – Advanced Nutrition: Food from Farm to Fork	NELC A150 – Elementary Arabic II	PSY 44400 – Human Sexual Behavior
ARET 21000 – Architecture & Urban Form	FREN F111 – Elementary French I	OLS 45400 – Gender & Diversity in Management	REL 11200 – Religion & Culture
ARET 22300 – Digital Graphics for Built Environment II	FREN F112 – Elementary French II	PHIL 12000 – Critical Thinking	REL 30000 – Religions of the Ancient World
ARET 22500 – Creative House Design	GEOG G315 – Environmental Conservation	PHIL 15000 – Principals of Logic	SOC S109 – Community & the Built Environment
ARET 31000 – Arch. & Urban Form in the Modern World	GEOL G300 – Environmental & Urban Geology	PHIL 27500 – The Philosophy of Art	SOC S314 – Social Aspects of Health & Medicine
CE 23600 – Transportation Policy, Planning & …	GEOL G305 – Geologic Fundamentals in Earth Science	PHIL 32600 – Business Ethics	SPAN S111 – Elementary Spanish I
CS 11200 – Survey of Computer Science	GER G111 – Elementary German I	PHIL 35100 – The Philosophy of Science	SPAN S112 – Elementary Spanish II
DANC 39000 – Introduction to Dance	GER G112 – Elementary German II	PHIL 35200 – Topics in the History & Philosophy of Science	SPAN S113 – Accelerated First Year Spanish
EALC J101 – Elementary Japanese I	INTL I200 – Introduction to International Studies	PHIL 43500 – Philosophy of Mind	THTR 13400 – Fundamentals of Performance
EALC J102 – Elementary Japanese II	INTR 33000 – Cultures & Design: A Cross-Cultural Comp. of Arch.	PHIL 46500 – Philosophy of Language	THTR 32510 – History of Modern Drama
ENG R190 – Rhetorical Reading	JOUR J210 – Visual Communication	PHYS 13600 – Chaos and Fractals	WOST W240 – Topics in Feminism
ENG W103 – Introductory Creative Writing	LGBT 20000 – Introduction to Scholarship on LGBT Issues	PHYS 25100 – Heat, Electricity, and Optics	
ENG W203 – Creative Writing	LING L360 – Language on Society	PHYS 30200 – Puzzles, Strategy Games & Problem Solving	
FINA N108 – Introduction to Drawing for Non-majors	MEST M201 – Medieval Encounters	POLS Y275 – Politics & Film	

Any suggestions regarding the Category B7 – Interdisciplinary or Creative Ways of Knowing, General Education Courses listed above?

Electrical Engineering offers Technical Elective courses in the following categories:

Group 1

Group 2

In the next 2 sections of technical electives, please select all classes you feel are beneficial to Electrical Engineering students.

TECHNICAL ELECTIVES – GROUP 1

ECE 4xx00 – Robotics and Automation	ECE 48300 – Digital Control Systems Analysis & Design
ECE 46500 – Embedded Microprocessors	ECE 54700 – Introduction to Computer Communication Network
ECE 47400 – Introduction to RF Circuit Design	

TECHNICAL ELECTIVES – GROUP 2

ECE 29300 – Measurements & Instrumentation	SE 51000 – Systems Engineering	MA 17500 – Intro to Discrete Math
ECE 35800 – Introduction to VHDL	SE 52000 – Engineering Economics	MA 27500 – Intermediate Discrete Math
ECE 36800 – Data Structures	SE 53000 – Engineering Management	MA 41700 – Mathematical Programming
ECE 43700 – Computer Design & Prototyping	CS 32100 – Computer Graphics	PHYS 32200 - Optics
ECE 48500 – Embedded Real-Time Operating Systems	CS 36000 – Software Engineering	PHYS 34200 – Modern Physics

Any suggestions regarding any of the Technical Electives listed above?

APPENDIX II: Electrical Engineering Student Learning Outcomes

- Sample Faculty Course Outcome Assessment Form
- Faculty Advisor/Coordinator Assessment of Course Outcomes (Senior Design II)
- Laboratory Evaluation by Instructor
- Industrial Sponsor’s Assessment of Course Outcomes (Senior Design II)
- Faculty Assessment of Course Outcomes (Senior Design I)
- Faculty Assessment of Course Outcomes (Senior Design II)
- Sample Student Course Outcome Assessment Form
- Student Assessment of Course Outcomes (Senior Design I)
- Student Assessment of Course Outcomes (Senior Design II)
- Laboratory Evaluation by the Students
- Exit Survey
  (Note: ElecCmp questions in 1st Destination survey)

Sample Faculty Course Outcome Assessment Form – ECE 255

Faculty Assessment of Course - SPRING 2014

Course: ECE 255
emester: SPRING 2014
Section: 1
Instructor: Todor Cooklev
Number of Students: 10

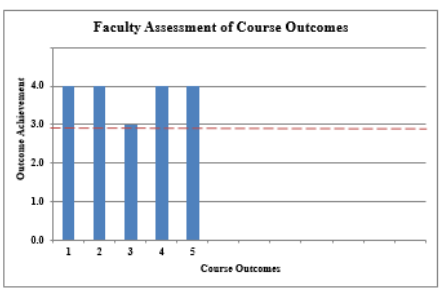
Outcomes			Faculty Assessment						
			Tools Used			Course	Criteria Used		
	Course	ABET	1	2	3	Outcome	criterion	Limit	Value
1)	An ability to identify and correctly utilize the external lead structure and basic electrical characteristics of common semiconductor devices (PN junctions, MOSFETs and BJTs).	a,k	Homework			Yes, strongly	criterion 1	**75%**	88%
2)	An ability to analyze and design DC bias circuits.	a,c,e,k	Midterm(s)			Yes, strongly	criterion 3	**75%**	80%
3)	An ability to utilize DC and AC models of semiconductor devices in both analysis and design.	a,c,e,k	Midterm(s)			Yes, adequate	criterion 4	**75%**	78%
4)	Understanding of frequency responses of transistor circuits in both analysis and design	a,c,e,k	Final Exam			Yes, strongly	criterion 4	**75%**	82%
5)	Understanding of power amplifiers in both analysis and design.	a,c,e,k	Final Exam			Yes, strongly	criterion 4	**75%**	82%

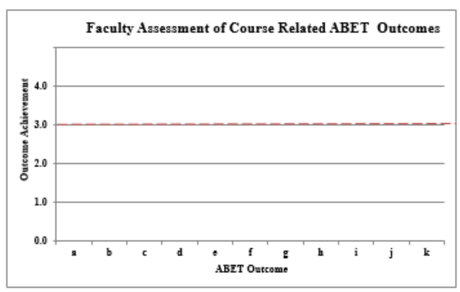
criterion 1: The average of students in the assessment tool is equal to or greate **75%**
criterion 2: The percentage of students with grade 70 or more is at least equal **70%**
criterion 3: The percentage of students passing the assessment tool is greater **75%**
criterion 4: The average grade of students passing the assessment tool is at le **75%**
criterion 5: Overall, students' participation in a team was effective.
criterion 6: Faculty observation of students' function in a team is satisfactory

Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.





Faculty Advisor/Coordinator Assessment of Course Outcomes (ECE 406: Senior Design II)

Faculty Assessment of Course - Fall 2016

Course:
Semester: Fall 2016
Section: ____________
Advsior:
Number of Students: ________

Outcomes			Faculty Assessment						
			Tools Used			Course	Criteria Used		
	Course	ABET	1	2	3	Outcome	criterion	Limit	Value
1)	The ability to identify the various paramaters that need to be determined in order to evaluate the prototype with the basic design that was obtained in the first semester	c	S. Design Report	S. Design Present	Meeting(s)	Yes, strongly	criterion 1	75%	
2)	The ability to build, test and evaluate the basic design completed in the first semster	c	S. Design Report	S. Design Present	Meeting(s)	Yes, strongly	criterion 1	75%	
3)	The ability to function within a multidisciplinary team	d	Meeting(s)	Memo(s)		Yes, strongly	criterion 6		
4)	The ability to present his/her work both written and orally	g	S. Design Present			Yes, strongly	criterion 1	75%	
5)	Knowledge of comtemporary issues	j							
6)	Understanding of the ethical issues that are associated with the engineering profession	f							
7)	Understanding of the societal impact of engineering	h							
8)	Recognition of the need for life-long learning	i							

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal tc	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	

Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Faculty Assessment of Course - Fall 2016

Course: ECE 40600 - Senior Engineering Design II
Semester: Fall 2016
Section: 1
Instructor: Coordinator
Number of Students: ________
1 Unknown/1 Dual Degree/5 CPE/5 EE

Outcomes			Faculty Assessment						
			Tools Used			Course	Criteria Used		
	Course	ABET	1	2	3	Outcome	criterion	Limit	Value
1)	The ability to identify the various paramaters that need to be determined in order to evaluate the prototype with the basic design that was obtained in the first semester	c							
2)	The ability to build, test and evaluate the basic design completed in the first semster	c							
3)	The ability to function within a multidisciplinary team	d							
4)	The ability to present his/her work both written and orally								
5)	Knowledge of comtemporary issues	j	Homework	Memo(s)	Presentation(s)		criterion 3	75%	
6)	Understanding of the ethical issues that are associated with the engineering profession	f	Homework	Memo(s)			criterion 2	70%	
7)	Understanding of the societal impact of engineering	h	Homework	Memo(s)	Presentation(s)		criterion 3	75%	
8)	Recognition of the need for life-long learning	i	Homework	Memo(s)	Presentation(s)		criterion 3	75%	

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	

Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Electrical and Computer Engineering Program
Indiana University-Purdue University Fort Wayne
Lab Evaluation by the Instructor

Course #:	Course Title:	
Semester:	Year:	
Instructor:	Section:	Number of Students:

Please indicate your overall experience with the labs that you took by circling a number.

	1 (strongly disagree)			4 (strongly agree)
1. The lab is well equipped If not, what do you think is missing?	**1**	**2**	**3**	**4**
2. The lab equipment is functional. If not, please elaborate.	**1**	**2**	**3**	**4**
3. The use of the lab equipment and facilities is safe If not, please elaborate.	**1**	**2**	**3**	**4**
4. The lab technical support is adequate **4** If not, please elaborate.		**1**	**2**	**3**
5. The level and type of interactions with the lab technician is adequate If not, please elaborate.	**1**	**2**	**3**	**4**

Department of Electrical and Computer Engineering
Industrial Sponsor's Assessment

Capstone Senior Design Course Outcomes

NAME: ____________________________________

POSITION: ____________________________________

COMPANY: ____________________________________

SIGNATURE:____________________________________

Design Project Title:
Team Members:
Faculty Advisor:
Semesters:

Using the scale **1 for weak to 4 for strong**, please rate the following by circling a number.

1. The ability of the students to formulate a problem statement. **1 2 3 4**
   Comments:

2. The ability of the students to generate solutions. **1 2 3 4**
   Comments:

3. The ability of the students to evaluate the generated solutions. **1 2 3 4**
   Comments:

4. The ability of the students to obtain a final design including, safety, economic, ethical and engineering standards considerations. **1 2 3 4**
   Comments:

5. The ability of the students to function within a team. **1 2 3 4**
   Comments:

6. The ability of the students to communicate effectively. **1 2 3 4**
   Comments:

7. The ability of the students to build, test and evaluate their design. **1 2 3 4**
   Comments:

Department of Electrical and Computer Engineering
Faculty Assessment
Senior Design I Course Outcomes

Faculty Name: ____

Signature: ____

Design Project Title:
Team Members:
Faculty Advisor:
Semester:

Using the scale **1 for weak to 4 for strong**, please rate the following by circling a number.

1. The ability to formulate a problem statement **1 2 3 4**
Comments:

2. The ability to generate solutions (conceptual designs) **1 2 3 4**
Comments:

3. The ability to evaluate conceptual designs using a well defined criteria **1 2 3 4**
Comments:

4. The ability to obtain a final design including safety, economic, ethical, and engineering standards considerations **1 2 3 4**
Comments:

5. The ability of the students to communicate effectively **1 2 3 4**
Comments:

Department of Electrical and Computer Engineering
Faculty Assessment
Capstone Senior Design Course Outcomes
Senior Design II Course Outcomes

Faculty Name:____

Signature: ____

Design Project Title:
Team Members:
Faculty Advisor:
Semester:

Using the scale **1 for weak to 4 for strong**, please rate the following by circling a number.

1. The ability of the students to build their design. **(c, 4)** **1 2 3 4**
Comments:

2. The ability of the students to test their design. **(c, 4)** **1 2 3 4**
Comments:

3. The ability of the students to evaluate their design. **(c, 4)** **1 2 3 4**
Comments:

4. The ability of the students to communicate effectively. **(g, 8)** **1 2 3 4**
Comments:

Student Assessment of Course Outcomes
ECE 201 – Linear Circuit Analysis I
Instructor:

Please be candid and use your best judgment in answering the questions.
If you think an outcome was strongly not achieved or not achieved, please elaborate

---

Check your degree program: CE ___ CmpE ___ EE ___ ME ___ Expected Grade: ___

1 strongly not achieved, **2** not achieved, **3** achieved, **4** strongly achieved

1. An understanding of the basic concepts of linear circuit elements and measurement variables. **1 2 3 4**
Comments:

2. An ability to analyze simple resistive circuits using Ohm's law and Kirchhoff's laws. **1 2 3 4**
Comments:

3. An ability to solve circuit problems using the techniques of mesh current, node voltage, superposition, and Thevenin/Northon equivalent circuits. **1 2 3 4**
Comments:

4. A basic understanding of operational amplifiers. **1 2 3 4**
Comments:

5. An understanding of inductors and capacitors as energy storage elements. **1 2 3 4**
Comments:

Continue on back →

6. An understanding of the natural and step responses of RL and RC circuits. *Comments:*	**1**	**2**	**3**	**4**
7. An understanding of the natural and step responses of RLC circuits. *Comments:*	**1**	**2**	**3**	**4**
8. An understanding of phasors and an ability to determine the sinusoidal steady-state response of linear circuits. *Comments:*	**1**	**2**	**3**	**4**
9. An ability to calculate the sinusoidal steady-state power for linear circuits. *Comments:*	**1**	**2**	**3**	**4**

Indiana University – Purdue University Fort Wayne
Department of Electrical and Computer Engineering

Student Assessment of Course Outcomes (Senior Design I)

Course Code and Number: ____________ Term/Year: ________

Coordinator: __________________________ Advisor(s): ____________________________________

Your Major is, ☐ CmpE ☐ EE ☐ Other

For each of the outcomes listed below, please check the appropriate box that corresponds to the extent that you feel the course has helped you to achieve the outcome

Outcome (If you need more space for comments please use the back of the form)	1 (Very Low)	2	3	4 (Very High)
1. The ability to formulate a problem statement *Comments:*	☐	☐	☐	☐
2. The ability to generate solutions (conceptual designs) using brainstorming technique *Comments:*	☐	☐	☐	☐
3. The ability to evaluate conceptual designs using a well defined criteria *Comments:*	☐	☐	☐	☐
4. The ability to obtain a final design including safety, economic and ethical considerations *Comments:*	☐	☐	☐	☐
5. The ability to function within a team *Comments:*	☐	☐	☐	☐
6. The ability to present his/her work both written and orally *Comments:*	☐	☐	☐	☐

Please use the space below to bring to the attention of the Department any additional comments or suggestions for improving the effectiveness of the course. Also, include comments about issues such as the adequacy of your preparation in prerequisite courses, if applicable.

____

____

____

____

____

____

Indiana University – Purdue University Fort Wayne
Department of Electrical and Computer Engineering

Student Assessment of Course Outcomes (Senior Design II)

Course Code and Number: ____________ Term/Year: ________

Coordinator: _________________________ Advisor(s): ____________________________________

Your Major is, ☐ CmpE ☐ EE ☐ Other

For each of the outcomes listed below, please check the appropriate box that corresponds to the extent that you feel the course has helped you to achieve the outcome

Outcome (If you need more space for comments please use the back of the form)	Very Low 1	2	3	Very 4
1. The ability to identify the various parameters that need to be determined in order to evaluate the prototype with the basic design that was obtained in the first semester *Comments:*	☐	☐	☐	☐
2. The ability to build, test and evaluate the basic design completed in the first semester *Comments:*	☐	☐	☐	☐
3. The ability to function within a team *Comments:*	☐	☐	☐	☐
4. The ability to present his/her work both written and orally *Comments:*	☐	☐	☐	☐
5. Knowledge of contemporary issues *Comments:*	☐	☐	☐	☐
6. Understanding of the ethical issues that are associated with the engineering profession *Comments:*	☐	☐	☐	☐
7. Understanding of the societal impact of engineering *Comments:*	☐	☐	☐	☐
8. Recognition of the need for life-long learning *Comments:*	☐	☐	☐	☐

Please use the space below to bring to the attention of the Department any additional comments or suggestions for improving the effectiveness of the course. Also, include comments about issues such as the adequacy of your preparation in prerequisite courses, if applicable.

Electrical and Computer Engineering Program
Indiana University-Purdue University Fort Wayne
Lab Evaluation by the Students

Course #: Course Title:
Semester: Year:
Instructor: Section: Number Enrolled:
Please indicate your major: CmpE _____ EE _____ Dual _____ Other _____ Expected Grade: __________

Please indicate your overall experience with the labs that you took by circling a number.

1 (strongly disagree) ***4 (strongly agree)***

1. The lab is well equipped. **1 2 3 4**
   If not, what do you think is missing?

2. The lab equipment is functional. **1 2 3 4**
   If not, please elaborate.

3. The lab experiments are reasonable in length. **1 2 3 4**
   If not, how can we improve it?

4. The lab experiments are reasonable in content. **1 2 3 4**
   If not, how can we improve it?

5. The lab manual adequately describes experiments. **1 2 3**
   4
   If not, please help us identify the shortcomings.

6. The general rules of lab safety were clearly explained **1 2 3 4**
   at the start of the semester.
   If not, please elaborate.

7. Safety provisions pertaining to each experiment and/or lab **1 2 3**
   4
   activity were explained at the beginning of the associated lab session
   (if applicable/required/needed)
   If not, please elaborate.

Please feel free to use the back for additional comments

1st Destination Survey (Computer and Electrical Engineering Questions)

ElecCompEI Please Continue - Specific Department / Degree Program Questions: The following questions are specific to your education and play a part of the process of continuous improvement mandated by our national accrediting agency. Your time and effort in participating in this survey is greatly appreciated.

ElecCompE1 Have you already received a job offer?
- Yes (1)
- No (2)

ElecCompE2 How many job offers have you received?

ElecCompE3 What are your salary expectations?

ElecCompE4 Are you going to graduate school?
- Yes (1)
- No (2)

ElecCompE5 What university are you planning to attend?

ElecCompE6 What degree do you plan on attaining?

ElecCompE7 The following statements pertain to the Computer and Electrical Engineering Curriculum. Please select the response that best reflects your experiences.

	1 (Strongly Disagree) (1)	2 (2)	3 (3)	4 (Strongly Agree) (4)
Background provided in the basic science and mathematics is sufficient. (2)	❍	❍	❍	❍
Content and amount of GenEd courses are useful. (3)	❍	❍	❍	❍
Frequency of courses offering in your major is satisfactory. (4)	❍	❍	❍	❍
There were enough technical electives. (5)	❍	❍	❍	❍

ElecCompE8 What topics would you recommend to be given more emphasis or to be introduced in the curriculum?

ElecCompE9 Please add any additional comments about the Computer and Electrical Engineering Curriculum.

ElecComp10 The following statements pertain to the Computer and Electrical Engineering Faculty. Please select the response that best reflects your experiences.

	1 (Strongly Disagree) (1)	2 (2)	3 (3)	4 (Strongly Agree) (5)
Faculty are proficient in their field of expertise. (1)	❍	❍	❍	❍
Faculty are well prepared for the lectures. (2)	❍	❍	❍	❍
Faculty provide good academic advising. (3)	❍	❍	❍	❍
Faculty provide a sufficient amount and adequacy of office hours. (4)	❍	❍	❍	❍
Faculty are helpful inside and outside the classrooms. (5)	❍	❍	❍	❍
Faculty show concern toward students. (6)	❍	❍	❍	❍
Faculty are enthusiastic about what they teach. (7)	❍	❍	❍	❍

ElecComp11 Please add any additional comments about the Computer and Electrical Engineering Faculty.

ElecComp12 The following statements pertain to the Computer and Electrical Engineering Facilities. Please score on the adequacy of the following services or facilities.

	1 (Poor) (1)	2 (2)	3 (3)	4 (Excellent) (5)
Laboratories facilities (other than computer labs) adequacy - Sophomore level. (1)	❍	❍	❍	❍
Laboratories facilities (other than computer labs) adequacy - Junior level and above. (2)	❍	❍	❍	❍
Computer laboratories adequacy - hardware. (3)	❍	❍	❍	❍
Computer laboratories adequacy - software. (4)	❍	❍	❍	❍

ElecComp13 Please add any additional comments about the Computer and Electrical Engineering Facilities.

ElecComp14 The following statements pertain to the IPFW Services or Facilities. Please score on the adequacy of the following services or facilities.

	1 (Poor) (1)	2 (2)	3 (3)	4 (Excellent) (5)	N/A (6)
Library facilities (1)	❍	❍	❍	❍	❍
Admission Office's services (2)	❍	❍	❍	❍	❍
Registrar Office's services (3)	❍	❍	❍	❍	❍
International Students Office's services (4)	❍	❍	❍	❍	❍
Campus-wide computer facilities (5)	❍	❍	❍	❍	❍
Career Services' services (6)	❍	❍	❍	❍	❍

ElecComp15 Please add any additional comments about the IPFW Services or Facilities.

ElecComp16 Please indicate the extent to which you agree with the following statements concerning the ABET program outcomes associated with the Computer and Electrical Engineering program. The IPFW Electrical Engineering and Computer Engineering program has:

	1 (Strongly Disagree) (1)	2 (2)	3 (3)	4 (Strongly Agree) (4)
adequately prepared you to apply the knowledge of mathematics, science, and engineering. (1)	❍	❍	❍	❍
adequately prepared you to design and conduct experiments, as well as to analyze and interpret. (2)	❍	❍	❍	❍
adequately prepared you to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. (3)	❍	❍	❍	❍
has cultivated in you an ability to function in a group or on multi-disciplinary teams. (4)	❍	❍	❍	❍
has enabled you to identify, formulate, and solve engineering problems. (5)	❍	❍	❍	❍

adequately familiarized you with an understanding of professional and ethical responsibility. (6)	❍	❍	❍	❍
provided you the means by which to communicate effectively. (7)	❍	❍	❍	❍
given you the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context. (8)	❍	❍	❍	❍
familiarized you with the recognition of the need for, and an ability to engage in life-long learning. (9)	❍	❍	❍	❍
familiarized you with the knowledge of contemporary issues. (10)	❍	❍	❍	❍
enabled you to use the techniques, skills, and modern engineering tools necessary for engineering practice. (11)	❍	❍	❍	❍

ElecComp17 Please add any additional comments about the IPFW Electrical Engineering and Computer Engineering program.

PURDUE UNIVERSITY FORT WAYNE

Department of Electrical and Computer Engineering

Electrical Engineering Program

Assessment Report

Spring 2018

Prepared by: Chao Chen

Date: September 2018

TABLE OF CONTENTS

1. Introduction

The Department of Electrical and Computer Engineering (ECE) at Purdue University Fort Wayne has developed an Assessment Plan for the *electrical engineering* program. A component of this plan is a semester-by-semester assessment report. This document is the report corresponding to the 2018 spring semester.

The Electrical Engineering Assessment Plan has gone through a review and update process during the 2016-2017 academic year. The most recent version of the assessment plan was approved by the faculty on March 20, 2017.

According to the Assessment Plan, the program educational objectives and student learning outcomes of the *electrical engineering* program are to be assessed using direct and indirect measures as summarized in Table 1.

Table 1
Direct and Indirect Measures

	Direct	Indirect
Program Educational Objectives	1) Employers (Supervisor) Survey and Feedback 2) Student Learning Outcomes	1) Alumni Survey 2) Admittance to Graduate School 3) Industry Advisory Board
Student Learning Outcomes	1) Interim Assessment by Faculty ▪ Course Outcomes ▪ Laboratory Evaluations 2) Capstone Senior Design Assessment ▪ Industrial Sponsor ▪ Faculty Members	1) Interim Assessment by Students ▪ Course Outcomes ▪ Laboratory Evaluations ▪ ECE Students' Forums 2) Exit Survey 3) FE Exam 4) Co-op Education Coordinator Report

2. Program Educational Objectives

The program educational objectives (PEOs) have gone through a review and update process during the 2017-2018 academic year. The following PEOs of the *electrical engineering* program were approved by the faculty on September 11, 2017. A survey was sent to 30 IAB members and alumni for asking for their input. All the 12 responses recommended the PEO update.

As a framework for the continuous improvement policy, the electrical engineering program has adopted a set of program educational objectives that describe the anticipated accomplishments of our graduates within a few years after graduation.

The electrical engineering program educational objectives are to produce graduates who:
1. Function and communicate effectively to solve technical problems.
2. Advance professionally to roles of greater electrical engineering responsibilities and/or by transitioning into leadership positions in business, government, and/or education.
3. Participate in life-long learning through the successful completion of advanced degree(s), professional development, and/or engineering certification(s)/licensure.
4. Demonstrate a commitment to community by applying technical skills and knowledge to support various service activities.

---

3. Student Learning Outcomes

The following student learning outcomes (SLOs) of the *electrical engineering* program at Purdue University Fort Wayne were revised and approved by the faculty on February 13, 2017. These outcomes are in alignment with ABET learning outcomes as one-to-one mapping.

The graduates from the Electrical Engineering Program will demonstrate that they have:

a. an ability to apply knowledge of mathematics, science, and engineering
b. an ability to design and conduct experiments, as well as to analyze and interpret data
c. an ability to design electrical systems, components, or processes to meet desired needs within realistic constraints such as economic, social, ethical, safety, manufacturability, and sustainability
d. an ability to function as team members on engineering projects, laboratory experiments, and/or multidisciplinary activities
e. an ability to identify, formulate, and solve electrical engineering problems
f. an understanding of professional and ethical responsibility
g. an ability to communicate in both oral and written forms
h. the broad education necessary to understand the impact of engineering solutions in a global, economic, and societal context
i. a recognition of the need for, and an ability to engage in life-long learning
j. a broad knowledge of contemporary issues
k. an ability to use the techniques, skills, and modern tools necessary for electrical engineering practice.

4. Assessment Results

The assessment actions taken in the spring of 2018 were in accordance with the Assessment Plan for the *electrical engineering program* in conjunction with the findings and recommendations made in previous assessment reports.

Starting fall 2016, based on the recommendation of the First-Year Engineering Committee, ENGR 12700/12800 will be assessed and reported by the First-Year Engineering Committee annually. ENGR 12700 is assessed in fall semesters and ENGR 12800 is assessed in spring semesters. The most recent First-Year Engineering Assessment Report (AY 2017-2018) can be found in Appendix A.

The following assessment results are divided in two parts: (1) assessment of program educational objectives and (2) assessment of student learning outcomes.

Note: In the assessment data where the numeric value 1-4 is used (1 for weak and 4 for strong, or 1-strongly disagree, 2- disagree, 3-agree, 4-strongly agree), the Assessment Committee recommended that target satisfactory score be >=3.

4.1. Assessment of the Electrical Engineering Program Educational Objectives

4.1.1. Direct Measures

4.1.1.1 Employer Survey

The employer survey was sent to all employers of alumni who have returned the alumni survey sent to them earlier in the summer. At the time of writing this report one employer has returned the survey. This employer is very satisfied with the alumni and rate high for the performance of our ECE graduates. A copy of this employer survey is included in Appendix B.

4.1.1.2 Student Learning Outcomes

Most of the student learning outcomes that were assessed during the spring of 2018 semester were reported as achieved. Details about these assessment results can be found in **Section 4.2**. Those cases where students and/or faculty have expressed concerns have been addressed and will be reassessed accordingly.

4.1.2. Indirect Measures

4.1.2.1 Alumni Survey

There are 22 Electrical Engineering students who graduated in 2013-2014 academic year. The survey forms were sent to them electronically. Also attempts were made to contact them via regular email about this survey. A total of five alumni returned the survey. The feedback from the alumni survey are summarized below:

- Assessment of educational objectives: Four out of five (80%) of the alumni agree that the EE program education objectives are adequate and do not require any modifications. Most alumni consider that the EE program has done well to meet those objectives.

- Feedback for continuous improvement of the EE program: Valuable suggestions are given such as more education on power from utilities and PLCs, more group projects to improve communication skills, more interaction with companies, more encouragement for students to join professional organizations such as IEEE, incorporating community service and outreach into curriculum requirements. The detailed comments are included in Appendix C.

Closing the loop

- The following curriculum improvement has been done since these students graduated:
    - The ECE Department has established the Energy Conversion Laboratory with power electronics and electric machinery equipment funded by an NSF grant. ECE 46000 (Power Electronics) has been enhanced with a laboratory component and added as a required course into the EE curriculum starting fall 2016. A new course ECE 31300 (Energy Conversion Laboratory) has been added to the EE curriculum as a required course in fall 2015. It enhances ECE 32400 (Introduction to Energy Systems) with hands-on experience of electric machines.
    - An introduction to PLC has been added into ENGR 12800 (Engineering Fundamentals II) with a lecture and a studio experiment using a PLC simulator starting spring 2016. In addition, a new course ECE 47800 (Robotics and Automation) has been developed with a detailed coverage on PLC and electric ladder diagrams. This course has been added to the list of Group 1 technical electives in fall 2016.
- The department has organized an inaugural annual ECE alumni luncheon on March 30, 2018. Invitations to ECE alumni have been sent through various channels such as email, LinkedIn, Facebook, and personal connections. More than 30 alumni attended the event. This annual luncheon will enhance the communication with our alumni, and hopefully increase the alumni survey participation rate in the future.

4.1.2.2 Admittance to Graduate School

One EE student who graduated in spring 2018 has been accepted been accepted and started the MSE program at Purdue University Fort Wayne. The detailed information can be found in Appendix D.

4.1.2.3 Industry Advisory Board

There was no ECE IAB meeting scheduled in the spring of 2018. These meetings are usually scheduled in fall semesters.

4.2. Assessment of the Electrical Engineering Student Learning Outcomes

4.2.1. Direct Measures

4.2.1.1 Interim Assessment by Faculty

4.2.1.1.1 Course Outcomes Assessment

The faculty members of ECE Department at PURDUE UNIVERSITY FORT WAYNE have developed course outcomes for all the required and technical elective engineering courses.

In the spring of 2018, following the guidelines of the Electrical Engineering Assessment Plan, the ABET program outcomes associated with the courses shown in Table 2 were assessed by their instructors. The assessment by faculty advisors and course coordinators regarding the achievement of the student learning outcomes of ECE 40500 and ECE 40600 is included in Table 3. The completed assessment forms were reviewed by the ECE Assessment Committee and have been kept on file in the department.

For all the courses listed in Table 2 and Table 3, except ECE 30100, ECE 46000, and ECE 40600 (all except one project advisor), the instructors' feedback is that all the outcomes have been achieved either strongly or adequately.

Table 2
Faculty assessment of Course Outcomes - Regular ECE Courses – Spring 2018

Course	Course Outcomes Achieved	Course Outcomes not Achieved	Mapped ABET Student Outcomes	Note
ECE 20700	(1)(2)(3)(4)(5)		(a)(b)(c)(e)(g)(k)	
ECE 20800	(1)(2)(3)(4)(5)(6)(7)		(a)(b)(c)(e)	
ECE 27000	(1)(2)(3)(4)(5)(6)		(a)(b)(c)(e)(k)(g)	
ECE 30100	(1)(2)(3)(4)(5)(6)(7)(8)(9)	(10)	(a)(e)(k)	^
ECE 30200	(1)(2)(3)(4)(5)(6)(7)(8)(9)		(a)(e)	^
ECE 31100	(1)(2)(3)(4)(5)(6)		(a)(c)(e)	^
ECE 33300	(1)(2)(3)(4)(5)(6)		(a)(c)(e)(k)	
ECE 36200	(1)(2)(3)		(a)(b)(c)(e)(g)(k)	
ECE 46000	(1)(2)(5)(6)(7)	(3)(4)	(a)(b)(c)(e)(k)	^
ECE 46500	(1)(2)(3)(4)(5)(6)(7)		(a)(c)(e)(k)	^

Notes:
(^) Instructor also provided comments and/or recommendations
ECE 46500 is a Group I technical elective course; the rest are core courses in the electrical engineering program.

Table 3
Faculty Advisor and Coordinator Assessment of Course Outcomes
ECE 405 and ECE 406 – Spring 2018

Course	Evaluator	Course Outcomes Achieved	Course Outcomes not Achieved	Mapped ABET Student Outcomes	Note
ECE 40500	Project Advisor[1]	(1)(2)(3)(4)(5)(6)		(a)(c)(d)(e)(f)(g)(h)	
	Project Advisor[2]	(1)(2)(3)(4)(5)(6)		(a)(c)(d)(e)(f)(g)(h)	^
	Project Advisor[3]	(1)(2)(3)(4)(5)(6)		(a)(c)(d)(e)(f)(g)(h)	
	Coordinator	(1)(2)(3)(4)(5)(6)		(a)(c)(d)(e)(f)(g)(h)	
ECE 40600	Project Advisor[1]	(1)(2)(3)		(c)(d)	
	Project Advisor[2]	(1)(3)(4)	(2)	(c)(d)(g)	^
	Project Advisor[3]	(1)(2)(3)(4)		(c)(d)(g)	^
	Project Advisor[4]	(1)(2)(3)(4)		(c)(d)(g)	
	Coordinator	(5)(6)(7)(8)		(f)(h)(i)(j)	

ECE 40500:
[1] Air Rotational Unit (1 CmpE student, 2 EE students, and 1 dual CmpE/EE students) – Industry Sponsor: General Motors
[2] The Lighting of a Historic Building (1 dual CmpE/EE student and 1 ECE student) – Sponsor: Purdue University
[3] Plastic Extrusion Die Heating Element Analysis and Design (1 CmpE student and 1 EE student) – Industry Sponsor: Trelleborg Sealing Solutions

ECE 40600:
[1] Universal Amplifier Controller (3 EE students) – Industry Sponsor: RF Spectra
[2] Sound Level Management System for Group Exercises (2 CmpE students) – Industry Sponsor: YMCA
[3] Kiosk Based Water Pumping System (3 EE students) – Industry Sponsor: Franklin Electric
[4] Data Collection System for Identification of Production Line Mutilations (3 EE students and 1 CmpE student) – Industry Sponsor: General Motors

Notes:
(^) Project advisor also provided comments and/or recommendations
For ECE 406 the faculty advisors evaluate outcomes 1-4 and the coordinator evaluates outcomes 5 to 8.

Closing the loop

In the courses where instructor raised concerns (outcome not achieved) and/or provided recommendations. The comments from the instructor have been forwarded to the instructor who teaches it the following semester as well as the course coordinator. The comments from instructors are included in Appendix E.

- **ECE 30100**: The instructor recommended removing outcome (10) on z-transforms since z-transforms is extensively covered in ECE 43600. However, ECE 30100 is a required course for both EE and CmpE students, whereas ECE 43600 is a technical elective course for CmpE majors. Removing outcome (10) from ECE 30100 will impact the learning outcome of CmpE students.
- **ECE 30200**: The instructor commented that some students showed deficiencies in basic calculus skill, such as integration by parts.
- **ECE 31100**: The instructor recommended having available at least one of the Matlab tools dedicated to the topics of this course. This will allow students to work on meaningful computational electromagnetics type projects.

- **ECE 46000**: The lab portion of this course was taught by a graduate student. It is recommended the course instructor being more involved with the lab portion and better integrate the lab with lecture.
- **ECE 46500:** This course is a totally revised course with new labs and lectures. The instructor observed that students are not very well prepared in C programming and hardware design/troubleshooting skills. More time on review of these areas are recommended. Separate lecture and lab sessions are also suggested. The instructor also recommended on revising certain course outcomes. These comments can be found in Appendix E.
- **Capstone senior design**: The feedback from the faculty advisors as well as the coordinators of the senior design courses is that the course outcomes have been achieved, except for one project - this project only involves two computer engineering students. The recommendations given by the faculty advisor, however, is much related for senior design in general. A review and redesign of the format of the senior design course (involving both ECE 40500 and ECE 40600) is suggested by both the course coordinator of ECE 40600 and some faculty advisors. Suggestions are summarized below. The detailed comments and recommendations can be found in Appendix E. These comments are forwarded to both coordinators, who are currently working on revising these courses.
  - Start the initial hardware building and software exploration at least a month before the end of the first semester.
  - Incorporate the Scrum process that is based on iterative and incremental development cycles.

4.2.1.1.2 Laboratory Evaluation

In the spring of 2018, following the guidelines of the Electrical Engineering Assessment Plan, the laboratory courses shown in Table 4 were assessed by their instructors. The completed laboratory evaluation forms were reviewed by the ECE Assessment Committee and have been kept on file in the department.

Table 4

Instructor Evaluation of Laboratories' outcomes – Spring 2018

Questions	ECE 20800 Lab$^{(1)}$	ECE 27000 Lab	ECE 36200 Lab	ECE 46000 Lab
The lab is well equipped	3	4	3	4
The lab equipment is functional	3	4	4	4
The use of the lab equipment and facilities is safe	4	4	4	4
The lab technical support is adequate	4	4	4	3
The level and type of interactions with the lab technician is adequate	3	4	4	4

Note: (1) Instructor provided comments.

Closing the loop

- **ECE 20800 Lab**: The lab instructor has noted that some equipment is missing or needs calibration. The detailed comments are included in Appendix F and have been forwarded to the course coordinator.

4.2.1.2 Capstone Senior Design Assessment

4.2.1.2.1 Industrial Sponsor

In spring 2018, all four ECE 406 senior design projects were sponsored externally by the industry. The department followed new guideline of the distribution and collection of Industrial Sponsor Assessment Form that was approved in fall 2017. Three industry sponsors returned the survey – among them two were sponsoring projects in which EE students were working on. A copy of the returned survey forms and additional comments can be found in Appendix G. The results in Figure 1 show that this industrial sponsor is positive regarding all survey questions.

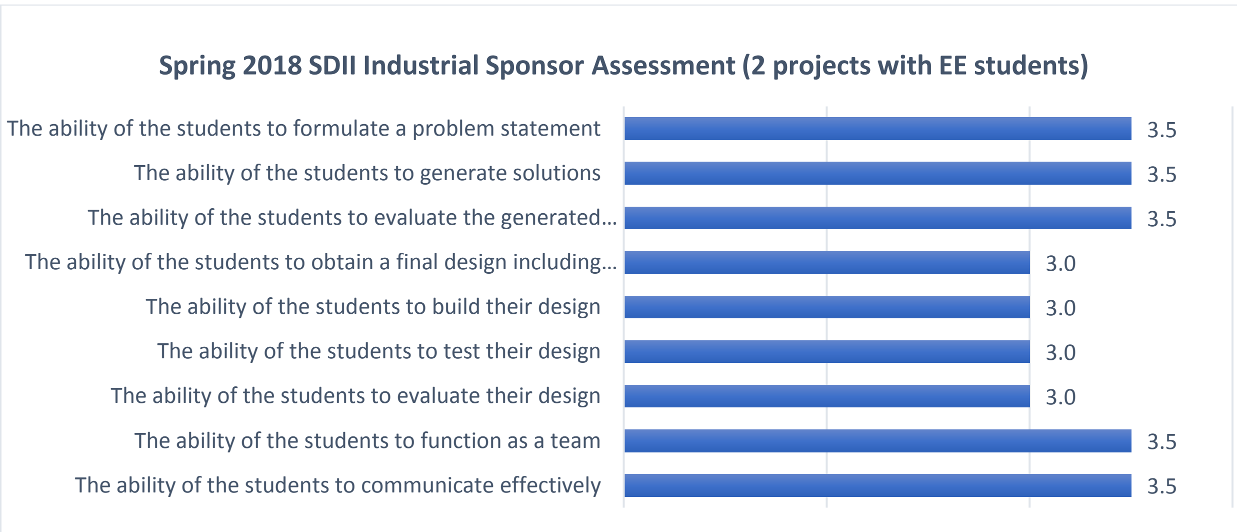


Figure 1. Industrial Sponsor Assessment of Senior Design II – Spring 2018

Closing the loop

- The new implemented guidelines on how to distribute and collect the feedback from the Industrial Sponsors has yielded a rapid increase in the spring 2018 semester – 3 out of 4 industry sponsors returned the assessment form. This return rate will continue to be monitored in the future to ensure a good return rate.

4.2.1.2.2 Faculty Members

The achievements of senior design I (ECE 40500) and senior design II (ECE 40600) outcomes were assessed by the faculty members of the ECE Department who were in attendance at the Capstone Senior Design presentations at the end of the semester. The faculty members reported their evaluations using two forms (one of ECE 40500 and the other for ECE 40600). A copy of these forms can be found in the Assessment Plan. The questions in the ECE 40500 assessment form correspond to the ABET program outcomes {a,c,d,e,f,g,h} and the questions in the ECE 40600 assessment form correspond to the ABET program outcomes {c, g}. The assessment results for ECE 40500 and ECE 40600 are shown in Figure 2 and Figure 3, respectively.

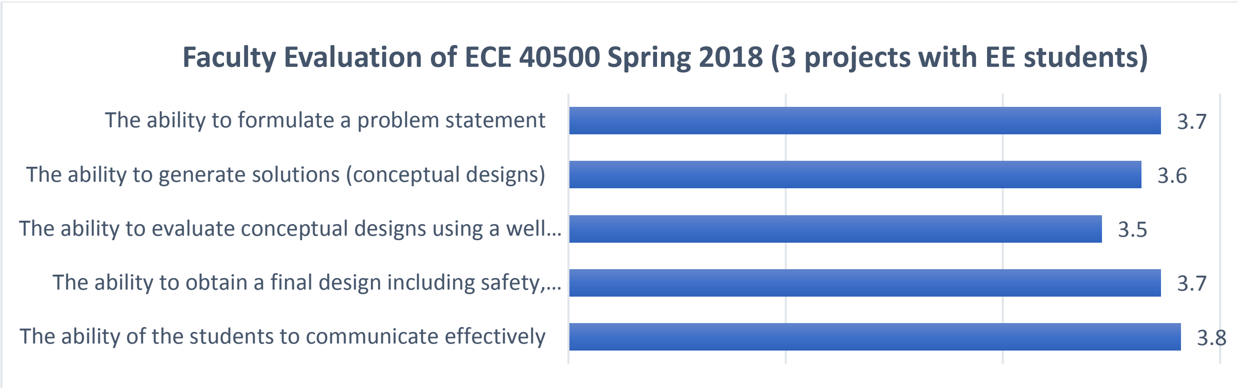


Figure 2. Faculty Assessment of ECE 40500 (3 projects with EE students) – Spring 2018

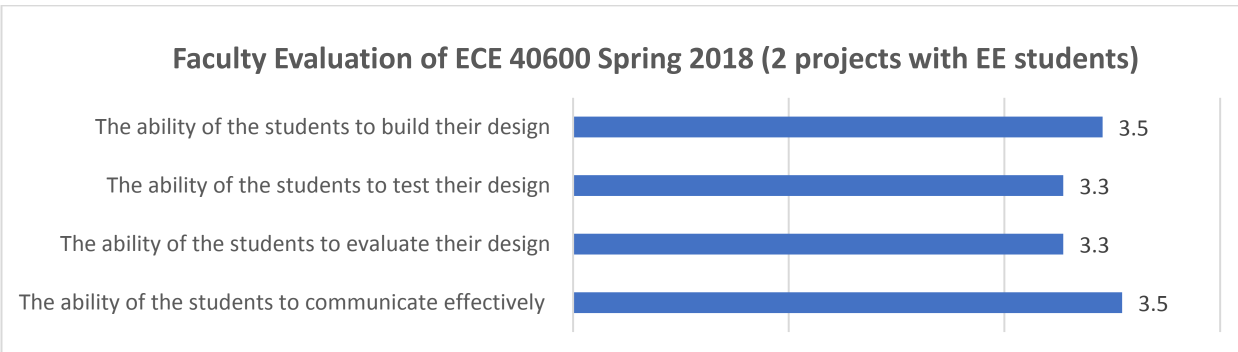


Figure 3. Faculty Assessment of ECE 40600 (2 projects with EE students) – Spring 2018

The results shown in this section indicate that the ECE faculty members at the final presentations, on the average, assessed that the outcomes of the senior design projects in ECE 40500 and ECE 40600 have been achieved.

4.2.2. Indirect Measures

4.2.2.1. Interim Assessment by Students

4.2.2.1.1 Course Outcomes Assessment

This assessment was carried out during the week before the finals exam week at the end of the semester. Based on the recommendations from the previous assessment report (Fall 2017), all the students enrolled in the following courses were asked to assess the course outcomes.

First-Year Engineering Course	ENGR 12800 (see Appendix A)
EE Core Courses	ECE 20700, ECE 20800, ECE 27000, ECE 30100, ECE 30200, ECE 31100, ECE 33300, ECE 36200, ECE 46000
Technical Elective Courses	ECE 46500 (Group I)
Senior Design Courses	ECE 40500, ECE 40600

Note: These are the same courses assessed by faculty (**Section 4.2.1.1**).

Students were asked to evaluate each outcome using a form that allows scores to be integer values between 1 and 4 (1 for weak and 4 for strong). A sample of the evaluation form can be found in the EE Assessment Plan. The results for the regular ECE courses listed above are summarized in Table 5. The number of outcomes varies from course to course. The values in the table entries are the average of the responses.

The course outcomes of ECE 40500 and ECE 40600 were also assessed by the enrolled students before the end of semester. The questions in the forms correspond to the ABET program outcomes {a,c,d,e,f,g,h} for ECE 40500 and {c,d,f,g,h,i,j} for ECE 40600. The results of this assessment are included in Table 6.

Table 5
Regular ECE Courses – EE Student Assessment of Courses' Outcomes in Spring 2018

Course	Course Outcomes									
	1	2	3	4	5	6	7	8	9	10
ECE 20700 (7, 12)	3.0	3.4	2.9	3.1	3.1					
ECE 20800 (5, 9)	3.6	3.2	3.4	3.4	3.6	3.6	3.6			
ECE 27000 (6, 19)	3.8	3.0	3.7	3.7	3.3	3.8				
ECE 30100 (8, 13)	3.8	3.7	3.8	3.8	3.6	3.4	3.4	3.6	3.7	3.1
ECE 30200 (9, 20)	3.3	3.7	3.6	3.4	3.6	3.2	3.3	2.9	2.9	
ECE 31100 (13, 16)	3.8	3.6	3.5	3.5	3.2	3.3				
ECE 33300 (11,25)	3.7	3.8	3.7	3.4	3.2	3.7				
ECE 36200 (7, 11)	3.3	3.1	3.0							
ECE 46000 (6 ,6)	4.0	3.8	4.0	3.8	3.7	4.0	4.0			
ECE 46500 (7, 17)	3.0	2.9	3.1	2.3	2.9	2.6	3.1			

Notes:

- In the first column, the 1st number between the parentheses is the number of *electrical engineering* students who filled the forms and the 2nd number is the number of students enrolled in the course.
- ECE 46500 is a group I technical elective for EE students, the rest are required courses.
- Computer engineering students are required to take ECE 20700, ECE 20800, ECE 27000, ECE 30100, ECE 30200, ECE 36200, and ECE 46500, and can take ECE 31100 and ECE 33300 as elective courses. The values in the table correspond only to the EE majors.

Table 6
EE Student Assessment of ECE 40500 and ECE 40600 in Spring 2018

Course	Course Outcomes							
	1	2	3	4	5	6	7	8
ECE 40500 (6, 8)	4.0	3.8	3.8	3.7	3.7	3.5		
ECE 40600 (8, 12)	3.4	2.9	3.6	3.5	3.3	3.5	3.5	3.3

Notes:

- In the first column, 1st number between the parentheses is the number of *electrical engineering* students who filled the forms and the 2nd number is the number of students enrolled in the course.
- Computer engineering students are also required to take ECE 40500 and ECE 40600. The values in the table correspond only to the EE majors.

Comparison with historical data

The comparison of the student assessment results in spring 2018 with those from the last time the same course was assessed is included in Table 7. The data show that:

- For ECE 27000, ECE 30100, ECE 31100, and ECE 40500, all the outcomes are considered as achieved as before.
- The student assessment results for ECE 20800, ECE 33300, ECE 46000, and ECE 40600 have improved.
- For ECE 20700, ECE 30200, ECE 46500, and ECE 40600, there are some new concerns.

Table 7
Historical Results for the Courses Assessed in Spring 2018– Student Assessment

Course	Last time assessed v.s. Spring 2018	Course Outcomes Achieved	Course Outcomes not Achieved
ECE 20700	Fall 2017	(1)(2)(3)(4)	(5)
	Spring 2018	(1)(2)(4)(5)	(3)
ECE 20800	Fall 2017	(1)(2)(3)(4)(6)(7)	(5)
	Spring 2018	(1)(2)(3)(4)(5)(6)(7)	
ECE 27000	Fall 2014	(1)(2)(3)(4)(5)(6)	
	Spring 2018	(1)(2)(3)(4)(5)(6)	
ECE 30100	Fall 2015	(1)(2)(3)(4)(5)(6)(7)(8)(9)(10)	
	Spring 2018	(1)(2)(3)(4)(5)(6)(7)(8)(9)(10)	
ECE 30200	Spring 2016	(1)(2)(3)(4)(5)(6)(7)(8)(9)	
	Spring 2018	(1)(2)(3)(4)(5)(6)(7)	(8)(9)
ECE 31100	Spring 2017	(1)(2)(3)(4)(5)(6)	
	Spring 2018	(1)(2)(3)(4)(5)(6)	
ECE 33300	Spring 2017	(2)(3)(4)(5)	(1)(6)
	Spring 2018	(1)(2)(3)(4)(5)(6)	
ECE 46000	Spring 2017	(1)(3)(4)(6)(7)	(2)(3)(5)
	Spring 2018	(1)(2)(3)(4)(5)(6)(7)	
ECE 46500 ^	Spring 2016	(1)(2)(3)(4)(5)(6)	
	Spring 2018	(1)(3)(7)	(2)(4)(5)(6)
ECE 40500	Fall 2017	(1)(2)(3)(4)(5)(6)	
	Spring 2018	(1)(2)(3)(4)(5)(6)	
ECE 40600	Fall 2017	(2)(3)(4)	(1)(5)(6)(7)(8)
	Spring 2018	(1)(3)(4)(5)(6)(7)(8)	(2)

Note:

^ ECE 46500 has gone through a major revamp with new labs and lectures. The instructor has provided recommendations on how to improve this course in the future.

Closing the loop

In the courses where students raised concerns (average score less than 3), the student assessment results were forwarded to the instructor. The feedback from the instructor and assessment results have been forwarded to the instructor who teaches it the following semester as well as the course coordinator. The feedback from instructors is included in Appendix E.

- **ECE 20700:** This is a laboratory courses taught by a Graduate Teaching Assistant (GTA). The instructor observed that some students are not prepared well with the theoretical background and the troubleshooting skills need to be enhanced. This course will be assessed in fall 2018.
- **ECE 30200:** This course was taught by a limited term lecturer for the first time. Regarding outcomes (8) and (9), the instructor commented that covering stochastic process in an introductory probability course is a challenge. The course coordinator is currently re-evaluating the content coverage and course outcomes. This course will be assessed again the next time it is offered.
- **ECE 46500:** This course has been totally re-designed with new lab and lectures. The instructor has provided detailed comments on revising the course outcomes and enhance the instruction. Please refer to **Section 4.2.1.1** for a summary of the recommendations. This course will be assessed again the next time it is offered.
- **ECE 40600:** ECE 40600 is evaluated every semester. A review and redesign of the format of the senior design is suggested by the course coordinator of ECE 40600 as well as some faculty advisors. Please refer to **Section 4.2.1.1** for a summary of the suggestions. The evaluation of outcome (2) will be revisited in fall 2018.

4.2.2.1.2 Laboratory Evaluation

Based on the recommendations from the previous assessment report (Fall 2017), the students enrolled in the laboratory courses listed below were asked to do the lab evaluation. The student assessment was carried out during the week before the final exam week at the end of the semester. The evaluation form used can be found in the Assessment Plan. The range of the allowed scores are integer values between 1 (strongly disagree) to 4 (strongly agree). Results the student laboratory evaluation are included in Table 8.

ECE Labs	ECE 20800 Lab, ECE 27000 Lab, ECE 36200 Lab, ECE 46000 Lab

Table 8
EE Student Evaluation of Laboratories' Outcomes – Spring 2018

Questions	ECE 20800 Lab (8, 9)	ECE 27000 Lab (13, 19)	ECE 36200 Lab (9, 11)	ECE 46000 Lab (4, 6)
The lab is well equipped	2.8	4.0	3.6	3.0
The lab equipment is functional	2.4	4.0	3.4	2.8
The lab experiments are reasonable in length	2.4	3.8	2.9	2.8
The lab experiments are reasonable in content	2.6	3.7	2.7	3.3
The lab manual adequately describes experiments	2.5	3.8	2.0	2.8
The general rules of lab safety were clearly explained at the start of the semester	3.1	4.0	3.1	3.5
Safe provisions pertaining to each experiment and/or lab activity were explained at the beginning of the associated lab session (if applicable/required/needed)	3.0	3.6	2.8	3.0

Note: In the first row, the 1st number between the parentheses is the number of students who filled the form and the 2nd number is the total enrollment.

Comparison with historical data

The comparison of the student evaluation results in spring 2018 with those from the last time the same laboratory was evaluated is included in Table 9. It can be seen that student evaluation results for ECE 46000 Lab have been improved, whereas for ECE 20800 Lab and ECE 36200 Lab, there are some new concerns regarding certain outcomes. ECE 27000 Lab was assessed because of recent lab manual and equipment upgrade. The results show that all outcomes are still achieved as before.

Table 9
Historical Results for the Laboratories Evaluated in Spring 2018 – Student Evaluation

Lab	Last time evaluated v.s. Spring 2018	Lab Outcomes Achieved	Lab Outcomes not Achieved
ECE 20800 Lab	Fall 2017	(4)(6)	(1)(2)(3)(5)(7)
	Spring 2018	(6)(7)	(1)(2)(3)(4)(5)
ECE 27000 Lab	Spring 2017	(1)(2)(3)(4)(5)(6)(7)	
	Spring 2018	(1)(2)(3)(4)(5)(6)(7)	
ECE 36200 Lab	Spring 2016	(1)(3)(4)(5)(6)(7)	(2)
	Spring 2018	(1)(2)(6)	(3)(4)(5)(7)
ECE 46000 Lab	Spring 2017		(1)(2)(3)(4)(5)(6)(7)
	Spring 2018	(1)(4)(6)(7)	(2)(3)(5)

Closing the loop

In the laboratories where students raised concern, the results were forwarded to the instructor for feedback. The responses from lab instructors are included in Appendix F. The students' evaluation results and the instructor's feedback are also forwarded to the instructor who teaches it the following semester as well as the course coordinator.

- **ECE 20800 Lab**: This is a laboratory courses taught by a GTA. He has provided specific inputs on how to make better use of lab equipment by adjusting certain lab content. He also gave suggestions on how to update the prelab and lab manual to better assist students before and during the lab. His comments are forwarded to the course coordinator. This lab will be assessed again in fall 2018.
- **ECE 36200 Lab**: This is a laboratory courses taught by a GTA. He has provided specific suggestions on updating the lab manual. His comments are forwarded to the course coordinator. This lab will be assessed again in fall 2018.
- **ECE 46000 Lab**: This is a laboratory courses taught by a GTA. He provided positive comments lab equipment, lab length, and lab manual. This lab will be assessed again the next time it is offered.

4.2.2.1.3 ECE Student Forum

No student forum was held in the spring of 2018.

An ECE student forum with Mr. Tirthak Saha as the Industrial guest speaker was held on January 12, 2018. Mr. Saha is a Gird Modernization Engineer at American Electric Power. During the forum, he shared with the students his personal and professional career history and insights on four Ts: Talking – The importance of communication; Tracking – The importance of a career goal; Translating – How what you learn in class relates to the outside world and industry; Tackling – How to face adversity, challenges and negativity in a professional manner.

4.2.2.2. Exit Survey

All graduating seniors are required to complete an exit survey at the end of their last semester. A component of the Exit Survey is devoted to assessing the curriculum, the laboratories, and the achievement of the Student Learning Outcomes. A sample of the exit survey form can be found in the Assessment Plan.

Starting fall 2015, the exit survey is conducted by the Office of Career Services. Usually the results are available a few months after students graduate. Usually the results are available a few months after students graduate. There are total of 16 electrical engineering students who graduated in the 2017-2018 academic year: including 7 in fall 2017, 6 in spring 2018, and 3 in summer 2018. As of today, 12 of them have filled the exit survey. Figure 4, Figure 5, and Figure 6 show the electrical engineering students ratings on curriculum, laboratories, and ABET outcomes, respectively.

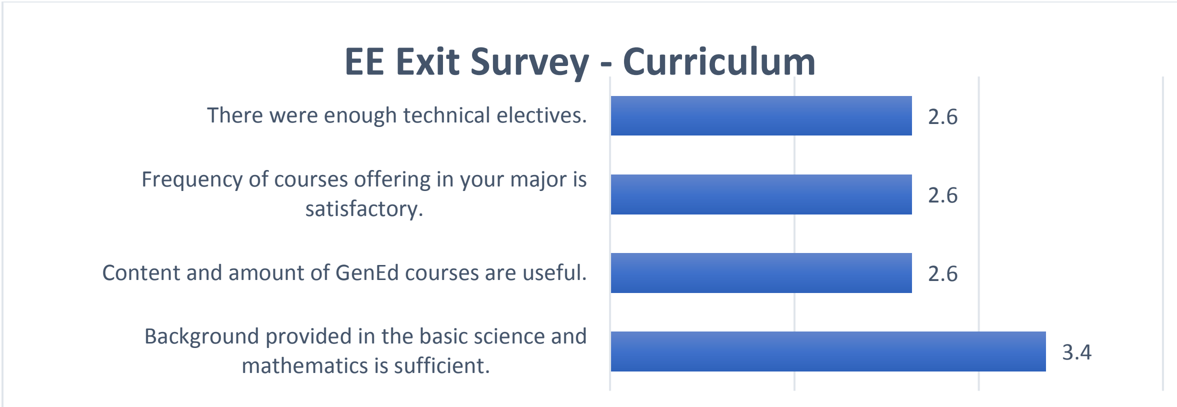


Figure 4. 2017–2018 EE Exit Survey – Curriculum

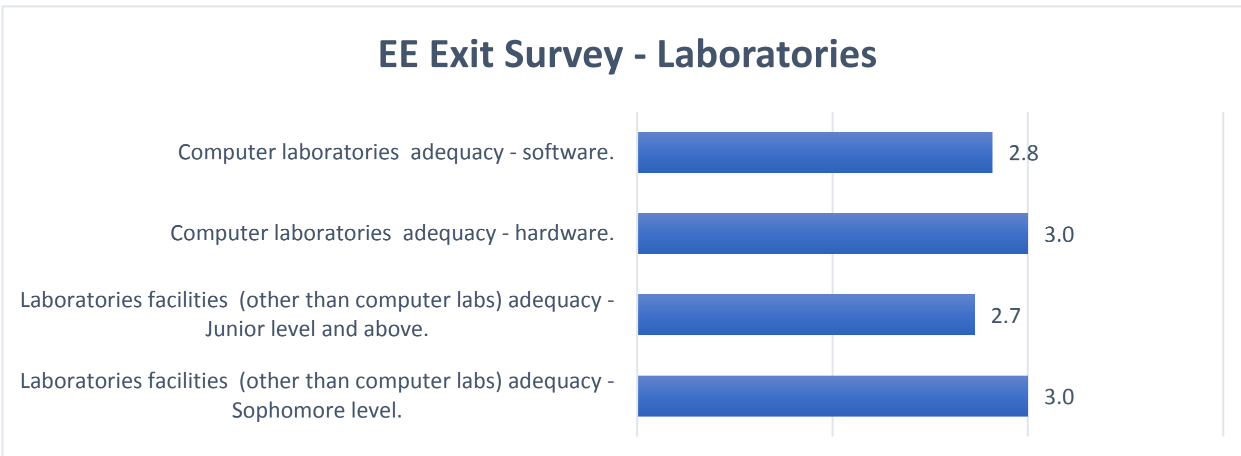


Figure 5. 2017-2018 EE Exit Survey – Laboratories

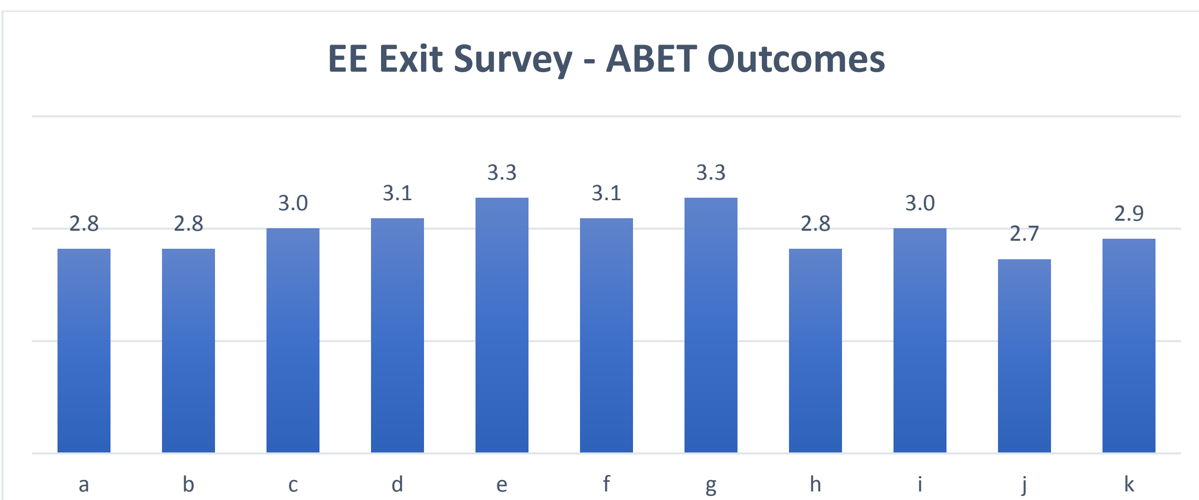


Figure 6. 2017-2018 EE Exit Survey – ABET Outcomes

Summary of EE exit survey results:

- The exiting EE students rated low (average<3) in the following questions:
  - Curriculum: sufficient technical electives, frequency of major courses, usefulness of GenEd courses
  - Laboratories: lab facilities at junior and senior level
  - ABET outcomes: Outcome (a) – “an ability to apply knowledge of mathematics, science, and engineering,” outcome (b) – “an ability to design and conduct experiments, as well as to analyze and interpret data,” outcome (h) – “the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context,” outcome (j) – “knowledge of contemporary issues,” outcome (k) – “an ability to use the technique, skills, and modern tools necessary for electrical engineering practice”
- Some graduates also leave comments and suggestions on the curriculum, facilities, and program in general in the exit survey. These comments are included in Appendix H. A summary of these comments is given below:
  - Curriculum: The following were suggested to be emphasized or introduced: Software and programming skills, PLC, digital systems, power electronics, design engineering, and practical application. Some student also commented that Group 1 technical electives are limited.
  - Facilities: The students suggested the following regarding facilities: calibration of basic equipment such as oscilloscopes, more efficient use of the facilities and the soldering station.
  - Program: Additional comments are given for the ECE program include essential training on soldering and PCB design, and actively involving students for inputs and discussions.

Closing the loop

- The department has made major efforts in curriculum improvement based on feedback from recent graduates.
  - The electrical engineering curriculum has been enhanced, especially on the area of power electronics and electric machines, as well as PLC programming. Please refer to **Section 4.1.2.1** for a detailed description. Soldering and PCB board design content has added to the newly revised ECE 46500 (Embedded Microprocessor). ECE 27000 (Introduction to Digital System Design) has been enhanced with a new system design board and updated lab manual.
- There is a growing trend that most of senior design projects are sponsored by industry or community partners. This greatly enhances the student experience on practical applications. The coordinator of the senior design I course (ECE 40500) is a professor of system engineering. He has added considerable coverages on system engineering and engineering design into the course content, which is very beneficial for ECE students.

- Students would like to see more technical elective and that all courses be offered more often. Due to low enrollments it is not feasible to offer courses, in particular electives, with less than ten students. This problem will persist until the enrollments increase beyond that threshold. At the same time, the EE Curriculum Committee are encouraged to review the courses, especially in the Group 1 technical elective list.
- Lab equipment/facilities have gone through a significant upgrade in the fall 2017 semester. The ECE department will continue its efforts to improve the quality of its laboratory facilities.
- The department will continue monitoring the ABET outcomes (those rated low) in future exit surveys.
- The department will continue actively seeking student feedback from diverse channels such as student forum and surveys. Faculty are also encouraged to maintain a welcoming and positive environment both in and out of classroom for students to openly express their opinions and concerns.

4.2.2.3. FE (Fundamentals of Engineering) Exam

No EE student took FE exam in spring 2018.

4.2.2.4. *EE Co-Op report*

The report filed by the Coordinator of the Co-Op program in May 2018 lists one EE student participated in Co-Op program in the spring of 2018. The evaluation of the student's performance, as measured by the student themselves and their industrial sponsor, is summarized in Table 10.

Table 10
Rating of EE Co-Op Students' Performance

Employer	Student's rate of the overall performance	Employer's rate of the overall performance
Regal-Beloit	Average	Very Good

The Coordinator of the Co-Op program has also evaluated the students' performance in the report. The Coordinator states: "*The Electrical & Computer Engineering curriculums are preparing students very well for the Cooperative Education jobs. Overall, Regal Beloit and Duesenburg are very satisfied with the students' performance*."

A copy of the ECE Co-Op Report can be found in Appendix I.

5. Summary of Continuous Improvement

The ECE Department has utilized the fall 2017 Assessment Report as input for the continuous improvement of the EE Program. Table 11 summarizes several major actions implemented for improving the program during the spring 2018 semester.

Table 11
Spring 2018 Continuous Improvement Actions and Status

Continuous Improvement Action	Type	Measurement Instrument or Reason for Action	Actions taken / Status
GTA training	Program	Student Assessment	To help the coordination between the faculty and the GTA, comments from the lab instructor have been forwarded to the lecture instructor as well as the course coordinator.
Lab equipment	Program	Student Assessment	Most lab equipment has been upgraded in fall 2017. Some lab equipment was re-configured in the Energy Conversion Laboratory during spring 2018. The student assessment of lab equipment has been improved.
Industry sponsor feedback on senior design projects	Program	Low return rate	The new implemented guidelines on how to distribute and collect the feedback from the Industrial Sponsors has yielded a rapid increase in the spring 2018 semester.
Alumni survey	Program	Low participation	First annual ECE alumni luncheon was held on March 30, 2018. This luncheon will enhance the connection with ECE alumni.

6. Summary of Recommendations for Future Assessments

The complete set of assessment artifacts (evaluations from instructors and students, exit surveys, etc.) used in this report are archived in the department. Instructors are encouraged to review them, in particular if they are teaching courses where concerns have been identified.

Highlights from the results of the assessment process described in this report include:

- **Alumni survey:** There has been very low participation rate in alumni survey in recent years. The ECE department has tried to reconnect to our students and alumni through different channels such as Facebook and LinkedIn. The first annual ECE alumni luncheon has been held in March 30, 2018 with more than 30 alumni attendances. These attempts are expected to enhance the communication with our alumni and increase the alumni survey participation rate in the future.
- **Lab manual update**: Lab equipment overall is no longer a major concern after the major upgrade in fall 2017 semester. The lab instructors (GTAs) of ECE 20800 lab

and ECE 36200 lab provided very valuable suggestions on how to adjust lab content and update lab manual. It is suggested that the course coordinators examine those recommendations and update lab manual if needed. Close monitoring of outcomes regarding lab equipment in the coming semesters is recommended.

- **ABET Student Outcome Update and Assessment Procedure:** Since ABET has announced new student outcomes, the mapping from course outcomes to ABET student outcomes should be updated for each course. The Assessment Committee is developing a detailed plan to address this concern.
  - Step 1: Revise all ECE course outcomes to be mapped into new ABET student outcomes.
  - Step 2: For each ECE course, develop assessment instruments (homework, report, exam, etc.) for each course outcome.
  - Step 3: Develop a detailed assessment plan to assess all ABET student outcomes in a two-year cycle.

Table 12 summarizes the main concerns/weaknesses, as well as the recommendation resulting from this current assessment process. These concerns will be evaluated and closely monitored in future semesters.

Table 12
Summary of Spring 2018 Concerns/Weaknesses and Recommendations

Program Concerns/ Weaknesses	Type	Measurement Instrument or Reason for Action	Recommendations or Actions
ECE 31100	Course	Faculty Assessment	Instructor recommended having available one of the Matlab tools dedicated to the topics of this course.
ECE 30200	Course	Faculty Assessment and Student Assessment	Instructor commented that covering stochastic process is a challenge in this course. The course coordinator is re-evaluating the content coverage and outcomes.
ECE 46500	Course	Faculty Assessment and Student Assessment	This is a totally revised course with new labs and lectures. The instructor recommended revising certain outcomes.
Capstone senior design	Course	Faculty Assessment and Student Assessment	A review and redesign of the format of the senior courses is suggested. Coordinators of ECE 40500 and ECE 40600 are currently working on revising these courses.
ECE 20800 lab	Lab	Faculty Assessment and Student Assessment	Lab instructor noted that some equipment is missing or needs calibration. Suggestions are also given on how to adjust some lab content and updating lab manual.
ECE 36200 lab	Lab	Student Assessment	Lab instructor provided specific suggestions on updating the lab manual.
Alumni Survey	Program	Low alumni participation	Continue effort to reconnect and maintain communication channels with Alumni. An annual alumni luncheon is one way but other ways should be explored and implemented as well.

Based on the assessment results in this report as well as the guideline in the Assessment Plan, the courses and laboratories shown in Table 13 are scheduled for assessment at the end of fall 2018 semester.

Table 13
Courses and Laboratories to be Assessed in Fall 2018

Courses	ENGR 12700, ECE 20700, ECE 20800, CS 22900
	ECE 31300, ECE 32400, ECE 43600, ECE 40500, ECE 40600
Labs	ECE 20700 Lab, ECE 20800 Lab, ECE 31300 Lab, ECE 36200 Lab

Table 14 lists those courses and laboratories to be evaluated the next time they are offered (these courses are not offered in the fall 2018).

Table 14
Courses and Laboratories to be Assessed the Next Time They are Offered

Courses	ECE 30200, ECE 46500, ECE 47400
Labs	ECE 46000 Lab

List of Appendices

Appendix A: Assessment Report - First Year Engineering Program

Click here to open the FYE 2017-2018 Assessment Report

Appendix B: Employer Survey of EE Alumni

IPFW | DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
INDIANA UNIVERSITY–PURDUE UNIVERSITY FORT WAYNE
COLLEGE OF ENGINEERING, TECHNOLOGY, AND COMPUTER SCIENCE

Employer Survey – Spring 2018

Employer Information

Company Quality Applied Systems, Inc.

Contact Person Tim Blauvelt

Email tblauvelt@qasinc.net

Position (Title) President

Number of IPFW Electrical and Computer Engineering graduates employed by your company:

Computer: ____ Electrical: 2

Primary function(s) of your company (please select all that apply):

Design x | Sales x | Consulting x

Management x | Manufacturing ____ | Other ____

Research & Development ____ | Testing ____

IPFW Electrical and Computer Engineering Graduates

Please select a typical IPFW Electrical and Computer Engineering (ECE) graduate (s) employed by your company and answer the following questions:

1. Overall rating of the education received by the student as it relates to his/her job preparation

Excellent x | Fair ____ | Poor ____

2. Compared with graduated of other universities, how well do IPFW ECE graduated perform?

Much better ____ | Better x | Same ____ | Worse ____ | Much Worse ____

3. Would you hire additional IPFW ECE graduates if there were openings? Yes x No ____

Comments:

Using the scale of 1 for Weak and 4 for Strong, please assess (where applicable) the performance of IPFW ECE graduates:

1. IPFW ECE graduates are prepared for a successful career in industry

4 | 3x | 2 | 1 | N/A

2. IPFW ECE graduates are proficient in the synthesis process with an emphasis on product and system design

4 | 3x | 2 | 1 | N/A

3. IPFW ECE graduates are able to function as part of a team and on multi-disciplinary projects

4x | 3 | 2 | 1 | N/A

4. IPFW ECE graduates possess a sound foundation in the mathematical, scientific and engineering fundamentals necessary to solve engineering problems

4 | 3x | 2 | 1 | N/A

5. IPFW ECE graduates demonstrate ethical responsibility and are aware of the need to engage in life-long learning

4x | 3 | 2 | 1 | N/A

(Space for additional comments on back)

Appendix C: Feedback from Electrical Engineering Alumni Survey

1. Part II - Assessment of educational objectives

- Question: Please list all the changes you recommend (for the educational objectives for the EE program at IPFW).
  - *More in depth conversation on power and how it is generated. Even though this is basic information, it would be worth one day of class in ENGR 199, to discuss power that is used every day.*

2. Part III - Feedback for continuous improvement of EE program

- Question: I recommend the following measures to prepare graduates better meet this objective (EE graduates will function and communicate effectively both as individuals and in multidisciplinary teams to solve technical problems.):
  - *More education on power from utilities and plcs*
  - *More group projects to help individuals talk about EE to one another fluently.*

- Question: I recommend the following measures to prepare graduates better meet this objective (EE graduates will advance professionally to roles of greater electrical engineering responsibilities and/or by transitioning into leadership positions in business, government, and/or education.)
  - *More face to face, internships, with companies that will help to educate students more and develop them professionally.*

- Question: I recommend the following measures to prepare graduates better meet this objective (EE graduates will participate in life-long learning through the successful completion of advanced degree(s), professional development, and/or engineering certification(s)/licensure.)
  - *More encouragement to join ieee*

- Question: I recommend the following measures to prepare graduates better meet this objective (EE graduates will demonstrate a commitment to community by applying technical skills and knowledge to support various service activities.
  - *Incorporate community service/ outreach into curriculum/ program requirements*

Appendix D: Admittance to Graduate School

1. Mattison Siri, graduated in 2017 with BSEE degree, was admitted into the Master of Science in Engineering program at Purdue Fort Wayne. He has started the graduate school in Fall 2018.

Appendix E: Instructor Feedback: Course Outcome Assessment

ECE 20700

Comments from the Instructor in the Faculty Assessment Form:

In this semester we did not face any problem with lab instruments. But sometimes some ICs were burnt. For that we were disturbed.

Comments from the Instructor regarding:

- Course Outcome 3 - An ability to layout, wire and troubleshoot electronic circuits

In the lab session, there were adequate circuits to practice circuit layout and troubleshoot electronic circuits. In lab class students can get idea about a single topic or circuit. Before the lab students should have theoretical idea about the topic. But I saw that, in most cases, they did not have any idea about most of the topics. I tried to discuss some topics in class. In two experiments, one or two group did not get the desired output. Maybe for that, there were low points in this section. Sometimes we got bad IC, sometimes wrong connections spoiled the lab time. My suggestions for improvement are as follows,

If anyone can't proceed the lab, he or group should knock instructor immediately so that instructor can help them.

Theory course should be done before the lab class. *

Every student should work by hand in lab, otherwise he/ she can't get proper idea about circuit layout and troubleshooting.

Note: * ECE 20100 is pre-requisite to ECE 20700 so all the students taking the lab have completed the semester with the theory.

ECE 30100

Comments from the Instructor in the Faculty Assessment Form:

I was unaware that z-transforms was a course outcome for this course. This has been added since the last time I taught the course. I cover z-transforms extensively in ECE 436 and did not cover it this semester in ECE 301. Please consider removing it as a course outcome from ECE 301 since it is covered extensively in ECE 436.

ECE 30200

Comments from the Instructor in the Faculty Assessment Form:

Some students showed deficiencies in basic calculus skill, such as integration by parts.

Comments from the Instructor regarding:

- Course Outcome 8 - An understanding of the basic concepts of stochastic processes
- Course Outcome 9 - An understanding of the Poisson process and its properties

Outcomes 8 and 9 deal with the subject of stochastic processes.
Stochastic processes is chapter 13 in the text. The Poisson process is covered in Chapter 13. I briefly covered stochastic processes in one lecture at the end of the semester because that is all the time I had left. I did cover the Poison process in the context of a Poison random variable (discrete)and had 1 exam question on it.

The short answer is that I ran out of time.

Covering stochastic process with any depth in a 1 semester introductory probability course is a challenge, considering all the other basic material that needs to be covered to get there.

ECE 31100

Comments and recommendations from the Instructor in the Faculty Assessment Form:

The textbook was too expensive so I asked the students to not buy it and instead I provided as much as possible material that they could access from the course website. Unfortunately, my slides were then full of text and equations. Those are not the type of slides that students like, hopefully they were not too unhappy. Next time I will not use those slides and instead just have them available online. During the lecture time I would use much simpler slides and work out problems on the board.

It would have been good to have available one of the Matlab tools dedicated to the topics of this course. Half of the students taking the course were computer engineering majors. Not only them but the entire class would have benefitted from a computational electromagnetics type project without having to code from scratch.

ECE 46000

Comments from the Instructor in the Faculty Assessment Form:

This is the first time I have taught the course, and I was learning the material concurrently with teaching it. I believe that I can improve on my performance and the outcomes after teaching it one or two more times.

Also, the lab portion of the course was taught by a graduate student, and I was not personally involved in the daily details. Next time I teach the course, I expect to be more involved in this portion of the course, and to better integrate the lab with lecture. Outcome 7 is based on lab performance, and the only insight I have in this are the lab grades supplied to me by the teaching assistant at the end of the course.

ECE 40500

Comments in the Faculty Assessment Form from the faculty advisor of the project "The Lighting of a Historic Building":

This project was out of my area of expertise, and the topic is not covered in our undergraduate curriculum. Therefore, I spent quite a bit of time and effort with the students consulting with architectural/engineering and lighting firms, including Frank Razinger, P.E., Barton Coe Vilamaa, Design Collaborative, Martin Riley, Dave Baker Agency, as well as consultation with Tim Hamilton, an adjunct faculty member at Purdue Fort Wayne. Some of these firms spent substantial time with us. Martin Riley provided a laser scan of the building for us, at no cost. We are grateful for their assistance and could not have done the project without them.

ECE 40600

Comments and recommendations from the Instructor in the Faculty Assessment Form:

The topics of the lectures and assignments given by the coordinator are not directly related to the building and testing of a working prototype. This creates a level of apathy among students and also the feeling that they are wasting their time.

The format of this course needs to be completely overhauled. to address:

1) New set of ABET outcomes
2) Students are having problems properly completing the building a working prototype.
3) Move the topics that the coordinator lectures and assess to a one credit course and just focus on the building and testing of a prototype in ECE 406

Comments and recommendations in the Faculty Assessment Form from the faculty advisor of the project "Sound Level Management System for Group Exercises":

Comments:
The late start, by at least a month, that this particular project had in the first semester, spilled over the second semester. The students were not able to build a complete prototype that could be properly tested.

Recommendations:
1) Make sure a project is properly defined and funded before the first semester starts. This project was not correctly setup from the start as pointed out on my assessment comments of ECE 405.
2) Start the hardware building and software development at least a month before the end of the first semester. There is not enough time in the second semester to complete those tasks if the objective is to have a working prototype.

Comments and recommendations in the Faculty Assessment Form from the faculty advisor of the project "Kiosk Based Water Pumping System":

Comments:
Students had to make several major design changes due to the mismatch between the hardware platform and the peripheral devices as well of lack of technical support from the seller. This has put students under tremendous stress of time. The students did successfully finish the redesign, building and testing process, and meet the design requirements with compliments from the sponsor. However, I would recommend review the ECE405/406 course sequence - see some suggestion below.

Recommendations:
I would recommend having the parts ordered and the circuit board made (if needed) at least one month before the end of first semester (ECE 405). So that students can do some initial exploration on the hardware and make sure that hardware and software would work and interface with no problem.
If this can be done, then at the beginning of the second semester (ECE 406), there is less chance of further design errors/changes and more time for actual development and testing.

Another suggestion is to remove or reduce the time for test plan in ECE 405, and incorporate in ECE 406 the Scrum process that is based on iterative and incremental development cycles.

ECE 46500

Recommendations from the Instructor in the Faculty Assessment Form:

1) Students are NOT very well prepared and some of them forgot some C language programming. It is suggested that several weeks with lecture and labs be spent to help student pickup their programming C skills.

2) Students need to be assisted with basic hardware design/troubleshooting in analog and digital circuit design and some reviews and practice problems will be helpful in their areas.

3) A separate lecture and lab sessions were suggested by students.

Comments from the Instructor regarding:

- Course Outcome 2 - An ability to learn the hardware of the modern family of microcontrollers
- Course Outcome 4 - An ability to understand and utilize the serial communications protocols, such as RS232, I2C, CAN and SPI
- Course Outcome 5 - An ability to develop the ability of embedded system co-design or both hardware and software
- Course Outcome 6 - An ability to design a PCB circuit board

General comments:

ECE 46500- embedded system is a totally revised course with new lab and lectures, usually it will take several cycles to polish it.

Outcome 2 (EE): ECE 46500 is mainly focused on the application of ARM MCU family system, therefore a strong foundation in the previous course ECE 36200-Microprocessor and Interface is necessary. We don't review too much of ARM MCU in this course, and assumed that students have a solid knowledge. It seemed that we may have to review some topics/subjects from ECE 36200 in the future.

Outcome 4: Due to time limits, we only covered and did some projects on UART serial communication, and not on others. From the comments, students assumed to learn all of them. It is suggested to change the outcome as: "*An ability to understand and utilize some serial communication protocols, such as RS232, etc.*"

Outcome 5: We plan to do another project on hardware and software co-design, however, students were not strong in programming and circuit designs, and they had to spend much more time on other previous projects. It is suggested to change this course outcome to: "*An understanding of the codesign of hardware and software of embedded systems.*"

Outcome 6: Due to time constraints, we only did one project on PCB. It is suggested to change this outcome course to: "*An understanding of PCB design.*"

Appendix F: Instructor Feedback: Lab Evaluation

ECE 20800 Lab

Comments from the Instructor in the Instructor Lab Evaluation regarding:

- The lab is well equipped. If not, what do you think is missing?

Measuring Probes for High Frequencies.

- Question 2 - The lab equipment is functional

Measuring probes all of them have missing cap grip.
Uncalibrated Signal Generator-Serial# AFG10221731345-Model: AFG1022

Comments from the Instructor regarding Students Lab Evaluation for:

- Question 1 - The lab is well equipped
- Question 2 – The lab equipment is functional
- Question 3 - The lab experiments are reasonable in length
- Question 4 – The lab experiments are reasonable in content
- Question 5 – The lab manual adequately describes experiments

Question #1. The Test Bench table only provide one power supply and one signal generator. The power supply provides two DC sources of +/- 12V and one 5V fixed source. Signal generator is a dual channel with a Peak to Peak AC voltage of 10V.The reason the students are concerned in respect of the need of more power supply is because in a couple of labs it is require to use 4 sources of DC voltage. So, they need to take the power supplies from the next table bench and sometimes they need to wait because they are unable to reach the power supply from the opposite side of the test bench table. One solution that can I provide is to create a separate circuit using op-amps to provide the two additional variable sources needed for the respected labs. In that way they are able to use four sources of DC from the power supply.

Question #2. The use of the decadence resistor boxed is needed for the beginning of the labs. Most of those Decadence resistor boxes doesn't have the nuts to tight the cables and other doesn't work properly. But it wasn't a factor to limit the work of the experiment. The lab have a lot of decadence boxes and they are easy to test and change it for a good one. Sometimes they blame the functionality of the equipment however much of the time these are by reasons of bad circuit setups, bad oscilloscope parameters and non-proper cable connections.

Question #3. The labs are reasonable in time. The main factor of why a lab may take more time of the required, is because of the lack of preparation before the lab. I mean by that, to read and try the circuit diagram before the lab time. Therefore, they can come prepared to work and know what they need to do. Otherwise, I spend a fraction of the time explaining how to work on the experiment. The solution that I implemented when I noted this behavior was to clarify that was crucial to work on the prelab before the lab time. Also, there are students that build the circuit faster leading to finish early than the rest of the class.

Question #4. The labs are reasonable in content. A behavior that I noted was that they were doing the prelab just minutes before the section lab. So, I provided to the students the equations and formulas, so they can be updated with the content of the experiment. A solution to the lack of content can be to provide the equations and formulas in the modules.

Question #5. All the modules clearly explain the experiment with circuit diagrams and steps to follow. A solution could be to review each one and update it with more relevant information.

ECE 36200 Lab

Comments from the Instructor regarding Students Lab Evaluation for:

- Question 3 - The lab experiments are reasonable in length
- Question 4 – The lab experiments are reasonable in content
- Question 5 – The lab manual adequately describes experiments
- Question 7 – Safety provisions pertaining to each experiment and/or lab activity were explained at the beginning of the associated lab session (if applicable/required/needed)

Question #3. The majority of the labs are reasonable in time. But there are a couple of labs that are more in content, leading to a longer lab section. A solution could be updating the lab manual to short the content. For example, there is one lab that require to build three separate codes and run the three codes individually. It could be improved by providing the first code and left the second and third code to the students.

Question #4. Students concern about the lack of content. To attend this behavior, I provide additional material for each lab. I provide list of instructions calls, example codes and instructions definitions. A solution to attend this behavior can be instead of giving this material separated it can be integrated to the Lab Manual.

Question #5. The Lab manual describe the experiments. The students concern about the description or explanation of the experiment. A solution could be review and update the lab manuals.

Question #7. The Lab Safety Rules are mentioned at the beginning. But they don’t apply to the kind of experiments realized in the lab. The majority of the time they work directly with the computer and a couple time they used a development board in which is powered by a USB cable.

ECE 46000 Lab

Comments from the Instructor regarding Students Lab Evaluation for:

- Question 2 – The lab equipment is functional
- Question 3 - The lab experiments are reasonable in length
- Question 5 – The lab manual adequately describes experiments

2. The lab equipment had some issues with functionality during a lab. Later we rearranged the equipment and all the required equipment were working during rest of the experiments. So, no experiment was affected due to this issue.

3. All the Lab experiments were done using Lucas-nulle integrated panel board. There were specific instructions for every experiment. Students had to follow the instructions to complete each experiment. The students had to build the circuit based on the diagram provided in the manual. They had to measure different values and the setup has the option to view the graphical results by switching to PC mode. Definitely the system helps students to learn and understand the topics. I can share the details of each experiment if required.

5. All the lab manuals were provided from the Lucas nulle. The lab manual elaborately describes how to do every step of the experiment. The lab manuals were uploaded to the blackboard before the experiments were done. Similar copy of the lab manual is also available in the pc associated with panel board. Students typically used that pc manuals during conducting experiments.

Appendix G: Industrial Sponsor Assessment of Senior Design II

- **Industry sponsor feedback form #1:**

IPFW | DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
INDIANA UNIVERSITY–PURDUE UNIVERSITY FORT WAYNE
COLLEGE OF ENGINEERING, TECHNOLOGY, AND COMPUTER SCIENCE

Industrial Sponsor's Assessment
Capstone Senior Design Course Outcomes

The faculty of the Department of Electrical and Computer Engineering has developed the following course outcomes for the capstone senior design course sequence. We are in the process of assessing the degree of achievement of these outcomes. This academic year, your company sponsored one of our capstone senior design projects. With this form, we seek your valuable feedback. Your input will greatly help us improve our electrical engineering programs. Thank you for your assistance and support.

NAME: __Richard Sartiano____________ POSITION: _Sr Program Manager__________
COMPANY: _Franklin Electric__________ DATE: ____5/15/2018_____________________
SIGNATURE: _____Richard Sartiano_________________________________
Project Title *Kiosk Based Water Pumping System*
Team Members: Cooper Hill, Philip Oprie, and Chris Stratton
Faculty Advisor: Dr. Chao Chen
Academic Year: Fall 2017 – Spring 2018

Using the scale **1 for weak to 4 for strong**, please rate the following by circling a number.

1. The ability of the students to formulate a problem statement. **1 2 3 4**
   Comments:
Students clearly identified customer needs and developed the pertinent Use Cases.

2. The ability of the students to generate solutions. **1 2 3 4**
   Comments:
Students created a product diagram delineating their solution.

3. The ability of the students to evaluate the generated solutions. **1 2 3 4**
   Comments:
Students completed and documented multiple trade studies describing how they evaluated each solution from top level system to individual components.

4. The ability of the students to obtain a final design including safety, economic, ethical and engineering standards considerations. **1 2 3 4**

Comments:

Students regarded multiple criteria besides requirements when considering their final design.

5. The ability of the students to build their design. **1 2 3 4**

Comments:

Students created a proof of concept that functional emulated the final production design.

6. The ability of the students to test their design. **1 2 3 4**

Comments:

Besides piece-meal integration testing, the students created an end-to-end validation test that demonstrated the full functionality of the Kiosk.

7. The ability of the students to evaluate their design. **1 2 3 4**

Comments:

The students allowed others to use the Kiosk to evaluate their UI with the final test being able to discharge the exact amount of water requested by the user.

8. The ability of the students to function as a team. **1 2 3 4**

Comments:

Each member of the team took on what appeared to be a natural role for that individual. They worked exceptionally well as a team. One reason why they were able to accomplish so much in such a short period of time.

9. The ability of the students to communicate effectively. **1 2 3 4**

Comments:

Besides communicating effectively by collaboration tools internally, the team had to work with members of Franklin Electric to execute the project. They did this very effectively.

- **Industry sponsor feedback form #2:**

<table>
<tr><th>Name</th><th>Position</th><th>Company</th></tr>
<tr><td>Adam Clark</td><td>GM Mutilation Coordinator</td><td>General Motors</td></tr>
<tr><th colspan="3">Project title</th></tr>
<tr><td colspan="3">Data Collection System for Identification of Production Line Mutilations</td></tr>
</table>

question	ranking
The ability of the students to formulate a problem statement	3
The ability of the students to generate solutions	3
The ability of the students to evaluate the generated solutions	3
The ability of the students to obtain a final design including, safety, economic, and ethical considerations	2
The ability of the students to build their design	2
The ability of the students to test their design	2
The ability of the students to evaluate their design	2
The ability of the students to function within a team	3
The ability of the students to communicate effectively	3

Appendix H: Comments from Electrical Engineering Students in Exit Survey

3. Comments on curriculum

- Question: What topics would you recommend to be given more emphasis or to be introduced in the curriculum?
  - *programming languages*
  - *PLC programming*
  - *More industry application*
  - *Programmable Logic Controllers*
  - *Doing. Listening to powerpoint presentations is not useful. Classes need discourse. Flaws in understanding are not exposed in written tested, but in application. Proof of Concept should be held paramount.*
  - *Software*
  - *Practical application*
  - *Digital systems. The first 2 years are almost exclusively analog.*
  - *power electronics, design engineering*

- Question: Please add any additional comments about the Computer and Electrical Engineering Curriculum.
  - *Courses such as Power Electronics, the course on micro controller/processor and senior design have been very useful with my current job*
  - *Group 1 electives were limited*
  - *The vast majority of my electrical engineering skill were learned by doing hands-on research in the Physics Department with barely any financing.*

4. Comments on facilities

- Question: Please add any additional comments about the Computer and Electrical Engineering Facilities.
  - *The basic equipment such as oscilloscopes, etc. need to calibrated.*
  - *The program has sufficient facilities (probably too much even); however, they are not utilized effectively for the good of the student. A tenacious and resourceful individual could build a particle accelerator in a junkyard.*
  - *The soldering station is terrible and hindered me in some projects.*
  - *Equipment could definitely use an update, lot of old electronics that works half the time*

5. Comments on the ECE program

- Question: Please add any additional comments about the IPFW Electrical Engineering and Computer Engineering program.
  - *There are plenty of discussions about these topics; however, the classrooms in ETCS are often open loop systems. There is no discourse or sense of community. Lectures ask their students if they understand and the students all nod their heads while looking at their cell phones. Asking that question and giving tests where students plug numbers into equations is not an accurate measurement system for understanding.*
  - *I can't believe I'm a EE graduate and I don't know anything about soldering or PCB design*

Appendix I: ECE Co-Op Coordinator Report

TO: Assessment Committee

FROM: Elizabeth A. Thompson, Ph.D.
ECE Co-Op Coordinator

DATE: May 3, 2018

SUBJECT: ECE Co-Op Report (Spring 2018)

Table 1. Rating of Co-Op students' performance

Student (class)	Employer	Student's rate of the overall performance	Employer's rate of the overall performance
1. Student X (CmpE)	Duesenburg	Outstanding	Outstanding
2. Student Y (EE)	Regal Beloit	Average	Very Good

External Assessment:

Table 1 above lists the Spring 2018 Co-Op student's self-rating of his performance as well as his rating as reported by his supervisor.

Table 2 below indicates performance factors and areas of competence the student has achieved through the Co-Op experience during the current work term as reported by the supervisor. The column numbers in Table 2 correspond to the student numbers listed in Table 1 above. That is, student X' information is listed in column 1 of Table 2 below, student Y's is in column 2. The items of Table 2 can be mapped to the electrical engineering and the computer engineering program outcomes.

During the March 22, 2018 visit to Duesenburg, student X's supervisor, Hunar Sakri, Vice President of Engineering, indicated his high opinion of X's work. In his end-of-semester evaluation, Mr. Sakri stated that X has the foundation and attitude to be a successful engineer.

During the March 13, 2018 visit to Regal Beloit, student Y's supervisor, Kerry Shelton, Chief Analytical Engineer, indicated that Y is doing well and that he has a good work ethic. Mr. Shelton also stated that one advantage of Purdue Fort Wayne students is that they have work experience. He also said that Regal Beloit has hired co-ops exclusively from Purdue Fort Wayne for approximately the last four years. In his end-of-semester evaluation, Kerry Shelton reiterated Y's great work ethic and added that his maturity in working with others helps his professional development.

<u>Conclusion:</u> Based on:

- Student evaluation
- Student report
- Employer evaluation
- My company visit and meeting with the student and his supervisor

The Electrical & Computer Engineering curriculums are preparing the students very well for the Cooperative Education jobs. Overall, Regal Beloit and Duesenburg are very satisfied with our students' performance.

Table 2. Performance factors and areas of competence as reported by Co-Op supervisors

1 = Outstanding, 2 = Very Good, 3 = Average, 4 = Marginal, 5 = Unsatisfactory, – = Not Applicable

Measurements Related to the Program Outcomes	**1**	**2**
Ability to integrate theory (academic learning) and practice (co-op experience)	1	2
Academically prepared for this job (course preparation)	---	2
Communicates clearly in written form	2	3
Communicates clearly verbally	2	2
Demonstrates ability to use decision making skills	1	2
Demonstrates analytical problem solving skills	2	2
Demonstrates necessary technical skills	---	2
Demonstrates ability to apply technical knowledge/skills	2	2
Demonstrates the necessary computer skills	1	2
Demonstrates ability to design	3	2

TO: Guoping Wang, Chair

FROM: ETCS Assessment Committee

SUBJ: 2017-2018 Assessment Report for EE

DATE: January 25, 2019

The ETCS Assessment Committee has received and reviewed the EE's 2017-2018 Assessment Report. Our comments below follow the rubrics derived from the revised Senate Document 98-22. Appendix D.

Overall, the report is well organized and clearly presents that work has been done and results used to improve assessment procedures.

Reporting results:

- The assessment results are well organized and clearly presented.
- It is recommended that the report include historical data, such as previous exit survey results for comparison.

Report dissemination and collaboration:

- The assessment results, feedback, and follow-ups are shared by the ECE faculty, Assessment Committee, and the Industrial Advisory Board.

Use of results for programmatic change to improve student learning, achievement and success:

- This is well documented in the Closing the Loop, Summary of Continuous Improvement, and Summary of Recommendations Sections.
- EE is encouraged to include more evidence on how curricular and/or pedagogical changes positively influence student learning.

Please contact us if you have any questions.

BS in Information Systems Assessment Fall 2017 to Spring 2018 Report

Department of Computer Science
Purdue University Fort Wayne
November 1, 2018

Section 1 Program Educational Objectives and Student Learning Outcome

The BS in Information Systems program although is not accredited by Computing Accreditation Commission (CAC) of ABET, Inc., a systematic assessment with the same principles required by an accredited program are followed. CAC-ABET requires Program Educational Objectives and Student Outcomes (i.e. Student Learning Outcomes).

A. BS in IS Program Education Objectives

As a framework for the continuous improvement policy, the Information Systems program has adopted a set of Program Educational Objectives (PEOs) that describe the anticipated accomplishments of our graduates 3-5 years after graduation. It was approved by the Assessment Committee on December 8, 2015 and approved by the faculty of the Department of Computer Science on Jan 29, 2016.

The Information Systems program educational objectives are to produce graduates who:

1. are able to apply the theoretical and technical computer science knowledge to analyze, design, implement, test, and maintain high quality computer-based solutions; [Professional Quality]
2. hold professional computer science/information systems positions or pursue graduate studies in computer science or other related degrees; [Career Success]
3. exhibit skills in effective oral and written communication, leadership, and are able to work individually and in diverse teams; [Communication, Team & Diversity]
4. contribute to Fort Wayne and the greater northeast Indiana region economy as productive and successful professionals in computing and information systems; [Economic Impact]
5. pursue lifelong learning in their computing professions; [Lifelong Learning]
6. demonstrate commitment to high ethical and professional standards within the community and profession. [Professionalism, Ethics]

B. BS in IS Student Learning Outcome

The learning outcomes for Information Systems were reviewed and approved by the faculty of the Department of Computer Science on January 20, 2012 and was confirmed by the faculty on August 21, 2016.

The program enables students to attain, by the time of graduation:

(a) An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline
(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
(d) An ability to function effectively on teams to accomplish a common goal
(e) An understanding of professional, ethical, legal, security and social issues and responsibilities

(f) An ability to communicate effectively with a range of audiences
(g) An ability to analyze the local and global impact of computing on individuals, organizations, and society
(h) Recognition of the need for and an ability to engage in continuing professional development
(i) An ability to use current techniques, skills, and tools necessary for computing practice.
(j) An understanding of processes that support the delivery and management of information systems within a specific application environment.

Section 2 Curriculum Maps

A. Map of Student Outcomes to PFW Baccalaureate Framework

Table 1 Map of Student Outcomes to Baccalaureate Framework

SO	Acquisition of knowledge	Application of knowledge	Personal and Professional Values	A Sense of Community	Critical Thinking & Problem Solv.	Communication
a	x	x			x	
b	x	x			x	
c	x	x			x	
d				x		x
e			x	x		
f						x
g			x	x		
h			x		x	
i	x	x			x	
j	x	x			x	

B. Map of Student Outcomes to the Core Courses in the curriculum

During the 2017-2018 academic year the Department of Computer Science will map IST courses to student learning outcomes. Every course already follows the practice of mapping SLOs for each course in the corresponding syllabi.

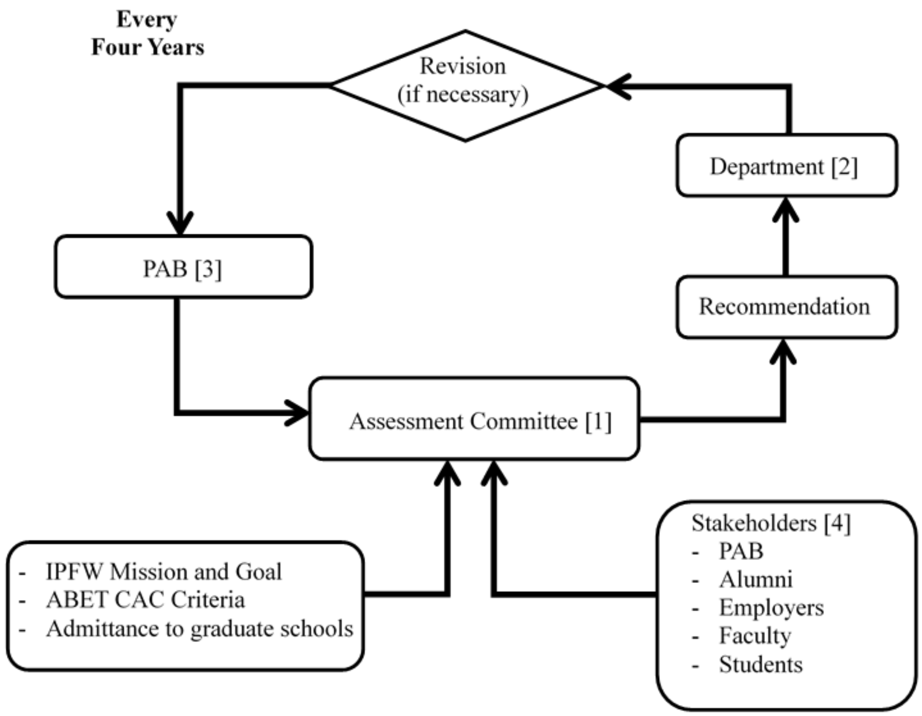
Section 3. Assessment Plan

A. Description of Department's Assessment Model

A.1 Program Education Objectives Review

A revised PEO review process was adopted by the CS department on January 29, 2016 (Figure 1). The fundamental process for reviewing the PEOs is unchanged from the process described in the Self-Study Report that can be found in Appendix Item 1.2. However, updates have been made incorporating the involvement of constituents of the CS department programs, emphasizing roles of the CSAC, and adding the review of the PAB to the PEOs review process.

Figure 1. Revised Process to Review the Program Educational Objectives



Note for Figure 1

Tasks:
[1] Collect and analyze data, and create a recommendation report to the CS department.
[2] Make decisions and execute required actions to the CSAC recommendation.
[3] Review and provide feedback.
[4] Various constituents of the CS program provide input.

The PEO review process consists of a four-year cycle that mainly focuses on program level goals, and an annual cycle that focuses on course level outcomes. For the review of the PEOs, the CSAC utilizes information from multiple sources and feedback from stakeholders of the CS Department programs, which is listed in Figure 1. The evaluation of the assessment data, input from PAB, survey results from constituents, the institutional mission statement, and the CAC-ABET Criteria are considered part of the review process.

To collect feedback on levels of attainment of the PEOs from stakeholders beyond PFW, the CS department will conduct an alumni and employers' survey every four years. The survey includes evaluation questions to gauge their levels of satisfaction on achieving the PEOs and the SOs, preparedness for career, and the quality of CS programs.

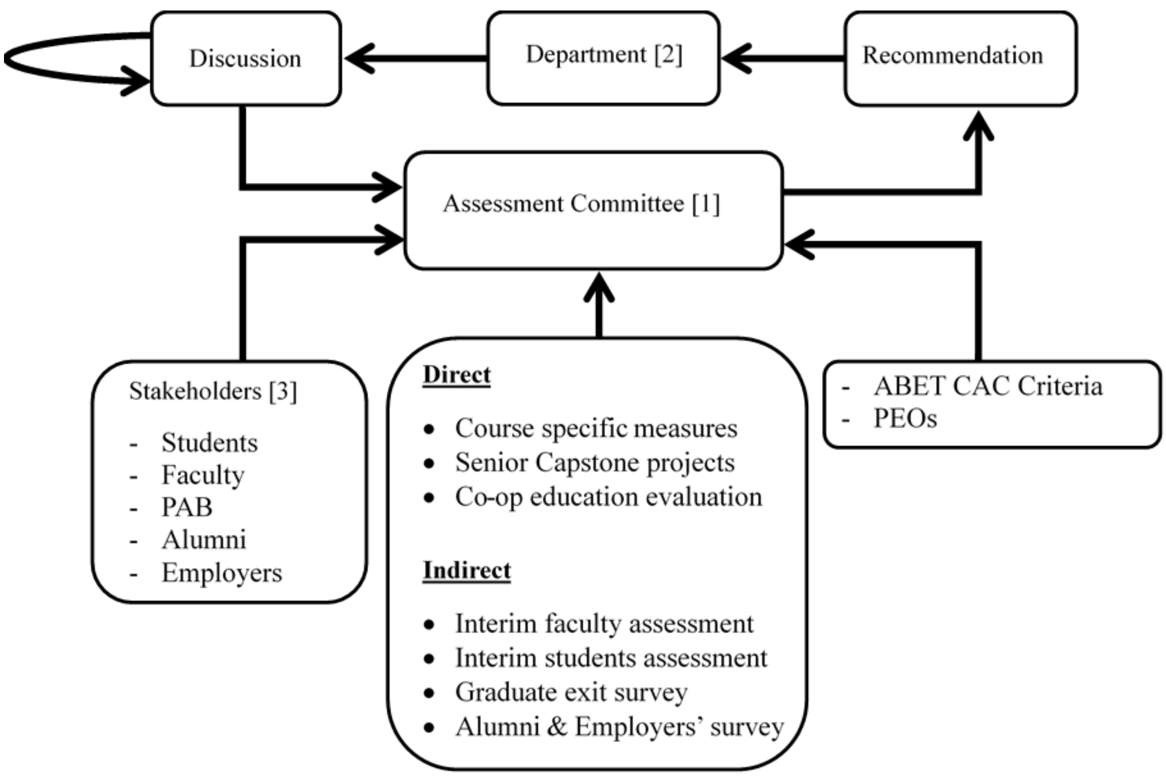
A short PEO review cycle is annually executed with the evaluation of the SOs. The CSAC regularly meets every semester to assess and evaluate the SOs. During the SOs' evaluation, the CSAC also reviews whether the SOs continue to prepare graduates to attain the PEOs. The CSAC presents the committee recommendation about the review of the PEOs to the CS department. If the CSAC doesn't suggest any changes to the PEOs, then the CS department keeps the PEOs until the next evaluation cycle. If the CSAC recommends revision of the PEOs that can be triggered by changes in the institution's mission, constituent needs, or relevant CAC-ABET criteria, then the CS department discusses proposed PEO changes.

Before the CSAC presents new PEOs, the committee makes sure that the PEOs are consistent with the institutional mission statement, constituent needs, and the CAC-ABET Criteria. The revision of PEOs kicks off the review of the SOs' process, so that the SOs are properly defined to attain new PEOs. The CS department informs the PAB about the PEO changes for their feedback to ensure that these changes still support the needs of major program constituents. After collecting PAB comments, if there are no concerns, the CS department adopts revised PEOs that are posted on the CS department web site. This closes the loop in the PEO review process. If the annual PEO review cycle doesn't trigger changes, the CS department executes a comprehensive review of the PEOs every four years with data collected after the last revision of the PEOs.

A.2 Student Outcome Establishment and Periodic Review

The Department revised and established the following process for the establishment and periodic review of the Student Outcomes. The process was approved by the faculty of the Department of Computer Science on Jan 29, 2016.

Figure 2 Process for the Periodic Review of the Student Outcomes



Note for Figure 2

Tasks:
[1] Collect and evaluate data, and create a report with recommendations to the CS department.
[2] Make decisions and execute required actions to the CSAC recommendations.
[3] Review and/or provide feedback.

The review of the SOs for the Information Systems program has been recently implemented, the information collected up to now is limited. As the Information Systems program assessment evolves, we expect to collect more data for assessment purposes. The goal is to have a review of the SOs following the same schedule as the Computer Science Program. The plan is to have a review of the SOs executed every semester in five steps: Planning, Data Collection, Evaluation, Recommendation, and Improvement. The review process starts with collecting assessment data, which includes outcomes from three direct and four indirect measures gathered from various program constituents. Over the semester, the CSAC regularly meets to evaluate collected information and assess the level of attainment of the SOs. Along with assessment data collected from students and faculty, the CSAC references feedback and survey results from other program constituents, the CAC-ABET Criteria, and the PEOs to review the SOs.

At the beginning of each semester, the CSAC presents the SOs' assessment schedule for a semester and the assessment report of the past semester to the CS faculty members. The report includes outcomes after reviewing the assessment data for the SOs and the CSAC recommendations to improve the CS program. If any results indicate that the SOs have not been properly attained, the CSAC analyzes reasons and presents possible solutions to achieve the SO to the CS department. After reviewing the CSAC reports, the CS department requests subcommittees of the CS department to carry out follow-up actions to the CSAC recommendations.

During the SOs' review process, if SO revision is required, which can be caused by concern about not having the right SOs, or changes of the PEOs or the CAC-ABET criteria, the SO revision process is initiated by the CSAC. As depicted in Figure 2, the CSAC proposes new SOs to the CS department. Before recommending SO changes, the CSAC confirms that all PEOs are covered by the SOs, so that the SOs continue to prepare graduates to attain the PEOs. Otherwise, the CSAC triggers the PEOs' revision process, which is described in Section 2 above. The CSAC also reviews measures for evaluating the SOs listed at Table 5 in Section 4. If needed, the CSAC properly revised these measures. Any changes to SOs will be presented at the annual PAB meeting with supporting information, such as how these changes still support the attainment of the PEOs and the needs of the PAB. The revised SOs are posted on the CS department website. Meanwhile, when the CSAC reports that no changes are needed to the SOs, the CS department maintains the SOs until the next evaluation cycle. This will close the periodic evaluation loop in the SOs' review process.

B. Student Outcome Assessment

In Spring 2016, the Department revised instruments for assessing the SOs. The attainment of the SOs is measured by three direct and four indirect measures with time intervals that range from every semester up to four years. The CS department evaluates the attainment of SOs by using multiple measures. Table 5 summarizes revised measures for assessing the SOs and associated implementation schedules.

Table 4 Direct and Indirect Measures for Evaluating the Attainment of the SOs

Direct Measures	Indirect Measures
1) Course specific direct measures on selected programming and written assignments, exams, term papers, presentations, etc. (1-3 years; at least once every three years) • Review of samples of students' work (every semester - 3 years) 2) The assessment of Senior Capstone projects by sponsors and faculty (every year)	1) Interim assessment by faculty • Course Learning Outcome Assessment (CLOA) survey (every semester) 2) Interim assessment by students • CLOA survey (every semester)

• Presentation evaluations by project sponsors, faculty, graduate students, PAB members, and guests from local industry (every semester) 3) Cooperative education employer evaluation (Whenever there is a co-op student)	3) Graduate exit survey and interview (every semester) 4) Alumni and Employers' survey (Every four years)

B.1 Course Specific Direct Measures on Students' Activities in a Course

Since Fall 2016, the CS department has used student performances in a course to assess the attainment of the SOs. Student performances in a course are evaluated by individual faculty members of the course using instruments that s/he designed. Each IST course has a standard set of the Course Learning Outcomes (CLOs) that are uniformly used by instructors no matter who teaches the course. The instructor selects certain programming assignments, homework, and/or exam questions to quantitatively measure student performances for the CLOs. Instructors of CS courses mapped a number of CLOs to the SOs. The average scores of students' work is used as direct measures to evaluate the extent to which the CLOs and the SOs are being attained. For these measures, the CS department developed a formula-embedded Excel worksheet. The worksheet is designed to incorporate students' performances of their coursework, the interim assessment of a course by students and faculty, and assessment results in the same file. Thus, all course related assessment material is in a file to assist the CSAC in evaluating individual courses comprehensively.

The IS program started this procedure to collect direct measures on students' activities in a limited number of courses. The CSAC determined that the chosen CLOs of IS courses to be assessed cover all SOs of the IS program. Course specific direct measures are executed based on a strategically designed timetable to assess the SOs periodically with proper time intervals. All lecture-based IST courses will be evaluated at least once every three years. Table 5 summarizes a guideline for selecting courses to be assessed using direct measures for the SOs' assessment (DMSO). At the beginning of each semester, the CSAC presents a schedule of courses to be assessed at the department meeting. At the end of each semester, the instructor submits collected data, a course assessment report including proposed improvement actions and results from completed actions.

Table 5 Guideline for Implementing Course Specific Direct Measures

Core Course	• IF (Faculty teaches a course for the first time OR any of the previous DMSO results < 70%), THEN collect DMSO data. • IF (All DMSO results from previous data collection > 70%), THEN do NOT collect DMSO data for ONE course offering. • IF (All DMSO results from previous two (2) data collections > 70%), THEN do NOT collect DMSO data for TWO course offerings.
Concentration Course	• IF (Faculty teaches a course for the first time OR any of the previous DMSO results < 70%), THEN collect DMSO data. • IF (All DMSO results from previous data collection > 70%), THEN do NOT collect DMSO data for TWO course offerings.
Special Case	• Certain courses, such as the Senior Capstone course, may need to be assessed more frequently. For example, in order to regularly measure students' communication and presentation skills, assessment of these measures will be needed regardless of the implementation schedule explained above.
Note	• IST core courses are expected to be offered every semester.

	• IST concentration courses are expected to be offered at least once during the academic year.

B.2 Interim Assessment by Students and Faculty

Since fall 2013, the CS Department has implemented the interim assessments by students and the faculty for evaluating the SOs. Based on the course assessment schedule, the CSAC conducts Course Learning Outcome Assessment (CLOA) surveys. Students complete CLOA surveys of selected courses at the end of every semester via an PFW online survey system. The survey results are presented to the instructor. After reviewing the CLOA of students, the instructor adds their observations and recommendations to an interim assessment report before presenting it to the CSAC. Detailed procedures to execute interim reports are available in the Self-Study Report. As described in item (a) above, course specific direct measures and interim assessments are added to a formula-embedded Excel worksheet. The resulting worksheet included interim assessments by students and the instructor, course specific direct measures, and assessment results survey. The minimum required score for each measured SO should be 3 out of the scale 1 to 5.

B.3 Senior Capstone Projects Assessment

The information systems program currently does not have a senior capstone project. A preliminary discussion on the feasibility of creating a senior capstone project for the IST program is underway. It is likely that a senior capstone project for the IS program will be proposed in the short-term.

B.4 Cooperative Education Employer Evaluation

The CS department has utilized co-op programs to collect employers' feedback on student performance at local companies and their expectations for improving the CS program. The Cooperative Education Employer Evaluation is implemented by a designated PFW office. The Office of Academic Internships, Cooperative Education, and Service Learning (OACS) administers all co-op related tasks such as initiating co-op positions at local companies, recruiting students, conducting co-op site visits, and evaluating activities associated with the co-op program. As part of the course evaluation, the PFW OACS surveys the co-op employer to collect feedback on the performance of students. The current survey includes evaluation questions to measure student's problem-solving skills, professionalism, teamwork, communication skills, and technical knowledge and computer skills. These performance indicators are used to assess the attainment of the SO items b, c, d, e, f, and i set by the CS department

B.5 Graduate Exit Survey

The CS department collects feedback from graduates of CS programs in two ways: A graduate exit survey administered by a designated PFW office and exit interviews conducted by the CS department chair. To prevent duplicated work in collecting data and to increase the response rate from the graduates, since Fall 2015 the PFW Career Services Center has collaboratively conducted a graduate exit survey with the CS department. The Career Services Center sends online surveys to recent graduates to gather information about employment status and their experiences at PFW. The questionnaire also asks about students' perceptions of their preparedness for career, the quality of the CS program, available facilities, and several items used for assessing the SOs. Every spring semester, the Career Services Center sends a summary of graduate exit surveys of the past AY to the CS department.

The CS department also collects the opinions of graduates through an exit interview. Around the end of each semester, the chair of the CS department meets with prospective graduates. During the meeting, students share their experiences with the CS department, their expectations of programs, and their recommendations for improving the CS curriculum. The discussion content is anonymous and confidential until students graduate. A student prepares a document of meeting minutes that is presented to the CS faculty and the CSAC. The CS department has conducted graduate exit interviews every semester since Spring 2016

B.6 Alumni and Employers' survey

The CS department collects feedback from alumni and employers on the SOs and PEOs in two ways. First a small-scale survey is conducted at the annual PAB meeting. The majority of PAB members hire or hired CS graduates At least four current PAB members are graduates of the CS department. Although the data collection pool is not large enough, by discussing and conducting a survey at the annual PAB meeting, the CS department is able to regularly gather feedback on the attainment of the SOs and the PEOs. The CS department executes a larger scale survey to evaluate the attainment of the PEOs and the SOs from alumni and employers every four years.

Section 4. Continuous Improvement

The CS Assessment Committee submitted 2017-2018 Assessment Report of the IS program to the CS department and to the Assessment Committee of the college in Fall 2018. The CS department has utilized the Assessment Report as input for the continuous improvement of the program. The following table summarizes a number of major actions implemented by the CS department for improving the IS program during 2017-2018 AY.

Table 7. Summary of the Continuous Improvement of the IS program

Semester	Trigger	Action Taken	Results
Fall 2017	Findings from PAB meetings and graduate exit interviews that recommended skill sets and areas that needed to be improved.	• Offered new courses and revised existing courses to introduce cutting edge technology. • To enhance collaboration with local industry, the IS Program Coordinator administers co-op courses.	• Introduced up-to-date technology and provide students skillsets requested by the local industry. • One IN-MaC projects were brought by IS faculty providing experiential learning to students
Spring 2018	The CSAC recommendation in Fall 2017 IS Assessment Report: • Modernize the Information Systems Program to match the industry and regional demand	• Recommended to modernize the visual basic courses to a more modern visual programming approach • Recommend to introduce a new course in Quantitative methods for Decision Sciences	• One IN-MaC projects were brought by IS faculty providing experiential learning to students

Section 5. Assessment Results

A. Current Year Assessment Findings

A.1. Program Education Objectives Review

The Computer Science Department and its Assessment Committee got feedback and recommendations from PAB (Professional Advisor Board) and followed up and took actions.

A.2 Period Review Student Outcomes

The Department Assessment Committee reviewed the potential ABET-CAC Student Outcome criteria updates and decided to keep the current student outcomes a to j.

A.3. Student Outcome Assessment

A.3.1 Course Learning Outcome Assessment through Student Survey

From Fall 2017 to Spring 2018, total of 3 IST courses are assessed through Course Learning Outcome Student Survey. These courses passed the minimum requirement of 3 of 5 in all Student Outcomes.

Table 6 Fall 2017 Course Learning Outcome Assessment (Survey)

Course	Student Outcome (out 5)										
	a	b	c	d	e	f	g	h	i	j	k
IST 37000	4.25				4.25	4.39	4.15		4.05		
IST 34000-D		4.67								4.67	

Table 7 Spring 2018 Course Learning Outcome Assessment (Survey)

Course	Student Outcome (out of 5)										
	a	b	c	d	e	f	g	h	i	j	
IST 35000-D	4.6	4.6									

A.3.2 Direct Measure Assessment

From Fall 2017 to Spring 2018, 2 IS courses are assessed through direct measures coming from graded submissions of students. These courses passed the requirement of 70% in all Student Outcomes using direct measures.

Table 8 Fall 2017 SO Course Direct Measure Assessment

Course	Student Outcome (%)										
	a	b	c	d	e	f	g	h	i	j	
IST 37000	84.1%				77.7%	90.6%	89.4%		90.6%		
IST 34000		81%								81%	

Table 9 Spring 2018 SO Course Direct Measure Assessment

Course	Student Outcome (%)										
	a	b	c	d	e	f	g	h	i	j	
IST 35000-D	83%	83%									

A3.3 Senior Capstone Projects Assessment

- NA

A3.4 Cooperative Education Employer Evaluation

- NA

A3.5 Graduate Exit Survey

The graduate exit survey was conducted in spring 2018. The information that this survey yielded was applicable to students in CS programs, as such, no additional action or comments apply to the IS program.

A3.6 Alumni Survey and Employers Survey

The Department revised the Alumni Survey and Employers Survey in Spring 2017. In October 20, 2017, ABET CAC changed the Student Outcomes (SOs), the Department will adopt the new SOs and review and update Program Educational Objectives (PEOs) accordingly. The Alumni Survey and Employers Survey will be revised according to the revised PEOs. The surveys will be conducted in Spring 2019.

Section 6. Conclusions, Next Steps, and Communication

After assessing measured data, the CS Assessment Committee (CSAC) recommends the following actions to the CS Department to be practiced for improving IS program during 2018-2019 AY.

- The Department adopts new ABET CAC new SOs and maps Course Learning Outcomes to SOs for each IST course
- The Department uses the new SOs for course direct and indirect assessments
- The Department revises PEOs and the Alumni Survey and Employers Survey and conduct the survey in Spring 2019.
- The CS Curriculum Committee needs to revise the curriculum to meet ABET CAC curriculum requirements.
- The Department follows up Spring 2018 Professional Advisory Board (PAB) recommendations.

TO: Beomjin Kim, Chair

FROM: ETCS Assessment Committee

SUBJ: 2017-2018 Assessment Report for IS

DATE: January 31, 2018

The ETCS Assessment Committee has received and reviewed the IS's 2017-2018 Assessment Report. Our comments below follow the rubrics derived from the revised Senate Document 98-22. Appendix D.

Overall, the report shows that some work regarding assessment has been done. Some improvement on the SLO assessment plan and reporting results is desired.

Assessment Plan:

- The process to review PEO's, that includes the PAB, alumni, employers, and students in the loop, is good.
- The process for review of SLOs is identical to the CS program, however the IS program does not have a senior capstone course and graduate exit survey established as part of the assessment process. Consider developing a process specific to the IS program.
- An increase in the number of courses assessed is desired. Ideally, courses assessed are to be selected such that all (or at least most) of the SLOs are annually assessed – SLOs c, d, h, and k were not assessed this time. It is recommended to have some guidelines for selecting courses to be assessed.

Reporting results:

- Summary of feedback and recommendations by the PAB is not presented.
- Graduate exit survey provides valuable data for the program assessment. Is there an adoption plan in the future for the IS program?
- The reporting of results is brief. More explanation would be helpful. For example, were the means and percentages provided under student assessment and direct measures derived from multiple sections of IST 37000 and 34000? More data (unless limited by course offerings) and analysis on the data (with historical data if applicable) will provide a more meaningful assessment.

Report dissemination and collaboration:

- It appears that assessment results, feedback, and follow-ups are shared with the CS faculty, Assessment Committee, and PAB.

Use of results for programmatic change to improve student learning, achievement and success:

- The Continuous Improvement Section summarized the major actions implemented based on inputs from the past assessment cycle. However, more specificity would be helpful. For example, identify specifically how the visual basic courses have been "modernized" and then provide assessment data as evidence these changes have resulted in improvement in student learning. If it is too early to assess these changes, indicate when you plan to do so. In general, it also would be helpful for assessment planning if the report presents a list of courses that have been assessed and a list of courses to be assessed in the following assessment cycle.

Other recommendations:

- Separate the assessment plan from the yearly report. The assessment report should focus on presenting assessment results and follow-ups rather than reciting the same assessment plan.
- The IS assessment report states that the department would map all the IST courses to student outcomes during the 2017-2018 school year. However, no mapping table is provided in the report. This was supposed to be provided in the 16-17 report according to the 15-16 report.

Please contact us if we can provide any assistance as you move forward with your assessment process.

Purdue University Fort Wayne

Assessment Report

PURDUE
UNIVERSITY
FORT WAYNE

First-Year Engineering Program
Fall 2017 – Spring 2018

Contents

Note: This report was circulated to the first-year engineering committee via email and was approved by the committee on 31 August 2018.

First-Year Engineering Assessment Report

Introduction

The first-year engineering (FYE) program is jointly managed by the Civil and Mechanical Engineering (CME) department and the Electrical and Computer Engineering (ECE) department. The FYE program seeks to provide an innovative and supportive environment to enhance the success of all incoming engineering students in their first-year and beyond. The program is responsible for developing and implementing curriculum, pedagogy, advising, facilities, and student support for all first-year engineering students. FYE faculty are also involved in recruiting and K12 outreach. In the classroom, the first-year faculty seek to develop and use a range of innovative pedagogies, particularly active and cooperative approaches.

Each department has a first-year engineering faculty member, i.e. FYE coordinator, who is responsible for providing leadership and representing the first-year engineering program. The coordinators and department chairs are listed in Table 1. The FYE committee, comprised of faculty members from both the ECE and CME departments, assists the coordinators in managing, overseeing, and assessing the FYE program. Faculty members from both the ECE and CME departments teach courses and advise students in the FYE program.

Table 1. Leadership of FYE program during the 2017-2018 school year

Department	**Chair**	**FYE Coordinator**
CME	Nash Younis	Rebecca Essig
ECE	Abdullah Eroglu	S. Scott Moor

As a result of its assessment-based, continuous improvement process, the engineering programs at Purdue Fort Wayne began offering a newly designed first-year engineering (FYE) curriculum in the fall 2014 semester. The overarching motivation behind the curriculum change was the desire to expose students to important mathematical techniques through engineering applications and to develop the students' problem-solving abilities. The curriculum change involved replacing four courses with two courses, as shown in Table 2.

Table 2. FYE curriculum

Pre-Fall 2014 Curriculum			**Post-Fall 2014 Curriculum**		
Number	Title	Credit Hours	Number	Title	Credit Hours
ENGR 101	Introduction to Engineering	1	ENGR 12700	Engineering Fundamentals I	4
ENGR 120	Graphical Communication and Spatial Analysis	2			
ENGR 121	Computer Tools for Engineers	2	ENGR 12800	Engineering Fundamentals II	4
ENGR 199	Introduction to Engineering Design	3			

The CME department is primarily responsible for the scheduling and staffing of ENGR 12700 and the ECE department is primarily responsible for the scheduling and staffing of ENGR 12800. This structure is to facilitate the administration of the course, but the continued goal is to have a unified curriculum that addresses the needs of all engineering students. This is reflected in the outcomes for each course which are designed to benefit students in any program.

Although the new curriculum consists of only two courses, each course has a lecture component, a studio component, and a computer lab component. The lecture component meets twice a week for 50 minutes. The studio and computer lab components each meet for 2.25 hours once a week.

Mission

The purpose of the first-year engineering program is to prepare incoming students for a successful college career in engineering or another major. Particularly to:

- Prepare students to be successful college students, introducing them to the skills, habits, and attitudes that led to success;
- Help students select or confirm their major;
- Increase their motivation to learn and work hard in the major they choose;
- Better prepare engineering students for sophomore courses, addressing varying weaknesses in preparation for incoming students of varying background, working to give all students a common starting point;
- Begin to prepare students for the teamwork required for success in all professions particularly engineering including communication skills, mutual accountability, and respect/understanding for individuals with varying backgrounds, approaches, & skills.
- Develop needed introductory computer skills (e.g., computer calculations, Computer Aided Design - CAD, introductory programming).

Program Outcomes

In the fall 2016 semester, the first-year engineering program committee revised the program and course outcomes for the first-year engineering program in order to create more clarity for students and instructors. The clarifications were approved by both engineering departments.

The first-year engineering program has three overall (two-semester) outcomes. A student who successfully completes the first-year engineering program (ENGR 12700 and 12800) will be able to:[1]

1. solve and document the solution of problems involving different elements or configurations not previously encountered (e.g. a new geometric arrangement, a new term to include in an analysis, a new type of starting condition) (a)
2. solve problems using multiple approaches including (e.g., equations including varied analytic approaches, diagrams, formal solution steps or simple computer programs) (a)

[1] The letters in parentheses correspond to ABET program outcomes. ABET outcomes are listed in the Appendix A. Note: ABET outcomes changed in the spring of 2018, and these changes will be reflected in the 2018-2019 report.

3. describe the broad nature of various engineering majors and the engineering profession and use this information to make appropriate career choices (f)

The three overall FYE program outcomes cover ABET outcomes (a) and (f).

The FYE program outcomes are also closely aligned with the foundations of Purdue Fort Wayne's baccalaureate framework, especially *Application of Knowledge*, *Personal and Professional Values, and Critical Thinking and Problem Solving.*

Course Outcomes

A student who successfully completes ENGR 12700: Engineering Fundamentals I will be able to:[2]

<u>Analysis & Success Outcomes</u>

A.1. formulate and solve engineering problems using linear and quadratic equations (a)
A.2. formulate and solve engineering problems using trigonometry in planar systems (a)
A.3. formulate and solve engineering problems using descriptive statistics (a)
A.4. formulate and solve engineering problems using derivatives (a)
A.5. formulate and solve engineering problems using systems of equations (a)
A.6. explain and apply appropriate study and success strategies, concepts & habits to be successful in an engineering major and exhibit the work ethic necessary to succeed in engineering (i)

<u>Project Outcomes</u>

B.1. plan and carry out a disciplined experimental study following a systematic project process of project planning and management (b)
B.2. utilize appropriate analytical and computer tools in project work (b)
B.3. communicate effectively using simple memos, properly formatted tables and properly formatted figures following an engineering format and style guideline (g)
B.4. identify and demonstrate the behaviors of an effective team member and/or leader, prepare a project schedule (d)
B.5. explain and apply the concepts of professional and ethical responsibility, evaluate ethical issues in engineering practice in terms of a Code of Ethics and apply to ethics as an engineering student (f)

<u>Computer Outcomes</u>

C.1. represent a physical object in single-view and multi-view orthographic projections (k)
C.2. dimension parts according to convention (k)
C.3. create pictorial (isometric) representations of a physical object (k)
C.4. create and use drawings and diagrams to solve a problem and to document its solution (k)
C.5. set up and use a spreadsheet to carry out repetitive calculations using formula (k)
C.6. explain and use appropriate spreadsheet functions in solving engineering problems (k)
C.7. calculate and use descriptive statistics and plot histograms (k)
C.8. produce and use clear and effective computer graphs (k)
C.9. clearly format a spreadsheet calculation to communicate a problem solution (k)

ENGR 127 covers ABET outcomes (a), (b), (d), (f), (i), and (k).

[2] The letters in parentheses correspond to ABET program outcomes. ABET outcomes are listed in the Appendix A. Note: ABET outcomes changed in the spring of 2018, and these changes will be reflected in the 2018-2019 report.

A student who successfully completes ENGR 12800: Engineering Fundamentals II will be able to:[3]

Analysis & Success Outcomes

A.1. formulate and solve engineering problems using complex numbers (a)
A.2. formulate and solve engineering problems using sign waves & frequency (a)
A.3. formulate and solve engineering problems using integration (a)
A.4. formulate and solve engineering problems using Boolean Logic (a)
A.5. formulate and solve engineering problems using log graphing and transformations (a)
A.6. formulate and solve engineering problems using simple differential equations (a)

Project Outcomes

B.1. plan and carry out a disciplined design project following a systematic design process (c)
B.2. utilize appropriate analytical and computer tools in project work (k)
B.3. write a precise and effective Technical Report Memo. Write clear Abstract, Methodology, Recommendations, and Conclusions sections (g)
B.4. prepare and deliver an effective oral technical presentation (g)
B.5. organize an effective team including setting ground rules, project planning, and task management; explain and utilize effective group processes (d)

Computer Outcomes

C.1. solve engineering problems using computer tools (k)
C.2. apply arrays and array manipulations (k)
C.3. use and explain text variables and ASCII text files (k)
C.4. write a function with multiple inputs and outputs at the command line (k)
C.5. write a function that results in a non-numerical output (k)
C.6. write programs using logical expressions and conditional statements (k)
C.7. write programs using loop structures (k)
C.8. fit data that follows linear, exponential or power law forms (k)
C.9. properly communicate a solution based on computer calculation or program (g)

ENGR 128 covers ABET outcomes (a), (c), (d), (g), and (k).

[3] The letters in parentheses correspond to ABET program outcomes. ABET outcomes are listed in the Appendix A. Note: ABET outcomes changed in the spring of 2018, and these changes will be reflected in the 2018-2019 report.

Table 3 summarizes the relationship between the course outcomes and the ABET program outcomes. Each outcome is mapped to the FYE program courses based on the degree to which the outcome is addressed using a scale of Low (L), Medium (M), or High (H).

Table 3. Mapping of course outcomes to ABET outcomes

Course	ABET Outcomes										
	a	b	c	d	e	f	g	h	i	j	k
ENGR 12700 Engineering Fundamentals I	H	M		H	L	H	M		L		H
ENGR 12800 Engineering Fundamentals II	H		M	H	L	L	H				H

During the spring 2018 semester, the FYE Committee revised the mapping of ABET Outcomes to program and course outcomes in order to reflect the new ABET Outcomes 1-7. These changes will be incorporated starting in the fall 2018 semester.

Assessment Measures and Evaluation

According to the FYE Assessment Plan, the FYE program outcomes and course learning outcomes are to be assessed using the following direct and indirect measures:

- **Direct Measures**
  1. Faculty assessment of course outcomes
  2. Student performance in subsequent courses
     - ECE 20100
     - CE 25000
     - ME 25000
- **Indirect Measures**
  1. Student assessment of course outcomes
  2. FYE program exit interview – given to students at the end of ENGR 12800 to assess classrooms, equipment, computer, software, and overall program outcomes
  3. Engineering program exit survey

In the next two sections, the assessment results for the fall 2017 and spring 2018 semesters are summarized and discussed.

In addition, on an ongoing basis, the first-year engineering committee will collect data and will study issues related to the first-year engineering program. Data related to the math placement and spatial visualization abilities of incoming students is reported.

Direct Measures

Faculty assessment of course outcomes

For the fall 2017 semester, all faculty who completed assessments indicated that, on average, all outcomes were met across the three components (analysis, project, and computer) for ENGR 12700. The faculty reports are included in Appendix F.

A faculty suggestion for ENGR 12700 course improvement was to make computer lab material more directly related to engineering applications as well as the course material covered in the studio and lecture portions. To address this, the CME FYE Coordinator adapted existing lab materials to remove redundant problems, emphasize multiple solution methods, and link to real world engineering applications.

During the spring 2018 semester, ENGR 12800 instructors indicated minor issues within the three course components. For the ENGR 12800 lecture component, the instructors has the following comments about student performance:

1. Students had lots of difficulty with integration of discontinuous functions, i.e. one that has segments, each defined by a different function. Extensive coverage of this type of integration was carried out during the lecture, homework, midterm exam and final exam, still less than 70% students could get it right.
2. Students had difficulty with second order differential equations, in particular using the initial conditions to determine the unknown constants of the general solution. Once the function is determined they also have difficulty in using the solution to answer further questions about the system that the solution function is modeling.
3. As the semester went on students attended less and less the lectures and didn't do the homework.

The lecture instructors suggested the following to help student performance.

1) Student attendance went downhill the second half of the semester which contributed a lot to their underperformance in the topics mentioned in (1) and (2) above.

2) Perhaps random 10 minutes quizzes to sharpen their attention and attendance has to be introduced to improve their focus on important topics such as integration.

3) Not directly related to the lectures but there were several students (more than just a few) that missed studio and in particular lab reports which impacted severely on their final grade.

In ENGR 12800 studio, an instructor found that students did not achieve Project Outcome 2 (project work) in one section while students in another section achieved this outcome strongly. One of the reasons for this difference is that in the section where the outcome was not achieved students did not turn in all stages of their project. From observation the instructor noticed some students were confused by details in the design process and by having multiple items due at the same time. In order to address these issues, the instructor suggests introducing the design process earlier in the term, simplifying some stages and eliminating multiple submissions on the same day.

In ENGR 12800 Computer lab, an instructor found students did not achieve Computer Outcome 2 (arrays) and Outcome 5 (functions with non-numerical output) in one section and did not achieve Computer Outcome 2 (arrays) and outcome 7 (loops) in multiple sections. Outcome 2 is the main concern because it appeared in both sections and because poor understanding of arrays could hurt student understanding of later subjects. From observation the instructor noticed that students where not getting the early concepts adequately to perform well as the course built on those ideas. The instructor suggests rearranging some of the first labs to ground students in the basic concepts, particularly moving text variables earlier and using it to emphasize basic variables and their use before introducing functions.

The received faculty reports are included in Appendix F.

Student performance in subsequent courses

Figures 1-3 show the percentage of students who successfully completed key sophomore-level courses, e.g. ME/CE 25000, ECE 20100, and ME 20000. Successful completion is indicated by a final course grade of A, B, or C. The remainder of the students finished the course with D, F, or W (withdraw).

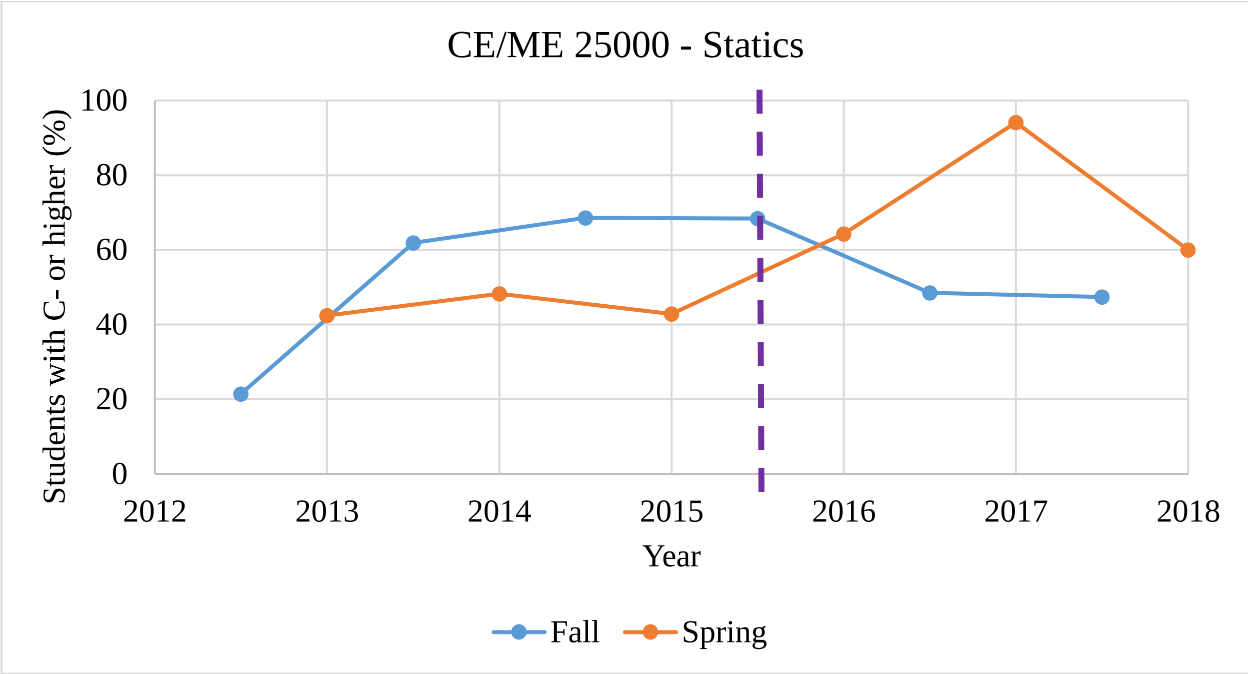


Figure 1. Percentage of students with grade of C- of higher in CE/ME 25000 fall 2012 - spring 2018

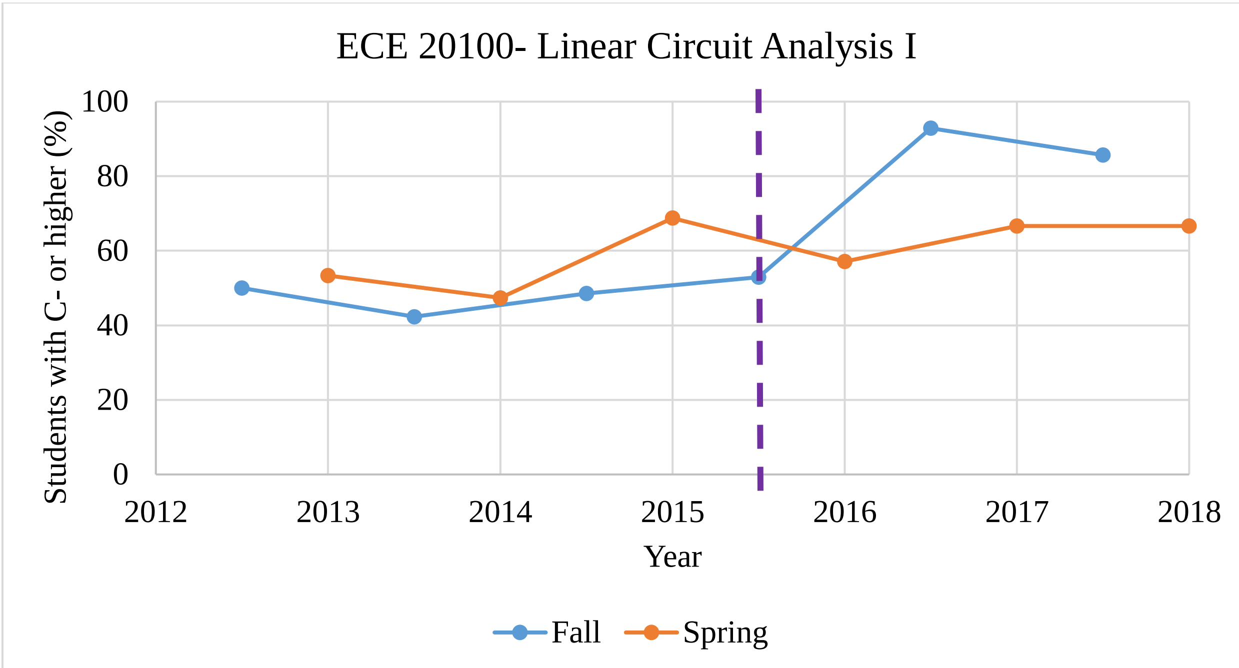


Figure 2. Percentage of students with grade of C- of higher in ECE 20100 fall 2012 - spring 2018

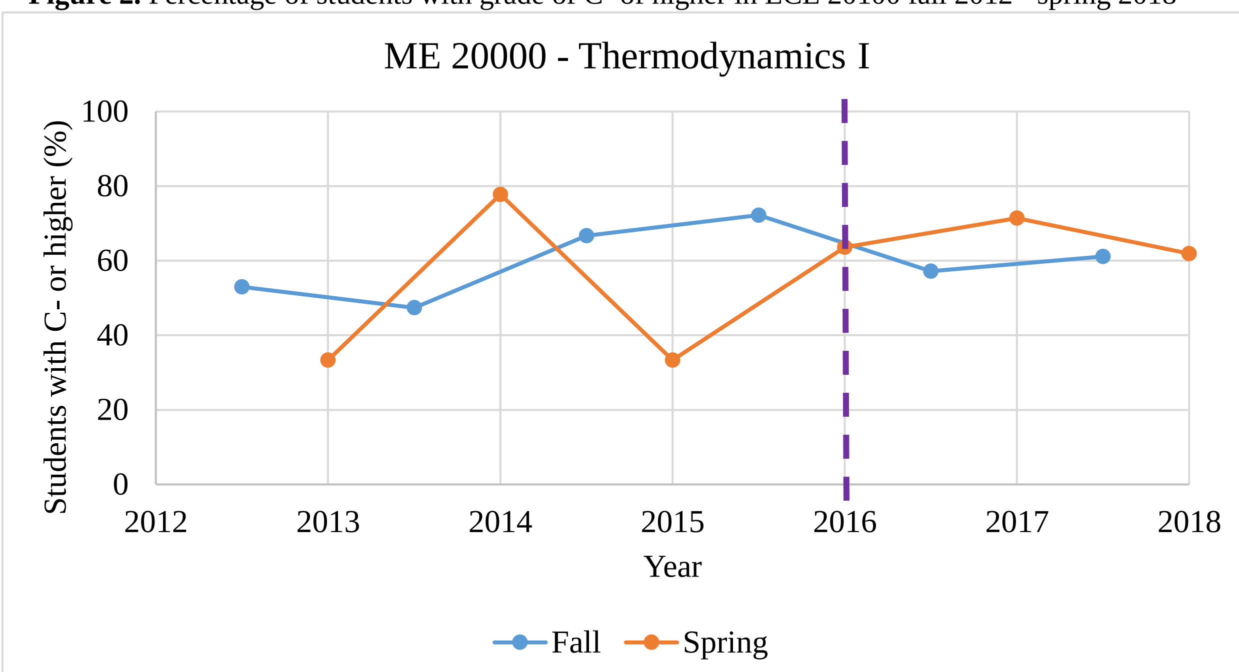


Figure 3. Percentage of students with grade of C- of higher in ECE 20100 fall 2012 - spring 2018

Indirect Measures

Student assessment of course outcomes

An online assessment instrument has been developed for students to record perceived achievement of the course outcomes. Students rated achievement outcomes on a Likert scale of 1-4. Results from the student assessment surveys are shown in Figures 4 – 9. Results are divided by course as well as by course component, and a list of the component outcomes corresponding to each graph are included. Figures 4-6 pertain to ENGR 12700 and Figures 7 – 9 pertain to ENGR 12800. These outcomes were previously presented in the Course Outcomes section of this document including which ABET outcome each course outcome addresses.

ENGR 12700 students were surveyed in the fall 2017 semester, and ENGR 12800 students were surveyed in the spring 2018 semester. The faculty assessment of course outcomes coincides with the student assessment of course outcomes.

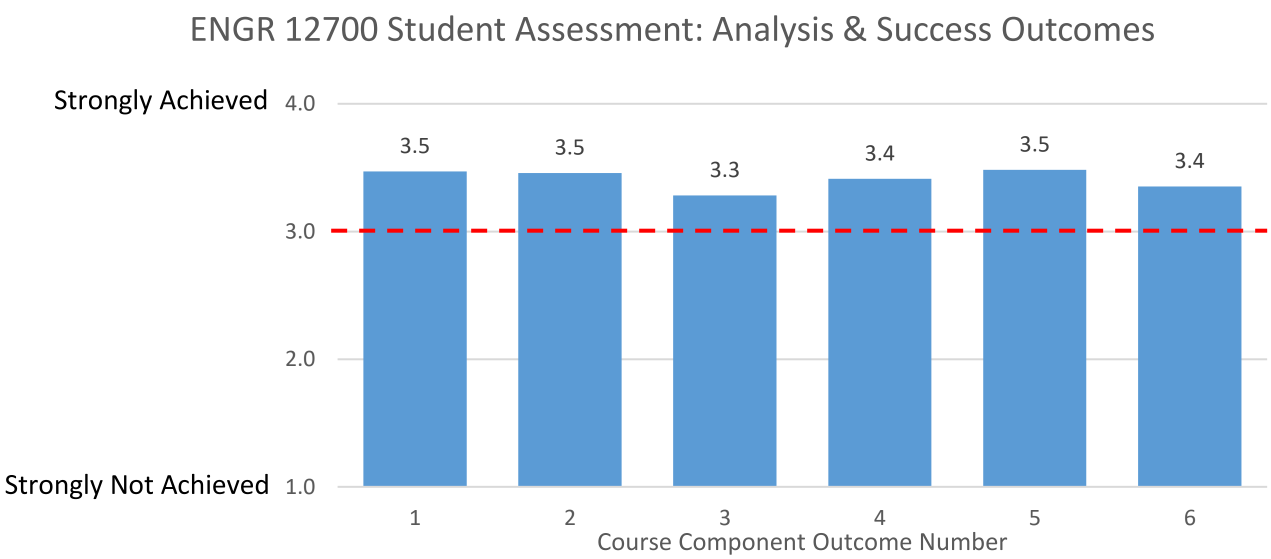


Figure 4. Student assessment of ENGR 12700 – Analysis and Success Outcomes

<u>ENGR 12700 Analysis & Success Outcomes</u>

A.1. formulate and solve engineering problems using linear and quadratic equations

A.2. formulate and solve engineering problems using trigonometry in planar systems

A.3. formulate and solve engineering problems using descriptive statistics

A.4. formulate and solve engineering problems using derivatives

A.5. formulate and solve engineering problems using systems of equations

A.6. explain and apply appropriate study and success strategies, concepts & habits to be successful in an engineering major and exhibit the work ethic necessary to succeed in engineering

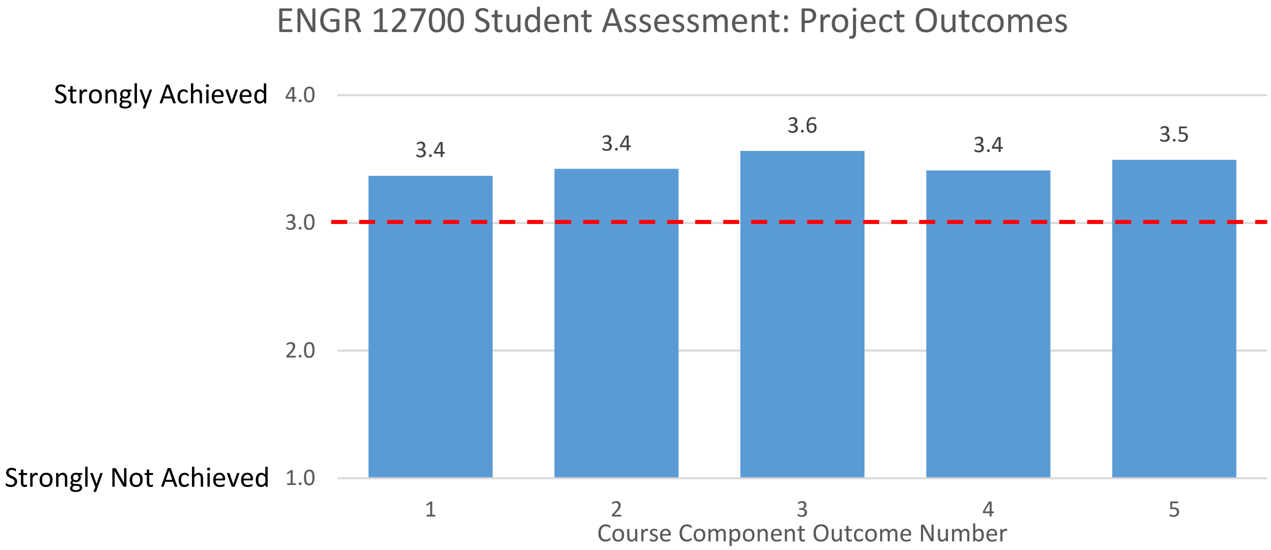


Figure 5. Student assessment of ENGR 12700 – Project Outcomes

<u>ENGR 12700 Project Outcomes</u>

B.1. plan and carry out a disciplined experimental study following a systematic project process of project planning and management

B.2. utilize appropriate analytical and computer tools in project work

B.3. communicate effectively using simple memos, properly formatted tables and properly formatted figures following an engineering format and style guideline

B.4. identify and demonstrate the behaviors of an effective team member and/or leader, prepare a project schedule

B.5. explain and apply the concepts of professional and ethical responsibility, evaluate ethical issues in engineering practice in terms of a Code of Ethics and apply to ethics as an engineering student

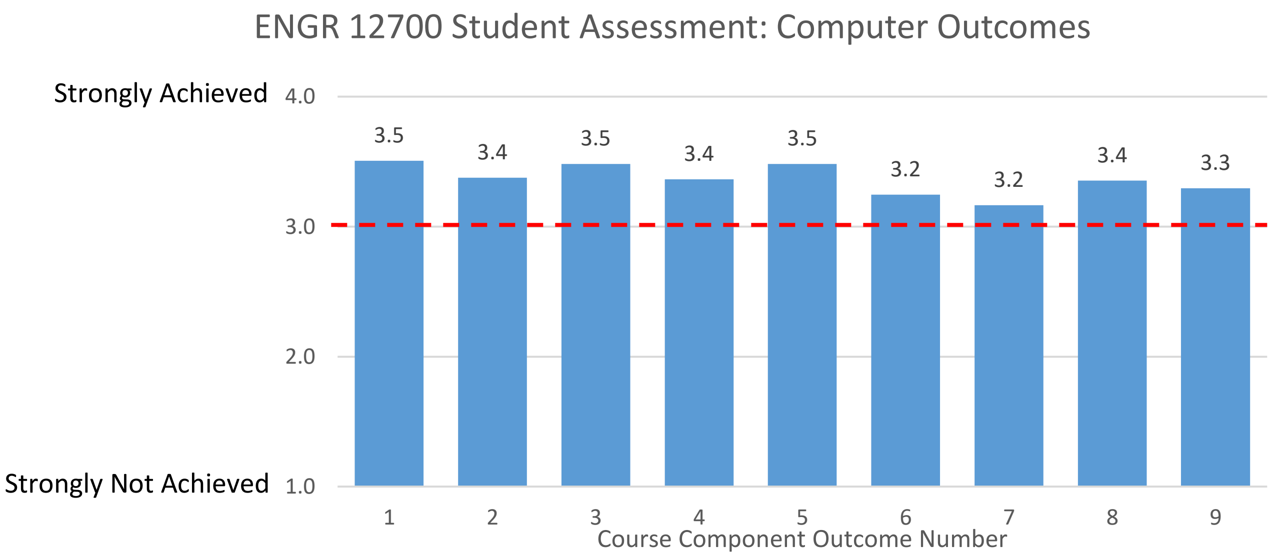


Figure 6. Student assessment of ENGR 12700 – Computer Outcomes

ENGR 12700 Computer Outcomes

C.1. represent a physical object in single-view and multi-view orthographic projections
C.2. dimension parts according to convention
C.3. create pictorial (isometric) representations of a physical object
C.4. create and use drawings and diagrams to solve a problem and to document its solution
C.5. set up and use a spreadsheet to carry out repetitive calculations using formula
C.6. explain and use appropriate spreadsheet functions in solving engineering problems
C.7. calculate and use descriptive statistics and plot histograms
C.8. produce and use clear and effective computer graphs
C.9. clearly format a spreadsheet calculation to communicate a problem solution

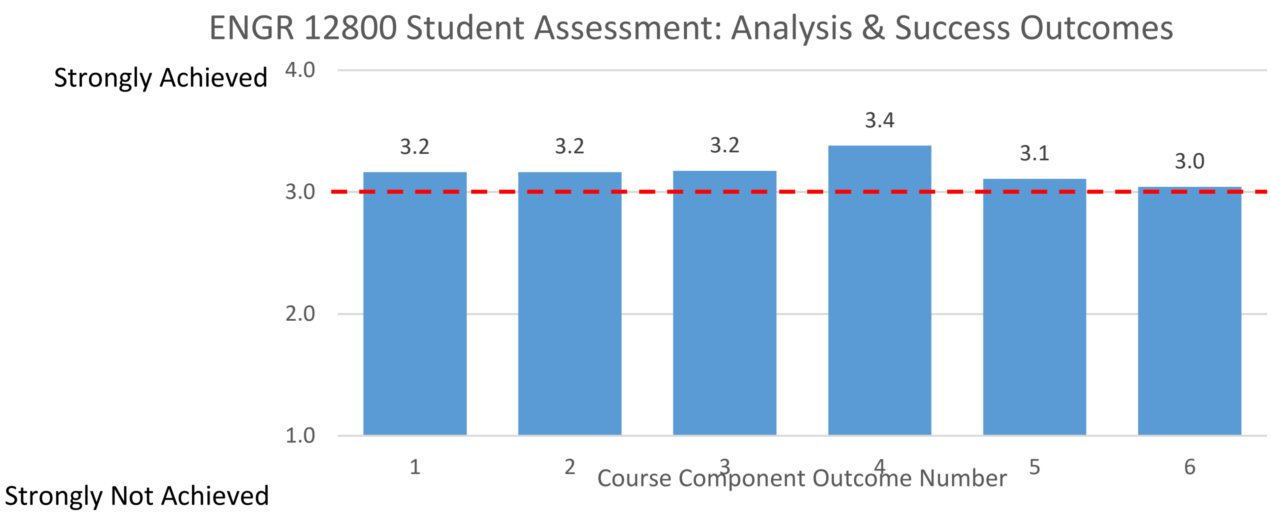


Figure 7. Student assessment of ENGR 12800 – Analysis and Success Outcomes

ENGR 12800 Analysis & Success Outcomes

A.1. formulate and solve engineering problems using complex numbers
A.2. formulate and solve engineering problems using sign waves & frequency
A.3. formulate and solve engineering problems using integration
A.4. formulate and solve engineering problems using Boolean Logic
A.5. formulate and solve engineering problems using log graphing and transformations
A.6. formulate and solve engineering problems using simple differential equations

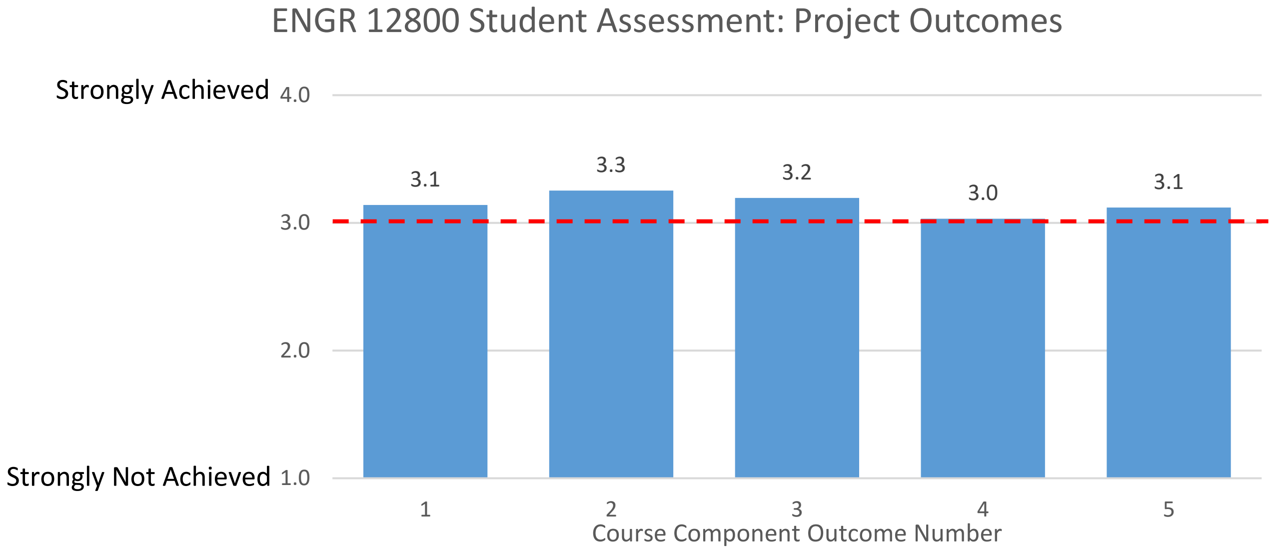


Figure 8. Student assessment of ENGR 12800 – Project Outcomes

<u>Project Outcomes</u>

B.1. plan and carry out a disciplined design project following a systematic design process
B.2. utilize appropriate analytical and computer tools in project work
B.3. write a precise and effective Technical Report Memo. Write clear Abstract, Methodology, Recommendations, and Conclusions sections
B.4. prepare and deliver an effective oral technical presentation
B.5. organize an effective team including setting ground rules, project planning, and task management; explain and utilize effective group processes

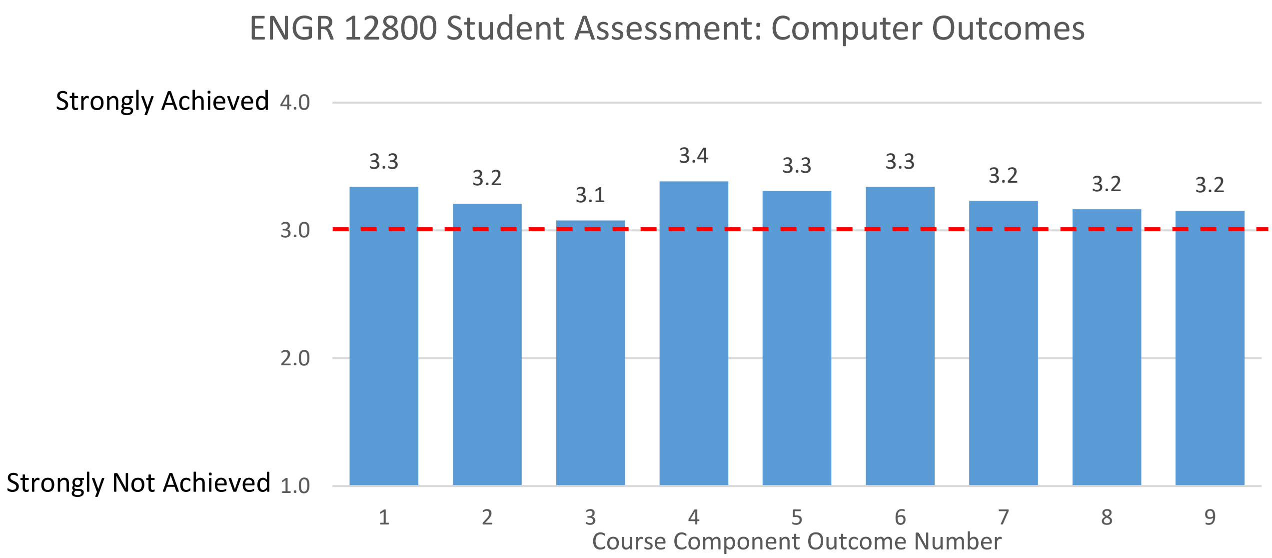


Figure 9. Student assessment of ENGR 12800 – Computer Outcomes

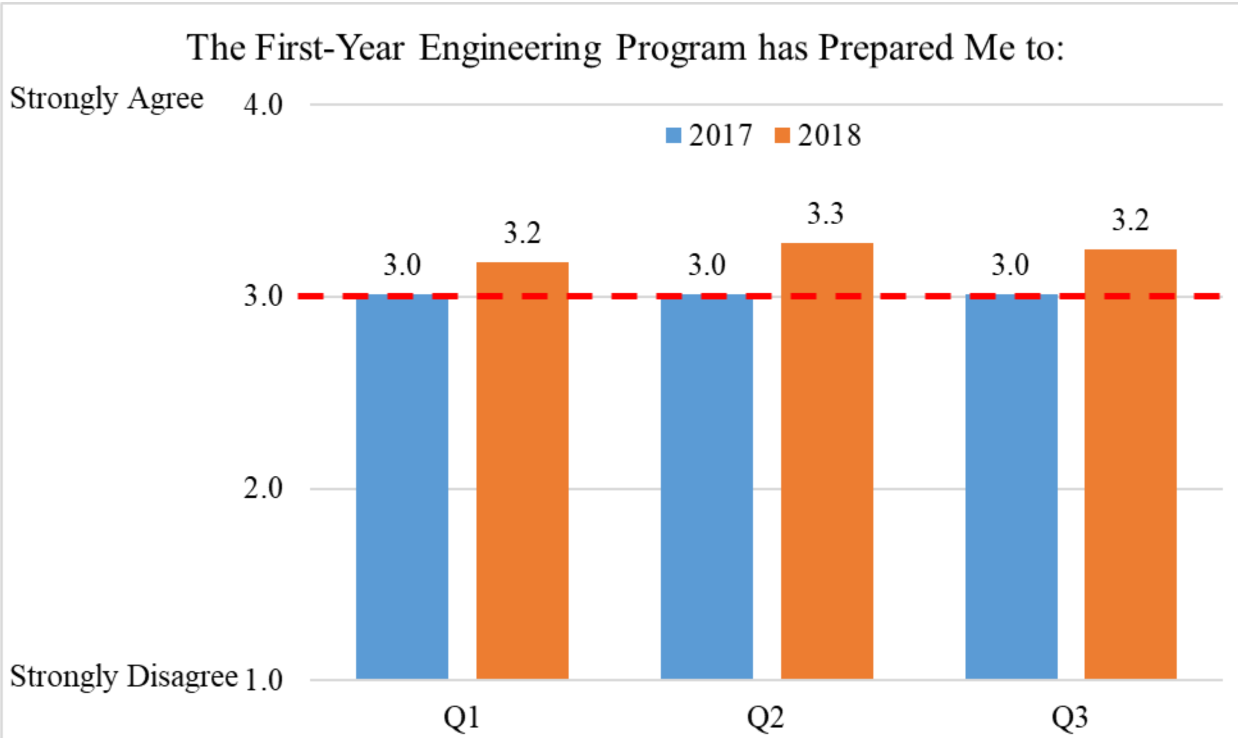
Computer Outcomes

C.1. solve engineering problems using computer tools
C.2. apply arrays and array manipulations
C.3. use and explain text variables and ASCII text files
C.4. write a function with multiple inputs and outputs at the command line
C.5. write a function that results in a non-numerical output
C.6. write programs using logical expressions and conditional statements
C.7. write programs using loop structures
C.8. fit data that follows linear, exponential or power law forms
C.9. properly communicate a solution based on computer calculation or program

Note: According student assessment of course outcomes, all outcomes are being achieved, as indicated by a score of 3.0 or higher.

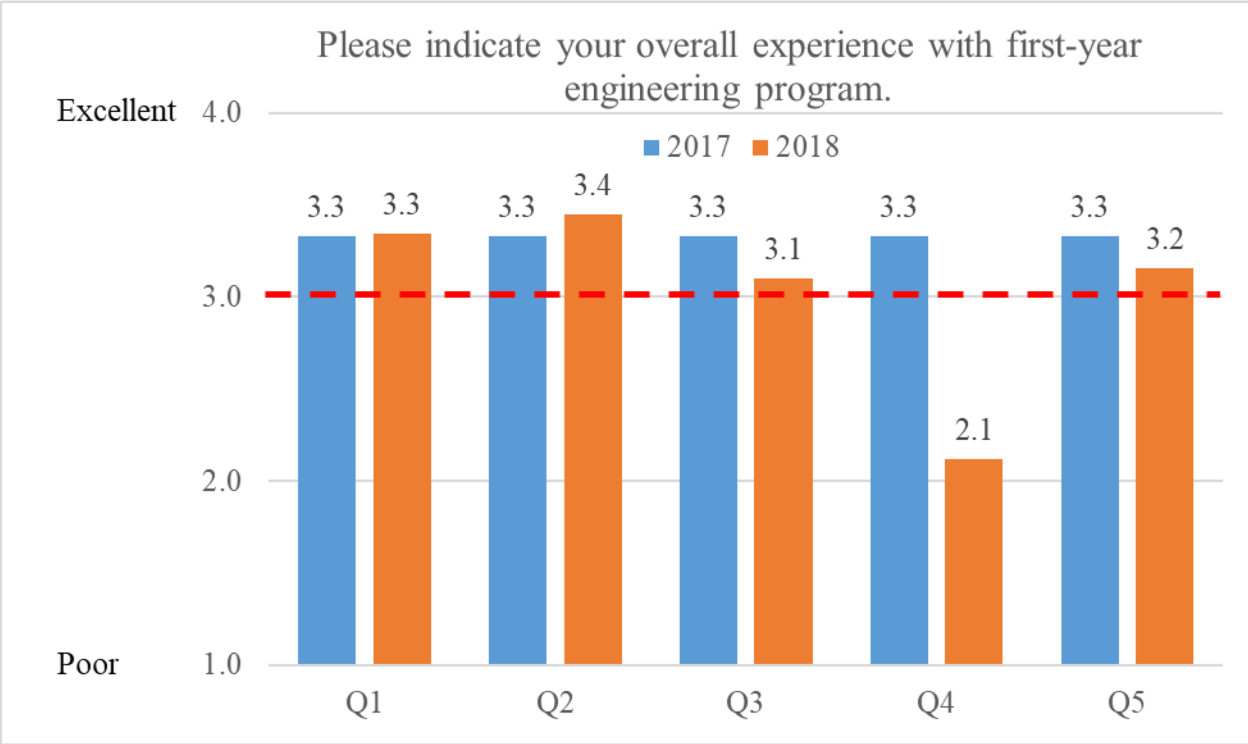
FYE Program Exit Survey

At the completion of ENGR 12800, students were given a survey to assess classrooms, equipment, computer, software, and overall FYE program outcomes and issues. Results are summarized in Figures 10 and 11. The questions on the FYE program exit interview are listed in Appendix D and included below the graphs.



The first-year engineering program has prepared me to:		strongly disagree			strongly agree
1	solve and document the solution of problems involving different elements or configurations not previously encountered (e.g. a new geometric arrangement, a new term to include in an analysis, a new type of starting condition)	1	2	3	4
2	solve problems using multiple approaches including (e.g., equations including varied analytic approaches, diagrams, formal solution steps or simple computer programs)	1	2	3	4
3	describe the broad nature of various engineering majors and the engineering profession and use this information to make appropriate career choices	1	2	3	4

Figure 10. Results of FYE Exit Survey questions related to outcomes—average responses from n= 38 students in spring 2017 and n=72 in spring 2018.



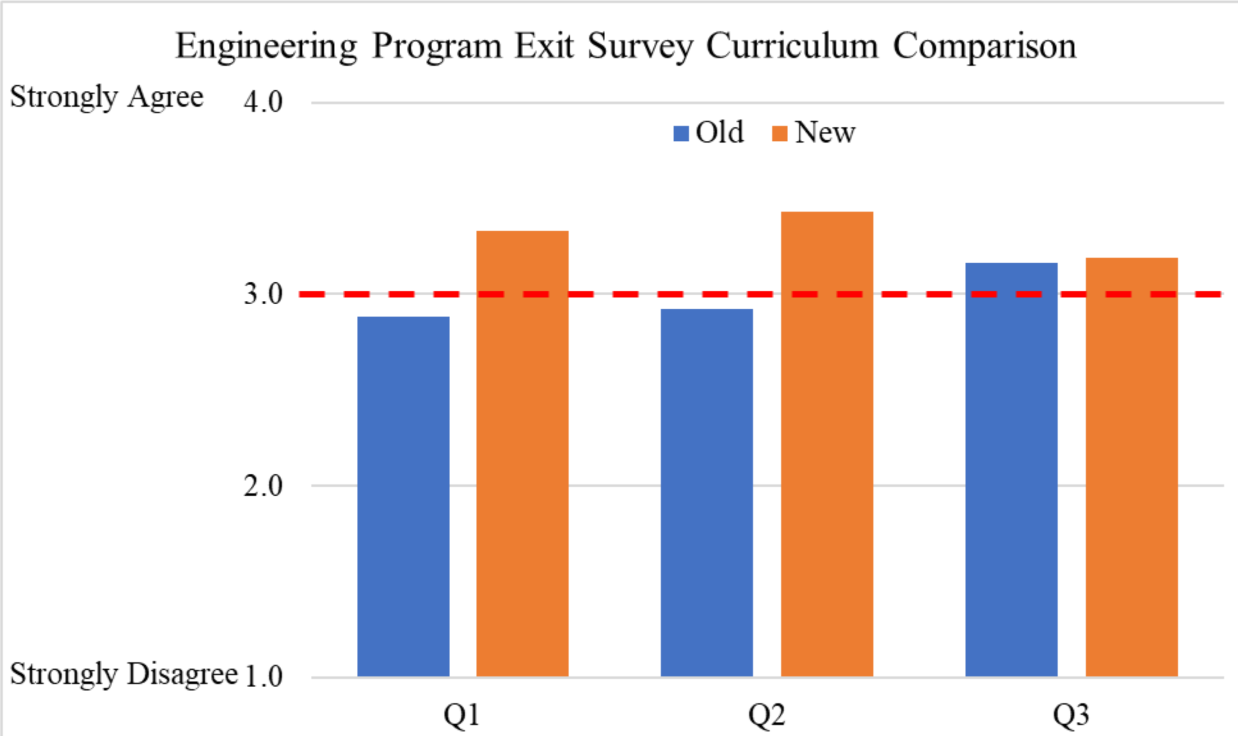
Please indicate your overall experience with first-year engineering program.		**poor**			**excellent**
1	Computer lab hardware is …	1	2	3	4
2	Computer lab software is …	1	2	3	4
3	Studio space is ….	1	2	3	4
4	Textbooks are ….	1	2	3	4
5	The first-year engineering program is …	1	2	3	4

Figure 11. Results of FYE Exit Survey questions related to experiences— average responses from n= 38 students in spring 2017 and n=72 in spring 2018.

Engineering Program Exit Survey

Questions related to the first-year engineering program will be given to all students graduating from an engineering program starting in the fall 2017. Results from these surveys are shown in Figure 12.

The questions on the engineering program exit survey related to the first-year engineering program are listed in Appendix E and included below the graphs.



		strongly disagree			strongly agree
1	The first-year engineering program has provided me with the basic soft-skills, e.g., communications, teamwork, time-management, etc., to be successful in the engineering program.	1	2	3	4
2	The first-year engineering program has provided me with the basic problem-solving skills to be successful in the engineering program.	1	2	3	4
3	The first-year engineering program has provided me with the fundamental computer skills to be successful in the engineering program.	1	2	3	4

Figure 12. Results of the Engineering Exit Survey questions— average responses from n=25 students who completed the old FYE curriculum and n=21 students who completed the current FYE curriculum.

Additional Measures

Mathematics Placement: Impact of Dual Credit on Student Success in the FYE Program

Over the last several years, high schools have increasingly developed dual credit courses that transfer to college. As a result, an increasing number of students are not taking Purdue Fort Wayne's mathematics placement test but are placing in their first mathematics course based on dual credit courses from high school. In the fall of 2017 over half of the students in ENGR 12700 received their mathematics placement based on a dual credit course. Based on interactions with some students there was concern that some dual credit students were not prepared for their mathematics course. Mathematics placement has a direct impact on ENGR 12700 because of the course's mathematics prerequisite and the analytical content of the course.

A preliminary study was conducted for the 2016-2017 FYE Program Assessment Report to examine the success of students based on the way they were placed in their first mathematics course. Because of their importance, the results of the study are also included within this report. No new data nor analysis is being presented for the 2017-2018 study year.

For the 2016-2017 study, students were divided into three groups based on their mathematics placement:

1. **Test:** Students in this group were placed by Purdue Fort Wayne's Accuplacer test or through a successful AP exam score
2. **Dual Credit (with grade of A or B):** Students in this group where placed based on dual credit where they had received an A or a B in the prerequisite dual credit course.
3. **Dual Credit (with grade of C):** Students in this group where placed based on dual credit where they had received a C in the prerequisite dual credit course.

Each student's percent score (out of 100%) in the ENGR 12700 course was estimated through November.

Table 4 shows the number of students in each group. A total of 96 students were included in this sample (roughly the continuing enrollment at this point in the term). These came from six sections of the course involving multiple instructors.

Table 4: Sample sizes for each placement group for dual credit study

Placement Method	Number	Percent
Test	41	43%
Dual Credit (with A or B)	35	36%
Dual Credit (with C)	20	21%
Total	96	100%

Figure 12 shows a box pot of the score distribution for each group. As is typical for this type of plot the box shows the inner quartile range, i.e. the middle half of the student scores. The line in the middle of the box is the media score for the group.

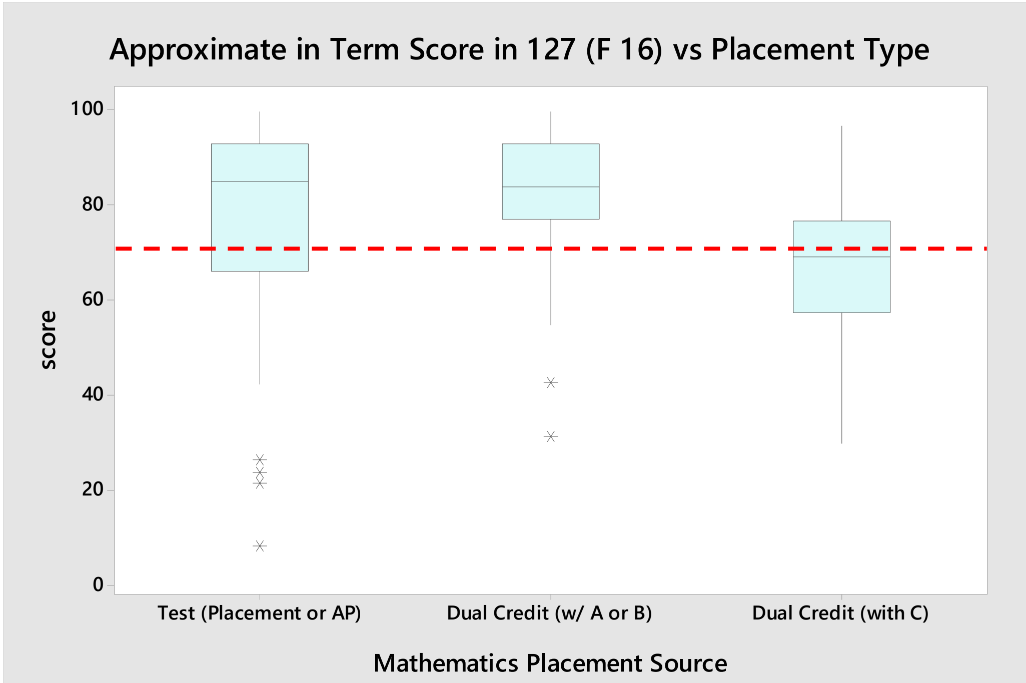


Figure 12: Box plot of student performance through November in ENGR 12700 based on their mathematics placement method. This data raises concern about the preparation of students being placed by a dual credit course in which they received a C.

The first two groups (students placed by test and students placed by dual credit with an A or B grade) have essentially equivalent median scores where the third group (students placed by dual credit with a C grade) has a median score that is approximately 20% lower. This third group represents more than 20% of the students in our first-year course.

Note also that the second group (dual credit with A or B) showed a narrower distribution resulting in almost 3/4 of these students scoring in an A or B range.

The results of students with an A or B grade in a dual credit are encouraging. These students may be performing better than students place by the usual placement test. However, the results for students with a C are concerning. A majority of these students were a low C or lower in their grade at this point in the course.

Recommended Follow up

1. Advise students with a C in a dual credit course used to place them in mathematics to take our placement test and/or repeat the dual credit course to make sure they have command of the material.
2. Continue to monitor the impact of placement on student's success. Plan an expanded study to take a broader look at these placement issues.

FYE Program Retention between ENGR 12700 and ENGR 12800

In the fall 2018, ENGR 12700 instructors (also members for the FYE committee) targeted the low retention rates between ENGR 12700 and ENGR 12800. In an attempt to increase student engagement, three student success topics were added to the ENGR 12700 course: (1) Campus Resources for Course Help, (2) Time Management, and (3) Participation in Campus Activities. For each topic, instructors used a combination of an in-class presentation paired with a take-home assignment for students. The activities were designed to introduce the students to important student success topics, give them an opportunity to interact with important personel on campus, and help motivate them to overcome the initial awkardness new students can feel when trying new activities on a new campus. The specifics of each activity include:

1. Campus Resources: Representatives from the Student Success Center presented information about the different course help available to students on campus. The presentation highlighted two free campus tutoring centers, described professor office hours, and gave the students an opporunity to meet the Student Success Center advisors. The students were assigned to go to any office hours or tutoring before the first midterm. They were required to get the instructor's or tutor's signature as well as answer four short reflection questions.
2. Time Management: The College of Engineering Dean gave a presentation to the students about the importance of time management. The follow-up assignment had students complete a time budget of their weekly schedule and write a short reflection about the results.
3. Participation in Campus Activities: Involvement in campus activities are beneficial to students' college experience and potentially their future careers. To introduce students to some campus activities available to them, instructors presented slides prepared by student organizations. The students were then assigned to choose two campus activities to attend before the second midterm and complete four reflection questions. The presentations only highlighted engineering related student groups, but students were allowed to go to any campus activity for the assignment.

Figure 13 shows the retention rates for the last three years of ENGR 12700-12800. Retention for this analysis was defined as the percent of student who took ENGR 12700 during the fall semester and also took ENGR 12800 during the following spring semester.

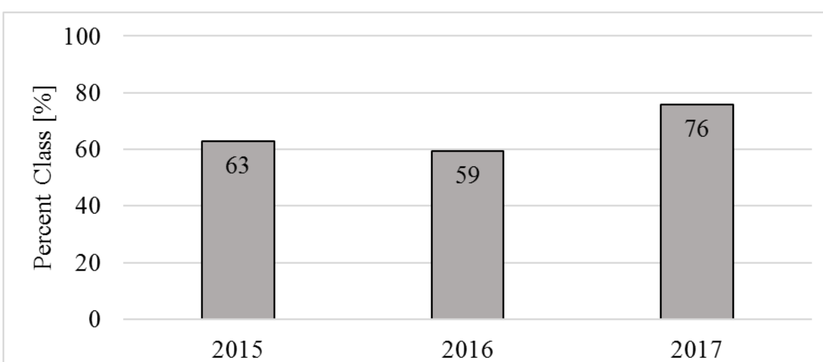


Figure 13. Retention rates of FYE students between ENGR 12700 and ENGR 12800

In prior semesters, approximately 60% of students who took ENGR 12700 in the fall semester also took ENGR 12800 the following spring semester. Following the implementation of the engagement activities in ENGR 12700, student retention rose to 76%. These results are promising and the committee plans to continue with retention efforts in future semesters.

ABET Program Accreditation Report

During the fall of 2017, the engineering programs at Purdue University Fort Wayne underwent their reaccreditation process. As part of the assessment, evaluators were provided with the 2016-2017 FYE Assessment report and course documents for ENGR 12700 and 12800 including syllabi, assignments, and student work. In the final statement, evaluators included the following remark about the First-Year Engineering Program:

> "A dedicated first-year engineering program is used to refresh and reinforce students' foundational skills. In this first-year program, students receive valuable instruction on computerized design, gain significant lab experience, and learn about careers associated with various engineering disciplines. This unique approach to providing key fundamental information and instruction to students as early as possible strengthens their skills and better prepares them to excel in their studies and future careers." – pg 8

This external review of the FYE program highlights the program's continued dedication to helping new engineering students succeed in their chosen majors. No areas of improvement were indicated by the reviewers.

Concluding Remarks

The results of the assessment process described in this report indicate that *course and program outcomes related to first-year engineering are being achieved*. Specifically,

- Student and faculty assessment indicate that overall the course outcomes are being achieved.
- Student success within subsequent sophomore-level courses showed an increase in two out of three courses evaluated.
- When looking at the first-year engineering exit survey results, students showed satisfaction in all assessed areas except the textbook. Upon further investigation of the student comments, it appears that students did not understand the survey covered both ENGR 12700 and ENGR 12800 because many comments stated the course did not require a textbook which is only true for the ENGR 12800 course. This mistake is understandable given the number of surveys students are given at the end of the semester, so greater emphasis on the scope of the exit survey provided by the administrator is recommended in future semesters.

Additional FYE program studies reveal that:

1. A previous study indicated that students with a grade of C in dual-credit math courses might not be prepared for success in an engineering program.
2. Retention rates within the FYE program increased by 16% over the last school year.
3. ABET evaluators highlighted the strengths of the FYE program in their Final Statement granting reaccreditation to the engineering programs at Purdue Fort Wayne. No areas for improvement were indicated.

Efforts to close-the-loop with regards to issues from previous semesters include:

1. Lab materials for ENGR 12700 were adjusted to better convey real world example problems as well as emphasize the multiple methods available to solve problems.

2. Activities were developed to better coordinate the lab and studio material to allow students to practice concepts in multiple contexts.

Topics for the FYE engineering committee to consider in 2018-2019 include:

1. Additional study between math placement and student performance. The committee plans to investigate the possibility of requiring the math placement test or AP exam for admission into an engineering program.

2. Making slight modifications to scheduling to better accommodate students and avoid scheduling conflicts with other required courses.

Appendix A: ABET Student Learning Outcomes

A student who successfully completes the program will have demonstrated

(a) an ability to apply knowledge of mathematics, science, and engineering

(b) an ability to design and conduct experiments, as well as to analyze and interpret data

(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

(d) an ability to function on multidisciplinary 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) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

(i) a recognition of the need for, and an ability to engage in life-long learning

(j) a knowledge of contemporary issues

(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Appendix B: Purdue Fort Wayne's Baccalaureate Framework

Students who earn a baccalaureate degree at Purdue Fort Wayne will be able to apply their knowledge to the needs of an increasingly diverse, complex, and dynamic world. To that end, Purdue Fort Wayne continually develops and enhances curricula and educational experiences that provide all students with a holistic and integrative education.

The Purdue Fort Wayne faculty has identified six foundations of baccalaureate education.

1. Acquisition of Knowledge

Students will demonstrate breadth of knowledge across disciplines and depth of knowledge in their chosen discipline. In order to do so, students must demonstrate the requisite information-seeking skills and technological competencies.

2. Application of Knowledge

Students will demonstrate the ability to integrate and apply that knowledge, and, in so doing, demonstrate the skills necessary for life-long learning.

3. Personal and Professional Values

Students will demonstrate the highest levels of personal integrity and professional ethics.

4. A Sense of Community

Students will demonstrate the knowledge and skills necessary to be productive and responsible citizens and leaders in local, regional, national, and international communities. In so doing, students will demonstrate a commitment to free and open inquiry and mutual respect across multiple cultures and perspectives.

5. Critical Thinking and Problem Solving

Students will demonstrate facility and adaptability in their approach to problem solving. In so doing, students will demonstrate critical-thinking abilities and familiarity with quantitative and qualitative reasoning.

6. Communication

Students will demonstrate the written, oral, and multimedia skills necessary to communicate effectively in diverse settings.

These foundations provide the framework for all baccalaureate degree programs. The foundations are interdependent, with each one contributing to the integrative and holistic education offered at Purdue Fort Wayne.

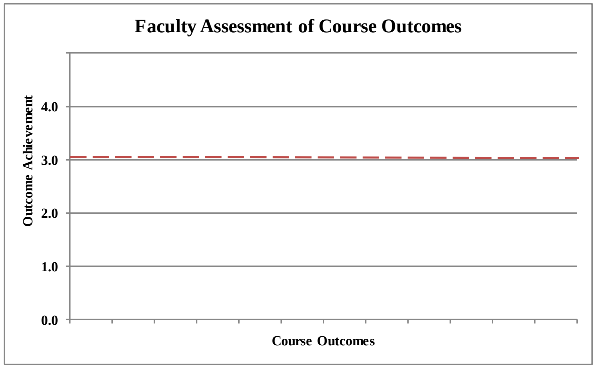
Appendix C: Faculty Assessment of Course Outcomes Form

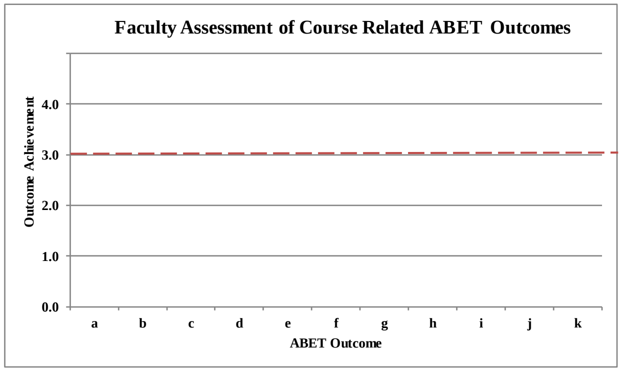
Faculty Assessment of Course -

Course:
Semester: **Section:** ________________ **Instructor:** **Number of Students:** __________

Outcomes		Faculty Assessment						
		Tools Used			Course Outcome Achieved?	Criteria Used		
Course	ABET	1	2	3		criterion	Limit	Value

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

Appendix D: FYE Program Exit Survey

When did you take each of the two first-year engineering courses (fall or spring and year)?

ENGR 12700 ___________________

ENGR 12800 ____________________

If you did not take one of these courses please list why (e.g. credit, 2+3 program, transfer credit,…)

What do you see to be the key goals of the first-year engineering courses (ENGR 12700 & 12800)? Please list:

Describe how you used material from one of these courses in another course.

	The first-year engineering program has prepared me to:	strongly disagree			strongly agree
1	solve and document the solution of problems involving different elements or configurations not previously encountered (e.g. a new geometric arrangement, a new term to include in an analysis, a new type of starting condition)	1	2	3	4
2	solve problems using multiple approaches including (e.g., equations including varied analytic approaches, diagrams, formal solution steps or simple computer programs)	1	2	3	4
3	describe the broad nature of various engineering majors and the engineering profession and use this information to make appropriate career choices	1	2	3	4

Please indicate your overall experience with first-year engineering program.		**poor**			**excellent**
1	Computer lab hardware is … Comments:	1	2	3	4
2	Computer lab software is … Comments:	1	2	3	4
3	Studio space is …. Comments:	1	2	3	4
4	Textbooks are …. Comments:	1	2	3	4
5	The first-year engineering program is … Comments:	1	2	3	4

Appendix E: Engineering program exit survey

The following questions will be added to each program's graduating senior exit survey:

		strongly disagree			strongly agree
1	The first-year engineering program has provided me with the basic soft-skills, e.g., communications, teamwork, time-management, etc., to be successful in the engineering program. Comments:	1	2	3	4
2	The first-year engineering program has provided me with the basic problem-solving skills to be successful in the engineering program. Comments:	1	2	3	4
3	The first-year engineering program has provided me with the fundamental computer skills to be successful in the engineering program. Comments:	1	2	3	4

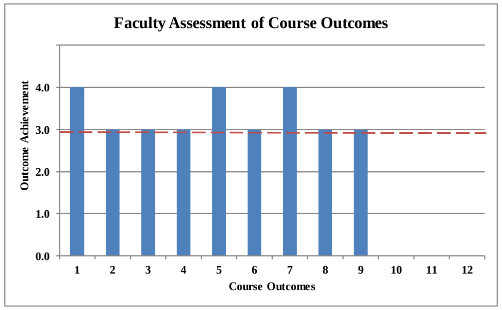
Appendix F: Faculty Assessment Reports for ENGR 12700 and ENGR 12800

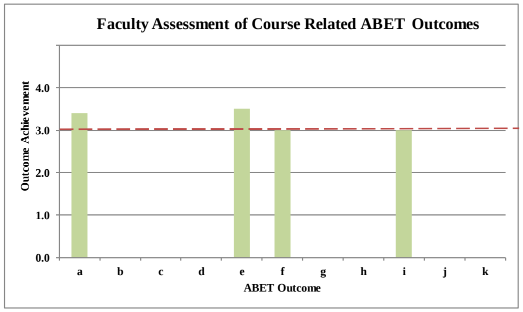
Faculty Assessment of Course - Fall 2017

Course: ENGR 12700 Analysis
Instructor: Essig
Semester: Fall 2017
Section: 02
Number of Students: 21

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	formulate and solve engineering problems using linear and quadratic equations	a	Midterm(s)			Yes, strongly	criterion 3	75%	90%
2)	formulate and solve engineering problems using trigonometry in planar systems	a	Midterm(s)			Yes, adequately	criterion 3	75%	90%
3)	formulate and solve engineering problems using descriptive statistics	a	Final Exam			Yes, adequately	criterion 3	75%	81%
4)	formulate and solve engineering problems using derivatives	a	Final Exam			Yes, adequately	criterion 3	75%	76%
5)	formulate and solve engineering problems using systems of equations	a	Midterm(s)			Yes, strongly	criterion 3	75%	100%
6)	explain and apply appropriate study and success strategies, concepts & habits to be successful in an engineering major and exhibit the work ethic necessary to succeed in engineering	i	Midterm(s)			Yes, adequately	criterion 3	75%	95%
7)	solve and document the solution of problems involving different configurations	e	Memo(s)			Yes, strongly	criterion 3	75%	95%
8)	solve problems using multiple approaches (e.g., equations including varied analytic approaches, diagrams, formal solution steps or simple computer programs)	e	Midterm(s)			Yes, adequately	criterion 3	75%	86%
9)	describe the broad nature of various engineering majors and the engineering profession and use this information to make appropriate career choices	f	Final Exam			Yes, adequately	criterion 3	75%	81%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

The only outcome almost not achieved was (4) which required students to apply derivatives to solve engineering problems. The first day of derivative applications, I was not able to teach class so I created an online activity with a worksheet. This section of class overwhelming did not complete the worksheet which I believe put them much further behind in comparison to the other sections. I believe this greatly hindered their ability to complete the exam questions used for the assessment.

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

Faculty Assessment of Course - Fall 2017

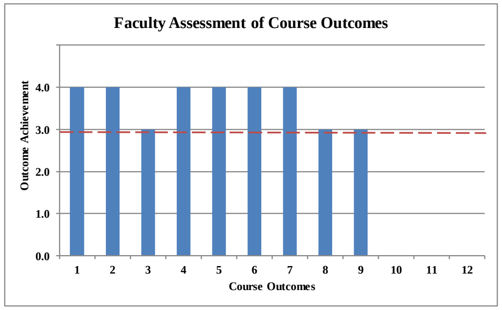
Course: ENGR 12700 Analysis
Semester: Fall 2017
Section: 04
Instructor: Essig
Number of Students: 21

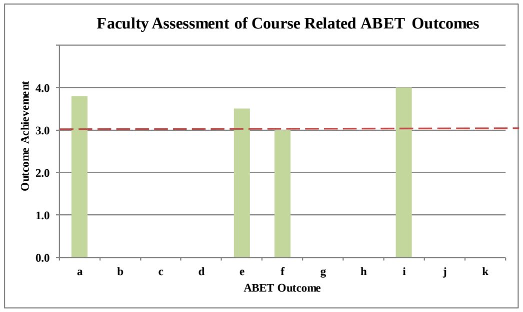
Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	formulate and solve engineering problems using linear and quadratic equations	a	Midterm(s)			Yes, strongly	criterion 3	75%	90%
2)	formulate and solve engineering problems using trigonometry in planar systems	a	Midterm(s)			Yes, strongly	criterion 3	75%	90%
3)	formulate and solve engineering problems using descriptive statistics	a	Final Exam			Yes, adequately	criterion 3	75%	86%
4)	formulate and solve engineering problems using derivatives	a	Final Exam			Yes, strongly	criterion 3	75%	90%
5)	formulate and solve engineering problems using systems of equations	a	Midterm(s)			Yes, strongly	criterion 3	75%	95%
6)	explain and apply appropriate study and success strategies, concepts & habits to be successful in an engineering major and exhibit the work ethic necessary to succeed in engineering	i	Midterm(s)			Yes, strongly	criterion 3	75%	90%
7)	solve and document the solution of problems involving different configurations	e	Memo(s)			Yes, strongly	criterion 3	75%	90%
8)	solve problems using multiple approaches (e.g., equations including varied analytic approaches, diagrams, formal solution steps or simple computer programs)	e	Midterm(s)			Yes, adequately	criterion 3	75%	86%
9)	describe the broad nature of various engineering majors and the engineering profession and use this information to make appropriate career choices	f	Final Exam			Yes, adequately	criterion 3	75%	86%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	

Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.





Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

Faculty Assessment of Course - Fall 2017

Course: ENGR 12700 Analysis
Semester: Fall 2017
Section: 05
Instructor: Essig
Number of Students: 24

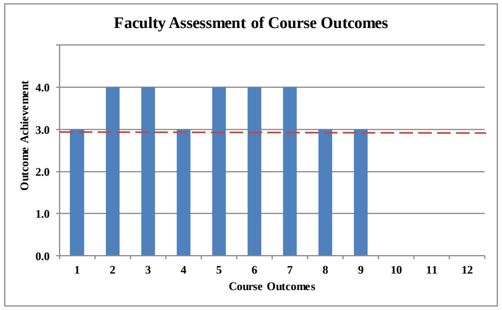
Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	formulate and solve engineering problems using linear and quadratic equations	a	Midterm(s)			Yes, adequately	criterion 3	75%	88%
2)	formulate and solve engineering problems using trigonometry in planar systems	a	Midterm(s)			Yes, strongly	criterion 3	75%	100%
3)	formulate and solve engineering problems using descriptive statistics	a	Final Exam			Yes, strongly	criterion 3	75%	92%
4)	formulate and solve engineering problems using derivatives	a	Final Exam			Yes, adequately	criterion 3	75%	79%
5)	formulate and solve engineering problems using systems of equations	a	Midterm(s)			Yes, strongly	criterion 3	75%	96%
6)	explain and apply appropriate study and success strategies, concepts & habits to be successful in an engineering major and exhibit the work ethic necessary to succeed in engineering	i	Midterm(s)			Yes, strongly	criterion 3	75%	92%
7)	solve and document the solution of problems involving different configurations	e	Memo(s)			Yes, strongly	criterion 3	75%	96%
8)	solve problems using multiple approaches (e.g., equations including varied analytic approaches, diagrams, formal solution steps or simple computer programs)	e	Midterm(s)			Yes, adequately	criterion 3	75%	79%
9)	describe the broad nature of various engineering majors and the engineering profession and use this information to make appropriate career choices	f	Final Exam			Yes, adequately	criterion 3	75%	88%

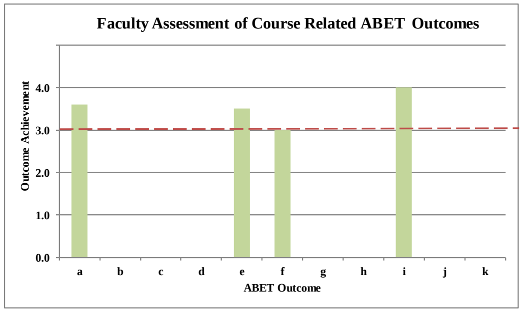
criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	

Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.



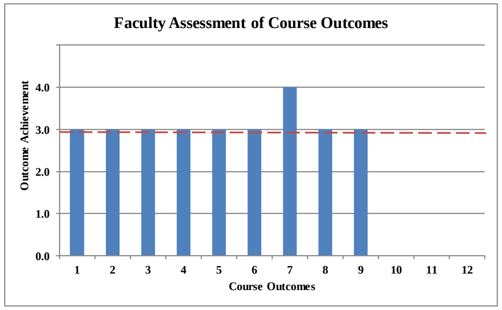


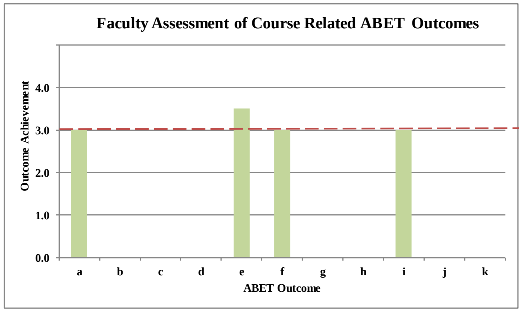
Faculty Assessment of Course - Fall 2017

Course: ENGR 12700 Analysis
Semester: Fall 2017
Section: 06
Instructor: Essig
Number of Students: 21

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	formulate and solve engineering problems using linear and quadratic equations	a	Midterm(s)			Yes, adequately	criterion 3	75%	90%
2)	formulate and solve engineering problems using trigonometry in planar systems	a	Midterm(s)			Yes, adequately	criterion 3	75%	86%
3)	formulate and solve engineering problems using descriptive statistics	a	Final Exam			Yes, adequately	criterion 3	75%	76%
4)	formulate and solve engineering problems using derivatives	a	Final Exam			Yes, adequately	criterion 3	75%	76%
5)	formulate and solve engineering problems using systems of equations	a	Midterm(s)			Yes, adequately	criterion 3	75%	90%
6)	explain and apply appropriate study and success strategies, concepts & habits to be successful in an engineering major and exhibit the work ethic necessary to succeed in engineering	i	Midterm(s)			Yes, adequately	criterion 3	75%	90%
7)	solve and document the solution of problems involving different configurations	e	Memo(s)			Yes, strongly	criterion 3	75%	100%
8)	solve problems using multiple approaches (e.g., equations including varied analytic approaches, diagrams, formal solution steps or simple computer programs)	e	Midterm(s)			Yes, adequately	criterion 3	75%	86%
9)	describe the broad nature of various engineering majors and the engineering profession and use this information to make appropriate career choices	f	Final Exam			Yes, adequately	criterion 3	75%	86%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Note: two students were removed from analysis because they did not participate in the course starting 6 weeks into the course. The blank scores for 10 weeks were skewing the results and not portraying an accurate image of the grading situation.

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

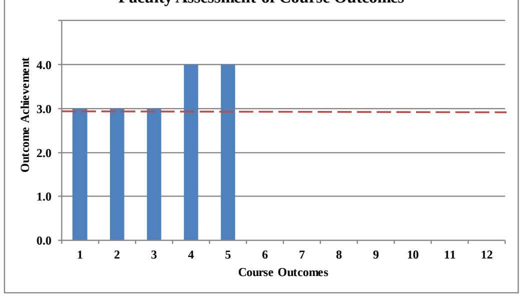
Faculty Assessment of Course -

Course: ENGR 12700 Project
Semester:
Section: 2
Instructor:
Number of Students: 23

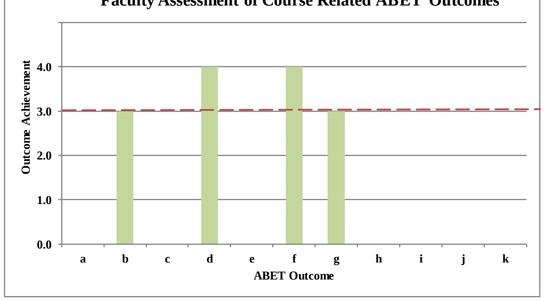
Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	plan and carry out a disciplined experimental study following a systematic project process of project planning and management	b	Memo(s)	Memo(s)	Memo(s)	Yes, adequately	criterion 1	75%	79%
2)	utilize appropriate analytical and computer tools in project work	b	Memo(s)	Memo(s)	Memo(s)	Yes, adequately	criterion 1	75%	79%
3)	communicate effectively using simple memos, properly formatted tables and properly formatted figures	g	Memo(s)	Memo(s)	Memo(s)	Yes, adequately	criterion 1	75%	79%
4)	identify and demonstrate the behaviors of an effective team member and/or leader, prepare a project schedule	d	Exercise(s)			Yes, strongly	criterion 1	75%	96%
5)	explain and apply the concepts of professional and ethical responsibility, evaluate ethical issues in engineering practice in terms of a Code of Ethics and apply to ethics as an engineering student	f	Exercise(s)	Exercise(s)		Yes, strongly	criterion 1	75%	95%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	

Faculty Assessment of Course Outcomes



Faculty Assessment of Course Related ABET Outcomes



Instructor comments on recommendation from previous assessment of the course.

Previous comments:
A greater effort should be made to coordinate the material covered in the lab and studio. Moving the ethics unit to the beginning of the semester would allow the students more time to learn Excel and Autocad before the need to apply it in Studio.

DPD comments Fall 2017: I do not concur that there needs to be coordinated effort between lab and studio. Some coordination is nice - good but too much seems to be doing the same "thing" again in a different "class". Coordination is one manner to get "coaster" students to have some ownership & responsibility. This is best exemplified with velocity, projectile motion, & energy lab spreadsheets.

Higher expectation of graphics produces in studio is a good way to connect with CAD. Professional license topic is lacking. I added info. for this

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.
Some deliverable, not always graded though, should be required each studio session. Studio time seems not well spent by many groups and distractions abound with computer, phones/devices, & chatting. Some groups are eager to "run" out of studio given first opportunity - saying at times we will work on this later. This was most evident when students were to spend time writing or reviewing memos.

Impact of missing group members caused great problems. All electornic files should be shared with each group member at the end of each studio session.

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

The use of phones/devices during studio hinders effective use of time, hinders any attention.

Some individual assignments seems appropriate to deal with folks not pulling their own weight and to get more student buy-in.

GANTT exercise is not meaningful - it is too easy, to open ended for any real assessment. It is fine as an intro. to topic. After the current exercise, use of GANTT for some campus or community project could be done outside of studio time or to be turned in next studio.

Faculty Assessment of Course - Fall 2017

Course: ENGR 12700 Project
Semester: Fall 2017
Section: 04
Instructor: Essig
Number of Students: 21

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	plan and carry out a disciplined experimental study following a systematic project process of project planning and management	b	Memo(s)	Memo(s)	Memo(s)	Yes, strongly	criterion 3	75%	90%
2)	utilize appropriate analytical and computer tools in project work	b	Memo(s)	Memo(s)	Memo(s)	Yes, strongly	criterion 3	75%	90%
3)	communicate effectively using simple memos, properly formatted tables and properly formatted figures	g	Memo(s)	Memo(s)	Memo(s)	Yes, strongly	criterion 3	75%	90%
4)	identify and demonstrate the behaviors of an effective team member and/or leader, prepare a project schedule	d	Exercise(s)			Yes, adequately	criterion 3	75%	86%
5)	explain and apply the concepts of professional and ethical responsibility, evaluate ethical issues in engineering practice in terms of a Code of Ethics and apply to ethics as an engineering student	f	Exercise(s)	Exercise(s)		Yes, adequately	criterion 3	75%	86%

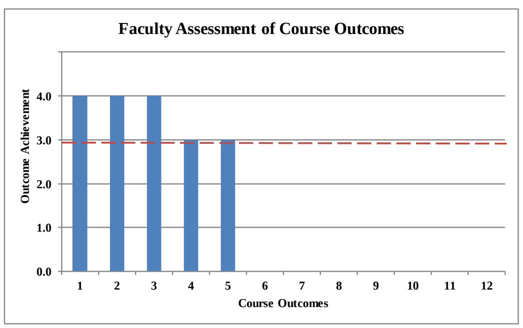
criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	

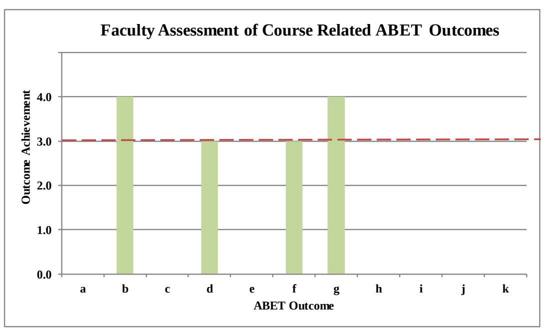
Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

A greater effort should be made to coordinate the material covered in the lab and studio. Moving the ethics unit to the beginning of the semester would allow the students more time to learn Excel and Autocad before the need to apply it in Studio.

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.



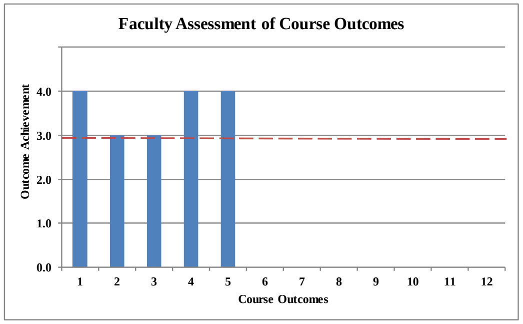


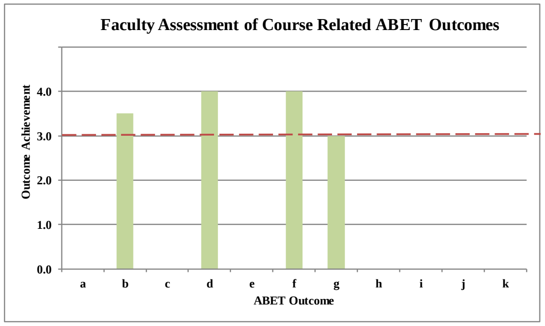
Faculty Assessment of Course - Fall 2017

Course: ENGR 12700 Project **Instructor:** Essig
Semester: Fall 2017 **Section:** 05 **Number of Students:** 23

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	plan and carry out a disciplined experimental study following a systematic project process of project planning and management	b	Memo(s)	Memo(s)	Memo(s)	Yes, strongly	criterion 3	75%	100%
2)	utilize appropriate analytical and computer tools in project work	b	Memo(s)	Memo(s)	Memo(s)	Yes, adequately	criterion 3	75%	83%
3)	communicate effectively using simple memos, properly formatted tables and properly formatted figures	g	Memo(s)	Memo(s)	Memo(s)	Yes, adequately	criterion 3	75%	83%
4)	identify and demonstrate the behaviors of an effective team member and/or leader, prepare a project schedule	d	Exercise(s)			Yes, strongly	criterion 3	75%	100%
5)	explain and apply the concepts of professional and ethical responsibility, evaluate ethical issues in engineering practice in terms of a Code of Ethics and apply to ethics as an engineering student	f	Exercise(s)	Exercise(s)		Yes, strongly	criterion 3	75%	96%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

A greater effort should be made to coordinate the material covered in the lab and studio. Moving the ethics unit to the beginning of the semester would allow the students more time to learn Excel and Autocad before the need to apply it in Studio.

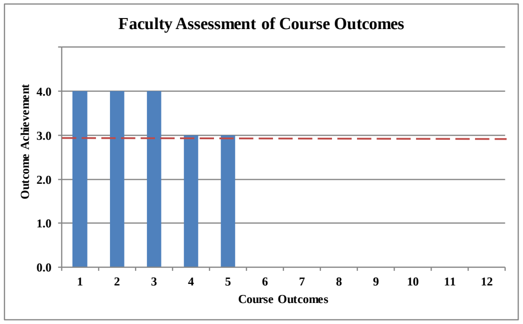
Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

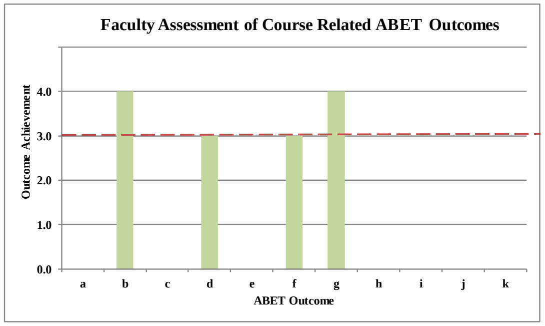
Faculty Assessment of Course - Fall 2017

Course: ENGR 12700 Project
Semester: Fall 2017
Section: 06
Instructor: Essig
Number of Students: 20

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	plan and carry out a disciplined experimental study following a systematic project process of project planning and management	b	Memo(s)	Memo(s)	Memo(s)	Yes, strongly	criterion 3	75%	95%
2)	utilize appropriate analytical and computer tools in project work	b	Memo(s)	Memo(s)	Memo(s)	Yes, strongly	criterion 3	75%	95%
3)	communicate effectively using simple memos, properly formatted tables and properly formatted figures	g	Memo(s)	Memo(s)	Memo(s)	Yes, strongly	criterion 3	75%	95%
4)	identify and demonstrate the behaviors of an effective team member and/or leader, prepare a project schedule	d	Exercise(s)			Yes, adequately	criterion 3	75%	80%
5)	explain and apply the concepts of professional and ethical responsibility, evaluate ethical issues in engineering practice in terms of a Code of Ethics and apply to ethics as an engineering student	f	Exercise(s)	Exercise(s)		Yes, adequately	criterion 3	75%	85%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

A greater effort should be made to coordinate the material covered in the lab and studio. Moving the ethics unit to the beginning of the semester would allow the students more time to learn Excel and Autocad before the need to apply it in Studio.

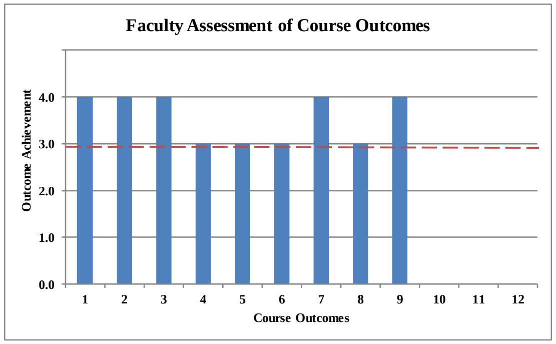
Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

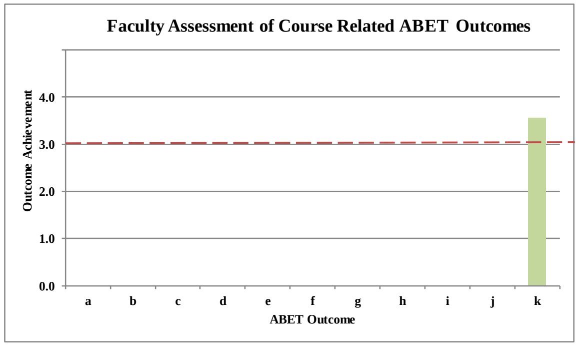
Faculty Assessment of Course - Fall 2017

Course: ENGR 12700 01-Computer
Instructor:
Semester: Fall 2017 **Section:** 1 **Number of Students:** ıctical final exam 20

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	represent a physical object in single-view and multi-view orthographic projections	k	Final Exam			Yes, strongly	criterion 1	75%	91%
2)	dimension parts according to convention	k	Final Exam			Yes, strongly	criterion 1	75%	89%
3)	create pictorial (isometric) representations of a physical	k	Homework			Yes, strongly	criterion 1	75%	96%
4)	create and use drawings and diagrams to solve a problem and to document its solution	k	Final Exam			Yes, adequately	criterion 1	75%	69%
5)	set up and use a spreadsheet to carry out repetitive calculations using formula	k	Final Exam			Yes, adequately	criterion 1	75%	58%
6)	explain and use appropriate spreadheet functions in solving engineering problems	k	Final Exam			Yes, adequately	criterion 1	75%	58%
7)	calculate and use descriptive statistics and plot histograms	k	Homework			Yes, strongly	criterion 1	75%	93%
8)	produce and use clear and effective computer graphs	k	Final Exam			Yes, adequately	criterion 1	75%	82%
9)	clearly format a spreadsheet calculation to communicate a problem solution	k	Final Exam			Yes, strongly	criterion 1	75%	100%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Some students might benefit from a text book that includes information on CAD and spreadsheet tools. However, the abundance of resources available on the Internet, not the least of which are many videos on YouTube, negates the impact of a text book, even more so considering the cost-benefit of a text book.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Much of the lab can occur on a self-study, self-directed basis, particularly with detailed instruction sheets - assignment sheets. Consideration to in-class assignments is important so it is known that students are doing the work themselves rather than copy & sharing electronic files. Much of the CAD seems to be too easy for most students, several have basic CAD skills prior to class. Many students attempt to complete assignemnts but do NOT read through sheet and most of the time can earn most if not all credit.

The varying levels of student skills causes difficulty in class with students who know already what is being done or pick info. up rapidly to the few who do not follow class-lab instruction or directions and need special, individual attention to follow keystrokes in order to achieve desired CAD or spreadsheet result .

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

Consideration of student portfolio. Also, submission of assignments in electronic form, not to grade, but to keep record of student work and to evaluated copy work of other students.

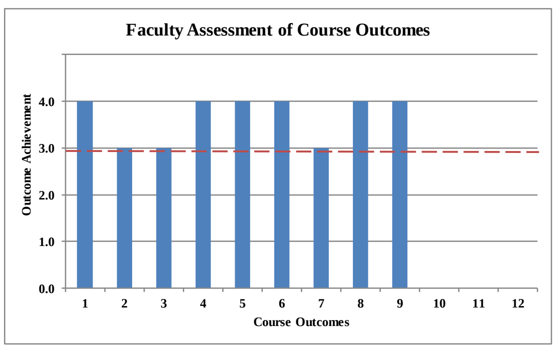
Simpler spreadsheets and CAD drawings could be self-checked or peer checked, likely much during lab session. More rigorous & challenging spreadsheet and CAD drawings could be made for assignments.

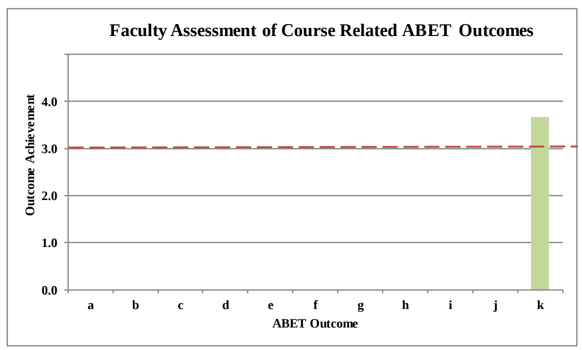
Faculty Assessment of Course - Fall 2017

Course: ENGR 12700 01-Computer **Instructor:**
Semester: Fall 2017 **Section:** 02 and 03 **Number of Students:** 23/23

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	represent a physical object in single-view and multi-view orthographic projections	k	Final Exam	Homework		Yes, strongly	criterion 1	**75%**	85%
2)	dimension parts according to convention	k	Final Exam	Homework		Yes, adequately	criterion 1	**75%**	75%
3)	create pictorial (isometric) representations of a physical	k	Homework			Yes, adequately	criterion 1	**75%**	80%
4)	create and use drawings and diagrams to solve a problem and to document its solution	k	Final Exam	Homework		Yes, strongly	criterion 1	**75%**	88%
5)	set up and use a spreadsheet to carry out repetitive calculations using formula	k	Final Exam	Homework		Yes, strongly	criterion 1	**75%**	87%
6)	explain and use appropriate spreadsheet functions in solving engineering problems	k	Final Exam	Homework		Yes, strongly	criterion 1	**75%**	85%
7)	calculate and use descriptive statistics and plot histograms	k	Homework	Homework		Yes, adequately	criterion 1	**75%**	89%*
8)	produce and use clear and effective computer graphs	k	Final Exam	Homework		Yes, strongly	criterion 1	**75%**	87%
9)	clearly format a spreadsheet calculation to communicate a problem solution	k	Final Exam	Homework		Yes, strongly	criterion 1	**75%**	86%

criterion 1: The average of students in the assessment tool is equal to or greater than	**75%**
criterion 2: The percentage of students with grade 70 or more is at least equal to	**70%**
criterion 3: The percentage of students passing the assessment tool is greater than	**75%**
criterion 4: The average grade of students passing the assessment tool is at least equal to	**75%**
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Students would benefit from a text book that includes information on CAD and spreadsheet tools.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Some students did not submit all of the homework; these students did rather poorly on the final exam.

The reason that I indicated YES, ADEQUATELY for statistics is that it was not assessed on the final exam. It was assessed using only one homework assignment.

Most items were assessed using specific questions on the final exam and specific homework assignments.

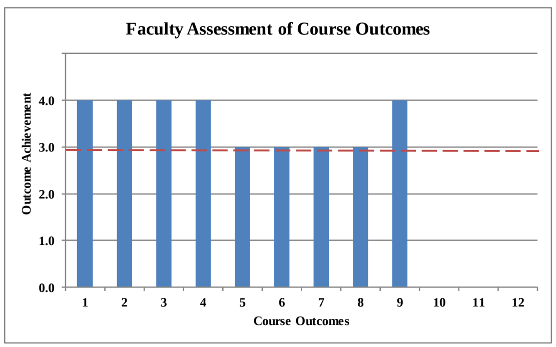
Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

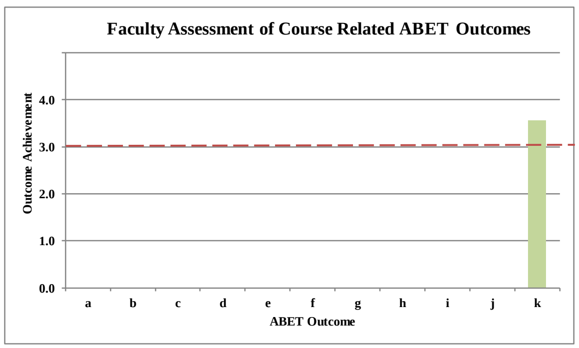
Faculty Assessment of Course - Fall 2017

Course: ENGR 12700 04-Computer
Instructor:
Semester: Fall 2017 **Section:** 4 - Lab **Number of Students:** 19

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	represent a physical object in single-view and multi-view orthographic projections	k	Final Exam			Yes, strongly	criterion 1	75%	94%
2)	dimension parts according to convention	k	Final Exam			Yes, strongly	criterion 1	75%	88%
3)	create pictorial (isometric) representations of a physical	k	Homework			Yes, strongly	criterion 1	75%	97%
4)	create and use drawings and diagrams to solve a problem and to document its solution	k	Final Exam			Yes, strongly	criterion 1	75%	97%
5)	set up and use a spreadsheet to carry out repetitive calculations using formula	k	Final Exam			Yes, adequately	criterion 1	75%	78%
6)	explain and use appropriate spreadsheet functions in solving engineering problems	k	Final Exam			Yes, adequately	criterion 1	75%	78%
7)	calculate and use descriptive statistics and plot histograms	k	Homework			Yes, adequately	criterion 1	75%	83%
8)	produce and use clear and effective computer graphs	k	Final Exam			Yes, adequately	criterion 1	75%	83%
9)	clearly format a spreadsheet calculation to communicate a problem solution	k	Final Exam			Yes, strongly	criterion 1	75%	93%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Some students might benefit from a text book that includes information on CAD and spreadsheet tools. However, the abundance of resources available on the Internet, not the least of which are many videos on YouTube, negates the impact of a text book, even more so considering the cost-benefit of a text book.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Much of the lab can occur on a self-study, self-directed basis, particularly with detailed instruction sheets - assignment sheets. Consideration to in-class assignments is important so it is known that students are doing the work themselves rather than copy & sharing electronic files. Much of the CAD seems to be too easy for most students, several have basic CAD skills prior to class. Many students attempt to complete assignemnts but do NOT read through sheet and most of the time can earn most if not all credit.

The varying levels of student skills causes difficulty in class with students who know already what is being done or pick info. up rapidly to the few who do not follow class-lab instruction or directions and need special, individual attention to follow keystrokes in order to achieve desired CAD or spreadsheet result .

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

Consideration of student portfolio. Also, submission of assignments in electronic form, not to grade, but to keep record of student work and to evaluated copy work of other students.

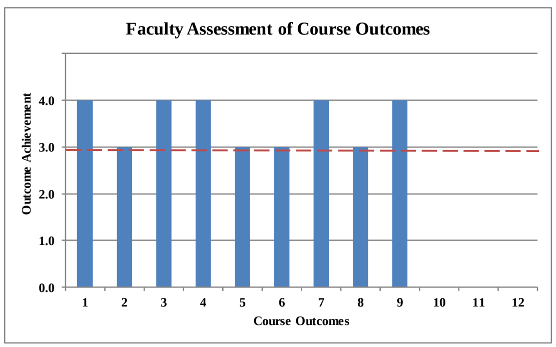
Simpler spreadsheets and CAD drawings could be self-checked or peer checked, likely much during lab session. More rigorous & challenging spreadsheet and CAD drawings could be made for assignments.

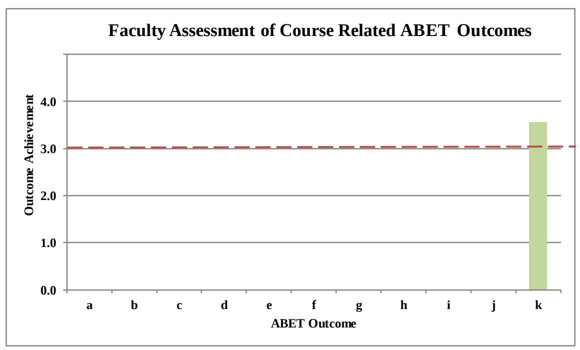
Faculty Assessment of Course -

Course: ENGR 12700 05-Computer **Instructor:**
Semester: **Section:** 5 - Lab **Number of Students:** 23

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	represent a physical object in single-view and multi-view orthographic projections	k	Final Exam			Yes, strongly	criterion 1	75%	84%
2)	dimension parts according to convention	k	Final Exam			Yes, adequately	criterion 3	75%	75%
3)	create pictorial (isometric) representations of a physical	k	Homework			Yes, strongly	criterion 1	75%	100%
4)	create and use drawings and diagrams to solve a problem and to document its solution	k	Final Exam			Yes, strongly	criterion 1	75%	92%
5)	set up and use a spreadsheet to carry out repetitive calculations using formula	k	Final Exam			Yes, adequately	criterion 1	75%	77%
6)	explain and use appropriate spreadheet functions in solving engineering problems	k	Final Exam			Yes, adequately	criterion 1	75%	77%
7)	calculate and use descriptive statistics and plot histograms	k	Homework			Yes, strongly	criterion 1	75%	85%
8)	produce and use clear and effective computer graphs	k	Final Exam			Yes, adequately	criterion 1	75%	78%
9)	clearly format a spreadsheet calculation to communicate a problem solution	k	Final Exam			Yes, strongly	criterion 1	75%	96%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Some students might benefit from a text book that includes information on CAD and spreadsheet tools. However, the abundance of resources available on the Internet, not the least of which are many videos on YouTube, negates the impact of a text book, even more so considering the cost-benefit of a text book.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Much of the lab can occur on a self-study, self-directed basis, particularly with detailed instruction sheets - assignment sheets. Consideration to in-class assignments is important so it is known that students are doing the work themselves rather than copy & sharing electronic files. Much of the CAD seems to be too easy for most students, several have basic CAD skills prior to class. Many students attempt to complete assignemnts but do NOT read through sheet and most of the time can earn most if not all credit.

The varying levels of student skills causes difficulty in class with students who know already what is being done or pick info. up rapidly to the few who do not follow class-lab instruction or directions and need special, individual attention to follow keystrokes in order to achieve desired CAD or spreadsheet result .

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

Consideration of student portfolio. Also, submission of assignments in electronic form, not to grade, but to keep record of student work and to evaluated copy work of other students.

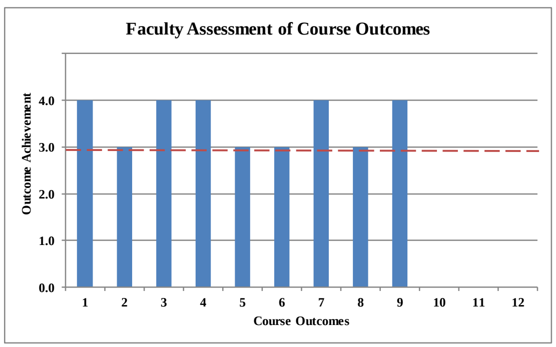
Simpler spreadsheets and CAD drawings could be self-checked or peer checked, likely much during lab session. More rigorous & challenging spreadsheet and CAD drawings could be made for assignments.

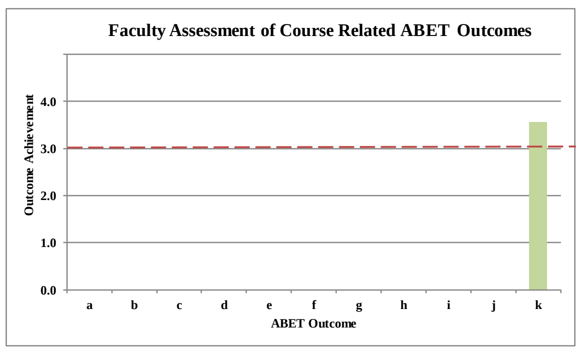
Faculty Assessment of Course - Fall 2017

Course: ENGR 12700 06-Computer
Instructor:
Semester: Fall 2017 **Section:** 6 - Lab **Number of Students:** 20

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	represent a physical object in single-view and multi-view orthographic projections	k	Final Exam			Yes, strongly	criterion 1	**75%**	87%
2)	dimension parts according to convention	k	Final Exam			Yes, adequately	criterion 1	**75%**	73%
3)	create pictorial (isometric) representations of a physical	k	Homework			Yes, strongly	criterion 1	**75%**	100%
4)	create and use drawings and diagrams to solve a problem and to document its solution	k	Final Exam			Yes, strongly	criterion 1	**75%**	89%
5)	set up and use a spreadsheet to carry out repetitive calculations using formula	k	Final Exam			Yes, adequately	criterion 1	**75%**	81%
6)	explain and use appropriate spreadsheet functions in solving engineering problems	k	Final Exam			Yes, adequately	criterion 1	**75%**	81%
7)	calculate and use descriptive statistics and plot histograms	k	Homework			Yes, strongly	criterion 1	**75%**	96%
8)	produce and use clear and effective computer graphs	k	Final Exam			Yes, adequately	criterion 1	**75%**	73%
9)	clearly format a spreadsheet calculation to communicate a problem solution	k	Final Exam			Yes, strongly	criterion 1	**75%**	93%

criterion 1: The average of students in the assessment tool is equal to or greater than	**75%**
criterion 2: The percentage of students with grade 70 or more is at least equal to	**70%**
criterion 3: The percentage of students passing the assessment tool is greater than	**75%**
criterion 4: The average grade of students passing the assessment tool is at least equal to	**75%**
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Some students might benefit from a text book that includes information on CAD and spreadsheet tools. However, the abundance of resources available on the Internet, not the least of which are many videos on YouTube, negates the impact of a text book, even more so considering the cost-benefit of a text book.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Much of the lab can occur on a self-study, self-directed basis, particularly with detailed instruction sheets - assignment sheets. Consideration to in-class assignments is important so it is known that students are doing the work themselves rather than copy & sharing electronic files. Much of the CAD seems to be too easy for most students, several have basic CAD skills prior to class. Many students attempt to complete assignemnts but do NOT read through sheet and most of the time can earn most if not all credit.

The varying levels of student skills causes difficulty in class with students who know already what is being done or pick info. up rapidly to the few who do not follow class-lab instruction or directions and need special, individual attention to follow keystrokes in order to achieve desired CAD or spreadsheet result .

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

Consideration of student portfolio. Also, submission of assignments in electronic form, not to grade, but to keep record of student work and to evaluated copy work of other students.

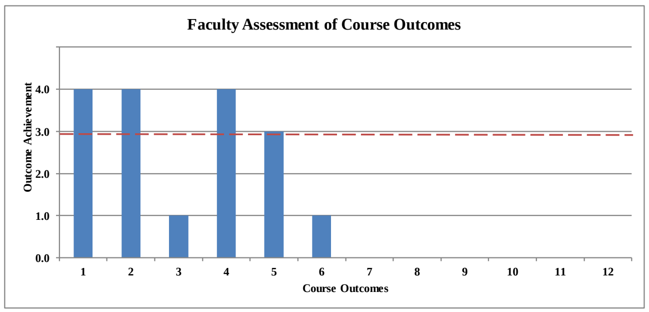
Simpler spreadsheets and CAD drawings could be self-checked or peer checked, likely much during lab session. More rigorous & challenging spreadsheet and CAD drawings could be made for assignments.

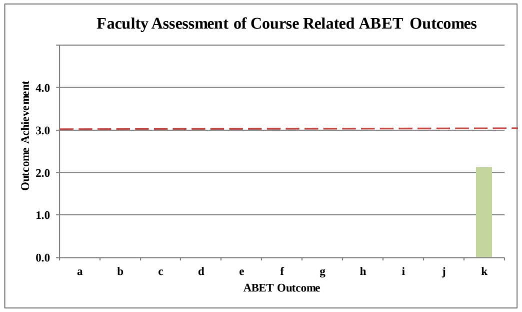
Faculty Assessment of Course - Spring 2018

Course: ENGR 12800 - Lecture
Semester: Spring 2018
Section: 01 - 02 - 03 -04
Instructor: carlos pomalaza-raez
Number of Students: 91

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	formulate and solve engineering problems using complex numbers	a	Midterm(s)	Homework	Exercise(s)	Yes, strongly	criterion 2	70%	
2)	formulate and solve engineering problems using sign waves & frequency	a	Midterm(s)	Homework	Exercise(s)	Yes, strongly	criterion 2	70%	
3)	formulate and solve engineering problems using integration	a	Midterm(s)	Final Exam	Homework	No	criterion 2	70%	
4)	formulate and solve engineering problems using Boolean Logic	a	Midterm(s)	Homework	Exercise(s)	Yes, strongly	criterion 2	70%	
5)	formulate and solve engineering problems using log graphing and transformations	a	Homework	Exercise(s)		Yes, adequately	criterion 2	70%	
6)	formulate and solve engineering problems using simple differential equations	a	Final Exam	Homework	Exercise(s)	No	criterion 2	70%	

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

1) Students had lots of difficulty with integration of discontinous functions , i.e. one that has segments, each defined by a different function. Extensive coverage of this type of integration was carried out during the lecture, homework, midterm exam and final exam, still less that 70% students could get it right.

2) Students had difficulty with second order differential equations, in particular using the initial conditions to determine the unknow constants of the general solution. Once the function is determined they also have difficulty in using the solution to answer further questions about the sytem that the solution function is modeling.

3) As the semester went on studens attended less and less the lectures and didn't do the homework.

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

1) Students attendance went down hill the second half of the semester which contributed a lot to their underperformance in the topics mentioned in (1) and (2) above.

2) Perhaps random 10 minutes quizzes to sharpen their attention and attendance has to be introduced to improve their focus on important topics such as integration.

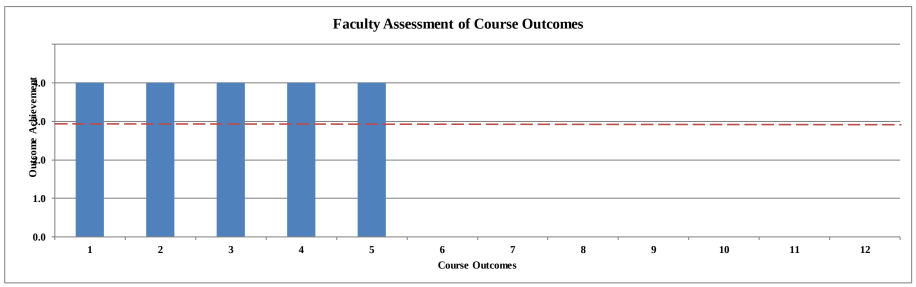
3) Not directly related to the lectures but there were several students (more than just a few) that missed studio and in particular lab reports which impacted severely on their final grade.

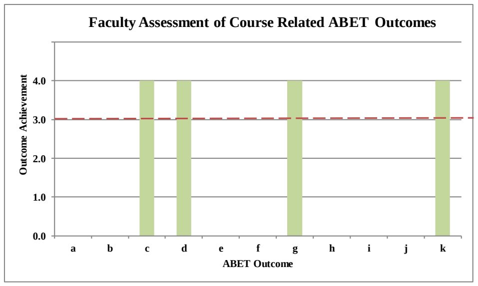
Faculty Assessment of Course - Spring 2018

Course: ENGR 12800 - Studio
Semester: Spring 2018
Section: 01
Instructor: Moor
Number of Students: 24

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	plan and carry out a disciplined design project following a systematic design process	c	Final Project Report	Project(s)		Yes, strongly	criterion 2	70%	100%
2)	utilize appropriate analytical and computer tools in project work	k	Initial Project Memo	Memo(s)		Yes, strongly	criterion 2	70%	88%
3)	write a precise and effective Technical Report Memo. Write clear Abstract, Methodology, Recommendations, and Conclusions sections	g	Final Project Report			Yes, strongly	criterion 2	70%	100%
4)	prepare and deliver an effective oral technical presentation	g	Final Project Report			Yes, strongly	criterion 2	70%	100%
5)	organize an effective team including setting ground rules, project planning, and task management; explain and utilize effective group processes	d	Initial Project Memo			Yes, strongly	criterion 2	70%	100%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

See comments for section 02

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

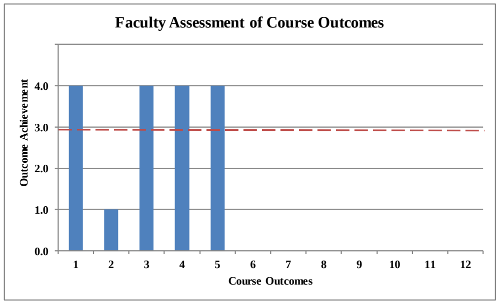
See comments for section 02

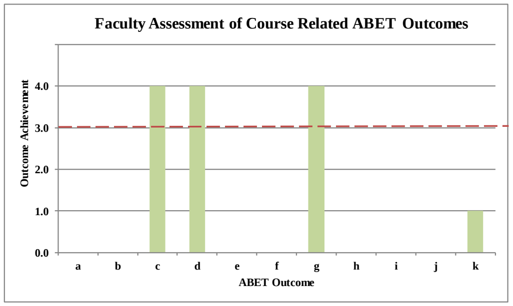
Faculty Assessment of Course - Spring 2018

Course: ENGR 12800 - Studio
Semester: Spring 2018
Section: 02
Instructor: Moor
Number of Students: 23

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	plan and carry out a disciplined design project following a systematic design process	c	Final Project Report	Project(s)		Yes, strongly	criterion 2	70%	83%
2)	utilize appropriate analytical and computer tools in project work	k	Others	Memo(s)		No	criterion 2	70%	65%
3)	write a precise and effective Technical Report Memo. Write clear Abstract, Methodology, Recommendations, and Conclusions sections	g	Final Project Report			Yes, strongly	criterion 2	70%	100%
4)	prepare and deliver an effective oral technical presentation	g	Final Project Report			Yes, strongly	criterion 2	70%	100%
5)	organize an effective team including setting ground rules, project planning, and task management; explain and utilize effective group processes	d	Initial Project Memo			Yes, strongly	criterion 2	70%	87%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Students did well with the simple assignments illustrating class content.

They had some struggles with the design process that could be smoothed out.

I have some concern that few of the objectives can be evaluated individually, we may need to look at ways to provide more individual accounability.

The workload in some weeks was a bit high (for both student and instructor).

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

Below are preliminary suggestions based on sections 01 and 02 my assessment only. They need to be evaluated and revised in the light of the other sections and student assessment.

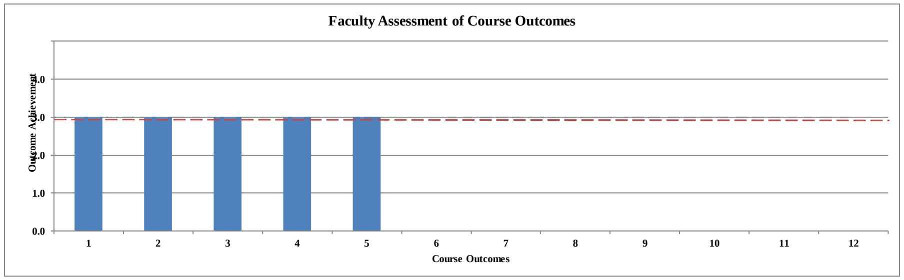
Where possible simplify requirments particularly:
1. avoid two memos due in a single week. Including considering alternating weeks between design project and class activities rather than doing both the same week.
2. consider some simplifications to the design process that don't fit the specific project well.
3. If possible give more time for design project

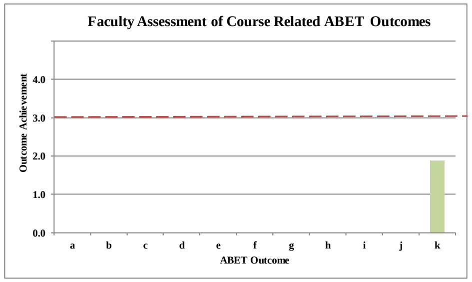
Faculty Assessment of Course - Spring 2018

Course: ENGR 12800 - Studio
Semester: Spring 2018
Section: 3
Instructor: Dave Devine
Number of Students: 21

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	plan and carry out a disciplined design project following a systematic design process	c	Project(s)			Yes, adequately	criterion 1	75%	80.95
2)	utilize appropriate analytical and computer tools in project work	k	Lab Report(s)			Yes, adequately	criterion 1	75%	80.95
3)	write a precise and effective Technical Report Memo. Write clear Abstract, Methodology, Recommendations, and Conclusions sections	g	Memo(s)	Final Project Report		Yes, adequately	criterion 2	70%	71.43
4)	prepare and deliver an effective oral technical presentation	g	Presentation(s)			Yes, adequately	criterion 1	75%	90.48
5)	organize an effective team including setting ground rules, project planning, and task management; explain and utilize effective group processes	d	Project(s)			Yes, adequately	criterion 1	75%	80.95

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Some deliverable seems appropriate during studio for each studio week, otherwise student efforts are off task and "we are meeting .... to finish"

students need to share all files each and every week, particularly early in the semester when drops occur, two students who "had the files" dropped during the term or at least did not show up for lab anymore

more detail to rubrics would permit more critical grading

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

Keeping students "on task" during studio is an ongoing challenge

going through engineering process is seemingly an outcome that is appropriate also

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

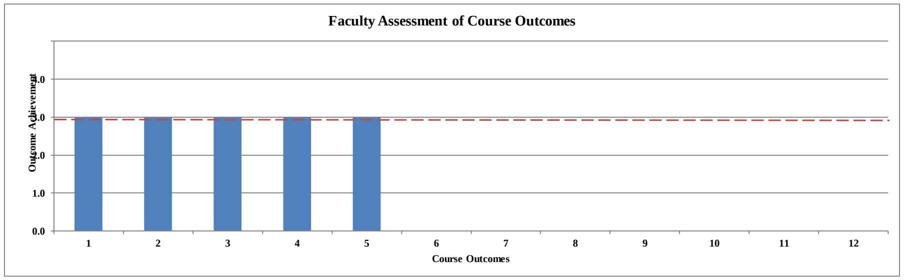
having students explain what occurs in a circuit seems not the point as much as data gathering and processing, what values include error, what values do not? Some reports stated "error" occurred with Multisim.

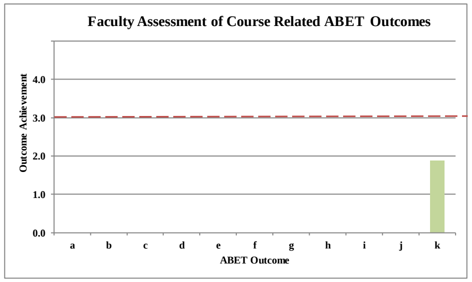
Faculty Assessment of Course - Spring 2018

Course: ENGR 12800 - Studio
Semester: Spring 2018
Section: 4
Instructor: Dave Devine
Number of Students: 24

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	plan and carry out a disciplined design project following a systematic design process	c	Project(s)			Yes, adequately	criterion 1	75%	91.67
2)	utilize appropriate analytical and computer tools in project work	k	Lab Report(s)			Yes, adequately	criterion 1	75%	83.33
3)	write a precise and effective Technical Report Memo. Write clear Abstract, Methodology, Recommendations, and Conclusions sections	g	Memo(s)	Final Project Report		Yes, adequately	criterion 1	75%	91.67
4)	prepare and deliver an effective oral technical presentation	g	Presentation(s)			Yes, adequately	criterion 1	75%	91.67
5)	organize an effective team including setting ground rules, project planning, and task management; explain and utilize effective group processes	d	Project(s)			Yes, adequately	criterion 1	75%	91.67

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	70%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

Some deliverable seems appropriate during studio for each studio week, otherwise student efforts are off task and "we are meeting .... to finish"

students need to share all files each and every week, particularly early in the semester when drops occur, two students who "had the files" dropped during the term or at least did not show up for lab anymore

more detail to rubrics would permit more critical grading

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

One group, a group of two students, did not work well together and ended up with efforts of just one student, the other student stood silent during the presentation.

Keeping students "on task" during studio is an ongoing challenge

going through engineering process is seemingly an outcome that is appropriate also

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

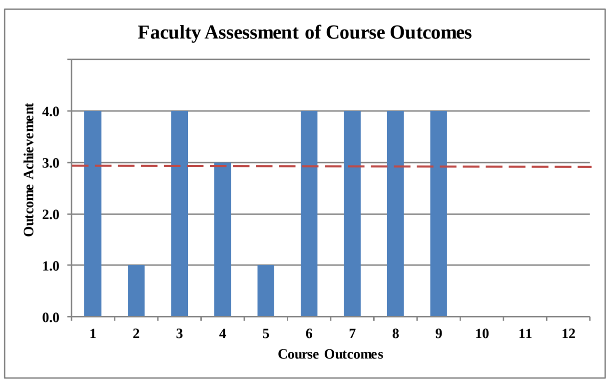
having students explain what occurs in a circuit seems not the point as much as data gathering and processing, what values include error, what values do not? Some reports stated "error" occurred with Multisim.

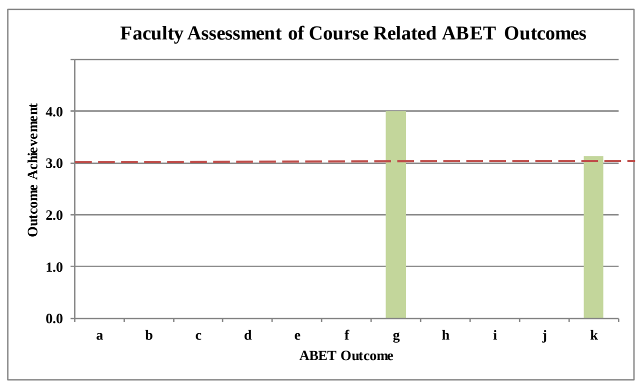
Faculty Assessment of Course - Spring 2018

Course: ENGR 12800 - Lab
Semester: Spring 2018
Section: 02
Instructor: Moor
Number of Students: 22

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	solve engineering problems using computer tools	k	Final Exam			Yes, strongly	criterion 2	65%	81%
2)	apply arrays and array manipulations	k	Final Exam			No	criterion 2	65%	57%
3)	use and explain text variables and ASCII text files	k	Final Exam			Yes, strongly	criterion 2	65%	86%
4)	write a function with multiple inputs and outputs at the command line	k	Final Exam			Yes, adequately	criterion 2	65%	71%
5)	write a function that results in a non-numerical output	k	Final Exam			No	criterion 2	65%	62%
6)	write programs using logical expressions and conditional statements	k	Final Exam			Yes, strongly	criterion 2	65%	90%
7)	write programs using loop structures	k	Final Exam			Yes, strongly	criterion 2	65%	81%
8)	fit data that follows linear, exponential, and power law forms	k	Final Exam			Yes, strongly	criterion 2	65%	81%
9)	properly communicate a solution based on a computer calculation or program	g	Final Exam			Yes, strongly	criterion 2	65%	86%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	65%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

I recommend simplifying the lab activities in order to help with student confusion. The current labs not only required students to figure out the new coding method, but also introduced students to science and engineering concepts they haven't seen before. I recommend simplifying down the complexity of the problems in order to allow students to focus more on learning the coding practices.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

We have continued to work on scafolding and focusing the classes on the goals including simplfying where appropriate as suggested from the previous semester.

This semester student completing and turning in of program assignments was significantly worse that in previous semesters where I have taught this computer lab. I am not sure of the reason for this. I will be focused on watching this and asking students about this problem in upcomming semesters.

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

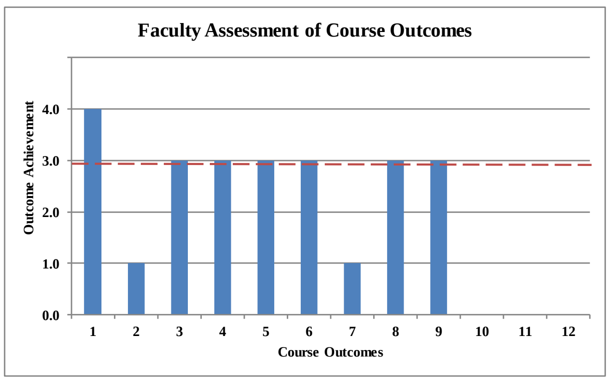
The following recommendations are based on my assessment of sections 02 and 04. They are tentitive with out the benifit of the other sections and the students' assessment.
Continuing the efforts to improve this lab in scaffolding, resources and focus should continue.
The lab team should consider
1. Revising the first lab to focus more on MATLAB coding. The resistance network examples that are used are good but are not leaving enough time for the code. This change will affect other components of the course and will need to be corrdinated with the entire 128 team.
2. I would suggest a simple schedule change of reversing the order of lab 3: Intro to Functions

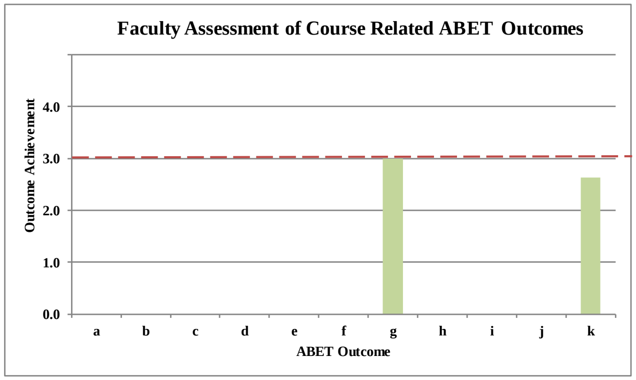
Faculty Assessment of Course - Spring 2018

Course: ENGR 12800 - Lab
Semester: Spring 2018
Section: 04
Instructor: S Moor
Number of Students: 20

Outcomes			Faculty Assessment						
			Tools Used			Course Outcome Achieved?	Criteria Used		
	Course	ABET	1	2	3		criterion	Limit	Value
1)	solve engineering problems using computer tools	k	Final Exam			Yes, strongly	criterion 2	65%	75%
2)	apply arrays and array manipulations	k	Final Exam			No	criterion 2	65%	45%
3)	use and explain text variables and ASCII text files	k	Final Exam			Yes, adequately	criterion 2	65%	65%
4)	write a function with multiple inputs and outputs at the command line	k	Final Exam			Yes, adequately	criterion 2	65%	65%
5)	write a function that results in a non-numerical output	k	Final Exam			Yes, adequately	criterion 2	65%	65%
6)	write programs using logical expressions and conditional statements	k	Final Exam			Yes, adequately	criterion 2	65%	75%
7)	write programs using loop structures	k	Final Exam			No	criterion 2	65%	60%
8)	fit data that follows linear, exponential, and power law forms	k	Final Exam			Yes, adequately	criterion 2	65%	76%
9)	properly communicate a solution based on a computer calculation or program	g	Final Exam			Yes, adequately	criterion 2	65%	76%

criterion 1: The average of students in the assessment tool is equal to or greater than	75%
criterion 2: The percentage of students with grade 70 or more is at least equal to	65%
criterion 3: The percentage of students passing the assessment tool is greater than	75%
criterion 4: The average grade of students passing the assessment tool is at least equal to	75%
criterion 5: Overall, students' participation in a team was effective.	
criterion 6: Faculty observation of students' function in a team is satisfactory	





Instructor comments on recommendation from previous assessment of the course.

I recommend simplifying the lab activities in order to help with student confusion. The current labs not only required students to figure out the new coding method, but also introduced students to science and engineering concepts they haven't seen before. I recommend simplifying down the complexity of the problems in order to allow students to focus more on learning the coding practices.

Instructor comments and observations during current semester. Please include feedback on the recommendations from previous assessment of the course, if applicable.

See comments with assessment for section 02

Recommendations to improve students' performance in achieving course learning outcomes in future offering based on current semester assessment of the course.

See comments with assessment for section 02

TO: Nash Younis, Chair of CME and Guoping Wang, Interim Chair of ECE

FROM: ETCS Assessment Committee

SUBJ: 2017-2018 Assessment Report for FYE program

DATE: January 25, 2019

The ETCS Assessment Committee has received and reviewed FYE's 2017-2018 Assessment Report. Our comments below follow the rubrics derived from the revised Senate Document 98-22. Appendix D.

<u>Programmatic Student Learning Outcomes (SLOs):</u>

- It is recommended to make it clear which SLOs specifically apply to the FYE program.

<u>Assessment Plan:</u>

- It is recommended to include a write-up on how reliability and validity of data collection is achieved to support drawing of meaningful conclusions. One way to achieve this recommendation is to provide a narrative on consistent results across different types of measures (i.e. direct versus indirect measures) over time.
- Overall, the plan clearly explain the relationship between assessments and student learning outcomes and employs multiple types of measurements.

<u>Reporting Results:</u>

- The FYE program should consider consolidating the data collected on course learning outcomes of the two courses and clarify its alignment and attainment of SLOs.
- The program should consider including past assessment results to assess improvements have been made that are reflected in the data.
- The FYE assessment report provides information on student performance in key courses in the program, this information is useful and goes beyond the traditional types of measurements.

<u>Report Dissemination and Collaboration:</u>

- Please specify if all faculty members received a copy of the assessment report.
- It is recommended to specify whether the information is distributed to other stakeholders.
- It would be helpful if the program adopts a procedure on how to distribute the information to faculty and other stakeholders.

Please contact us if you have any questions.

Purdue University Fort Wayne

Department of Civil and Mechanical Engineering

Mechanical Engineering Program

Assessment Report

Spring 2018

Prepared by:

Bongsu Kang, Ph.D.

10 September 2018

Table of Contents

Note: This report was circulated among the ME faculty via email on 5 September 2018 for feedback and suggestions. A special thanks to Ms. Rita Reed for organizing and processing much of the data.

1. Introduction

The mission of the Department of Civil and Mechanical Engineering is to support the needs of northeast Indiana through education, scholarship and service. The members of the department are committed to providing quality educational opportunities to both traditional and non-traditional students and seek to equip our students with the knowledge, skills, and experience to pursue productive engineering careers. The faculty is also dedicated to excellence in scholarship and service to the community and the profession.

The purpose of this document is to provide information about progress in mechanical engineering students' learning experiences during the spring semester 2018. Efforts have been made to establish clear, measurable learning goals and to gather, analyze, and interpret evidence to determine how well student achievement matched the expected outcomes. The following report is based on the Mechanical Engineering Assessment Plan.

This program assessment report is to be reviewed by the ETCS Assessment Committee.

2. Program Educational Objectives (PEOs)

As a framework for the continuous improvement policy, the mechanical engineering program has adopted a set of program educational objectives (PEOs) that describe the anticipated accomplishments of our graduates within a few years of graduation.

The mechanical engineering program educational objectives are to produce graduates who:

1. *Function and communicate effectively both as individuals and in multidisciplinary teams to solve technical problems.*
2. *Advance professionally to roles of greater mechanical engineering responsibilities and/or by transitioning into leadership positions in business, government, and/or education.*
3. *Participate in life-long learning through the successful completion of advanced degree(s), professional development, and/or engineering certification(s)/licensure.*
4. *Demonstrate a commitment to community by applying technical skills and knowledge to support various service activities.*

Note: This set of new program educational outcomes was approved by the engineering faculty on 27 February 2012. A description of the process followed in updating the program educational outcomes is provided in the Mechanical Engineering Assessment Plan. In August 2017, the ABET evaluator team suggested that the PEOs refer to accomplishments of our alumni a few years after graduation (instead of 3-5 years after graduation).

3. Program Outcomes (POs)

Program outcomes (POs) describe what students are expected to know and be able to do by the time of graduation.[1]

The program outcomes of the mechanical engineering program have been modified in the fall 2012. The reason for the change is a result of the last ABET visit. During the preparation, it became evident that the current program outcomes are not directly used in the assessment process – we map our course outcomes to *ABET Student Outcomes (a)-(k)*. In fact, one ABET reviewer suggested that we adopt the ABET Student Outcomes directly and add any outcomes specific to our program. The Department of Engineering approved the following program outcomes at the 30 November 2012 faculty meeting.

[1] 2012-2013 ABET Criteria for Accrediting Engineering Programs

Graduates of the Mechanical Engineering program will demonstrate:

(a) *An ability to apply knowledge of mathematics, science, and engineering*
(b) *An ability to design and conduct experiments, as well as to analyze and interpret data*
(c) *An ability to design both thermal and mechanical systems, components, or processes to meet desired needs within realistic constraints such as economic, environmental, social, ethical, safety, manufacturability, and sustainability*
(d) *An ability to function on engineering and science laboratory and project teams as well as multi-disciplinary teams*
(e) *An ability to identify, formulate, and solve mechanical engineering problems*
(f) *An understanding of professional and ethical responsibility*
(g) *An ability to communicate effectively in both verbal and written forms*
(h) *The broad education necessary to understand the impact of engineering solutions in a global and societal context*
(i) *A recognition of the need for, and an ability to engage in life-long learning*
(j) *A knowledge of and exposure to contemporary issues*
(k) *An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice, including analysis and design.*

The relationship of the mechanical engineering program outcomes with the program educational objectives are summarized in Table 1.

Each engineering course has a list of associated course outcomes (COs). Course outcomes describe the skills, knowledge, and behaviors that students have acquired when they successfully complete the course. These course outcomes have been established by the course coordinator in consultation with other faculty and are listed on the course syllabi which are posted on the department webpage. Course syllabi also show how individual course outcomes are mapped to specific program outcomes.

During the spring 2018 semester, the department approved to replace the current ME program outcomes with a new set of student outcomes in response to the latest revision of ABET student outcomes in 2018. These new student outcomes will be incorporated and assessed starting in the fall 2018 semester.

Table 1. Relationship between Mechanical Engineering program educational objectives (PEOs) and program outcomes.

PEOs	Program Outcomes										
	a	b	c	d	e	f	g	h	i	j	k
1	√	√	√	√	√	√	√				√
2		√	√	√	√	√	√		√	√	√
3					√	√			√	√	
4								√		√	

4. Alignment of Program Outcomes to PFW Baccalaureate Framework

Furthermore, as shown in Table 2, our mechanical engineering program outcomes are aligned with the PFW Baccalaureate Framework (Senate Reference No. 05-17) which was developed to ensure students who earn a baccalaureate degree at PFW will be able to apply their knowledge to the needs of an increasingly diverse, complex, and dynamic world. The framework has six foundations which are interdependent, with each one contributing to the integrative and holistic education offered at PFW.

Table 2. Alignment of ME program outcomes to PFW Baccalaureate framework.

Program Outcomes	PFW Baccalaureate Framework
(a) An ability to apply knowledge of mathematics, science, and engineering *(b) An ability to design and conduct experiments, as well as to analyze and interpret data*	Acquisition of Knowledge
(c) An ability to design both thermal and mechanical systems, components, or processes to meet desired needs within realistic constraints such as economic, environmental, social, ethical, safety, manufacturability, and sustainability	Application of Knowledge
(d) An ability to function on engineering and science laboratory and project teams as well as multi-disciplinary teams	Communication
(e) An ability to identify, formulate, and solve mechanical engineering problems	Critical Thinking and Problem Solving
(f) An understanding of professional and ethical responsibility	Personal and Professional Values
(g) An ability to communicate effectively in both verbal and written forms	Communication
(h) The broad education necessary to understand the impact of engineering solutions in a global and societal context	Personal and Professional Values
(i) A recognition of the need for, and an ability to engage in life-long learning	Application of Knowledge
(j) A knowledge of and exposure to contemporary issues	A Sense of Community
(k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice, including analysis and design.	Acquisition of Knowledge

5. Program Assessment and Evaluation

The framework for continuous improvement is the Assessment Plan. The Mechanical Engineering Assessment Plan contains the processes for regularly assessing and evaluating the extent to which program educational outcomes and program outcomes are being attained. Assessment is defined as one or more processes that identify, collect, and prepare the data necessary for evaluation.[2] Evaluation is defined as one or more processes for interpreting the data acquired though the assessment processes in order to determine how well the program educational outcomes and program outcomes are being attained.

Several measurement instruments or tools, both direct and indirect, are used in the assessment process. In all cases, the collected information is first reviewed by the assessment committee and then forwarded to the appropriate committee or faculty member, who is charged with the responsibility of making recommendations or suggesting corrective actions. Some recommendations are presented to the entire faculty for discussion. The final action is feedback, which translates into possible changes in a single course or lab, content changes in the curriculum, or changes in the program. This process is documented in the Mechanical Engineering Assessment Plan. This assessment report is also shared with the Industry Advisory Board members for their feedback.

The rest of this section describes the assessment, evaluation, and attainment of the program educational objectives (Section 5.1) and program outcomes (Section 5.2).

[2] 2011-2012 ABET Criteria for Accrediting Engineering Programs

5.1. Assessment of Program Educational Objectives

The PFW Department of Engineering has had a procedure (see the Mechanical Engineering Assessment Plan) in place for the periodic evaluation of the relevance and appropriateness of program educational outcomes since 2006. This cycle was implemented in 2008-2010 and based on input from the 2011 ABET review team again in 2011-2012. The appropriateness and adequacy of program educational outcomes is a main topic of discussion and feedback at annual Industrial Advisory Board meetings.

According to the assessment plan, achievement of the program educational outcomes of the mechanical engineering program are to be assessed using the five measurement tools listed in Table 3.

Table 3. Measurement tools of program educational outcomes and frequency of use.

Measurement Tool	Frequency
1. Employers (Supervisor) Survey and Feedback	Once a year
2. Alumni Survey	Once a year
3. Admittance to Graduate School	Once a year
4. Program Outcomes	Every semester
5. Industry Advisory Board Meeting	Once a year

5.1.1. Alumni and Employer Surveys

Alumni surveys were conducted in the summer 2018. Online surveys were sent via email to all 2013-14 graduates of the mechanical engineering program (the list was provided by the Alumni Office). A total of 24 surveys were sent out and 12 surveys were returned.

Table 4 shows a summary of the alumni responses. Overall, the respondents agree that the PEOs are being achieved. They feel that improvements to the program can be made by including more coverage on engineering management, quality and reliability, and drafting standards, specifically GD&T (Geometric Dimensioning and Tolerancing). Note that GD&T is currently covered in ME 160 Solid Modeling and ME 369 Design of Machine Elements. In response to the alumni request for more coverage on drafting standards, one-hour lecture on GD&T will be also given to the senior capstone design students in ME 487 starting from Fall 2018, in addition to increasing the coverage of the topic in ME 160 and ME 369.

Alumni employer surveys were conducted in the summer 2018. 2013-14 graduates of the mechanical engineering program provided their supervisor’s contact information. 7 online surveys were sent out via email and 2 were returned. The employer responses are summarized in Table 5. The 2 respondents feel that the PEOs are adequate being achieved.

Table 4. Summary of alumni survey results.

	Responses (12 responses)
Current position (title)	Reliability Engineer II, Heavy Section Mill Mechanical Engineer, Sr. Technical Service Engineer (Applications Engineering), Customer Service Manager, Sr. Quality Assurance Engineer, Designer, Project Engineer, Industrial Engineer, Sr. Combustion Engineer, Graduate Student
Current salary range	\$0-\$40K (1), \$61K-\$70K (4), \$71K-\$80K (6), \$100K or more (1)
Job function	Design/analysis (7), Lab and test engineering (3), engineering support (3), engineering management (1), education (2), field engineering (1), non-engineering (sales, business, etc.) (1), other (5) - Reliability, maintenance engineering, new product development, and managing the maintenance department, review of all prints, identification of functional inputs/outputs that drive risks, risk mitigation, verification and validation activities, and project management.
Area of work	Dynamics (5), Mechanics (5), Thermal Science (5), Control (1), Mechatronics (1), Other (3) – Fatigue analysis, Fluid Dynamics

PEO achievement	Response/Score	Comments/Recommendations
I am prepared to function and communicate effectively both as individuals and in multidisciplinary teams to solve technical problems.	strongly agree = 0 agree = 12 disagree = 0 strongly disagree = 0	Incorporate quality and reliability into some courses or create a separate course. Some more practical hands on experience.
The program does not require any changes to improve this objective. *I recommend the following measures to prepare graduates better to meet this objective:* See Comments/Recommendations.	8 3	I regret that I did not get any “hands on” education with basic circuit design. A basic 200 level course where an ME student builds simple circuits (maybe programs an Arduino as well?) would have been VERY useful. Maybe a modification to the robotics lab, or an alternative to the robotics course?
I have been advanced professionally to roles of greater mechanical engineering responsibilities and/or by transitioning into leadership positions in business, government, and/or education. *The program does not require any changes to improve this objective.* *I recommend the following measures to prepare graduates better to meet this objective:* See Comments/Recommendations.	strongly agree = 0 agree = 8 disagree = 2 strongly disagree = 0 8 3	This all depends on the individual. I think the program is easy enough that non-dedicated students can get through it and will just coast through their jobs without any drive to achieve more. There is no "leadership" class in engineering (that I am aware of). I don't know if leadership roles are the intended focus of the engineering program, but this facet of learning is not explicitly addressed by the engineering program.

I am able to participate in life-long learning through the successful completion of advanced degree(s), professional development, and/or engineering certification(s)/licensure. *The program does not require any changes to improve this objective.* *I recommend the following measures to prepare graduates better to meet this objective:* See Comments/Recommendations.	strongly agree = 0 agree = 10 disagree = 1 strongly disagree = 0 9 2	Again, odd question as this completely depends on the individual. This is more a function of the individual person, not something that is instilled by the engineering program. The only way that the program could instill this in a student is to identify and nurture the student's preferred focus.
I have a commitment to community by applying technical skills and knowledge to support various service activities. *The program does not require any changes to improve this objective.* *I recommend the following measures to prepare graduates better to meet this objective:* See Comments/Recommendations.	strongly agree = 0 agree = 10 disagree = 1 strongly disagree = 0 9 2	I don't think I learned anything that gave me an extra drive to support service activities. I have that drive but I didn't learn it at PFW. I'm not sure if this is the objective of an engineering program. To achieve this goal, the faculty needs to be very active in supporting students involvement in organizations that do these service activities.
Overall, the ME PEOs are adequate.	yes = 5 no = 6	Incorporate introductions to quality and reliability into curriculum A course in engineering management would go a long way, which could be implemented as a technical elective. Almost all of my jobs have involved managing people and ordering/product and materials. So a little business knowledge and management skills would go a long way. Larger focus on GD&T would be helpful for actual work applications, finding more ways to incorporate how theories are realistically used in application. I did not learn all that I should have about Fluid Mechanics taking it with Dr. [redacted]. He is not a good professor. I got an A but didn't learn much at all. At least for me, more GD&T would have been helpful as well as a little better understanding of machining capabilities. Basic engineering management (BOM control, product lifecycle management, etc.) are big parts of engineering that need included in the program.

Table 5. Summary of employer survey results.

General Question	Respondent 1	Respondent 2
Current position (title)	Engineering Coordinator	Mechanical Engineering Manager
Number of PFW ME graduates employed by the company	1	1
Primary function(s) of the company	Design, Engineering support, R&D, Engineering management, Project management	
Overall rating of the education received by the graduates as it relates to his/her preparation	excellent = 1 good = 1	
Any recommendation that is necessary to improve PFW ME graduates' education to better prepare them for the job market	In our line of work some of the elective courses are helpful like HVAC, but are not available every semester and it is hard for students to take them without postponing their graduation. I know it is hard to justify in many cases, but having more availability would be helpful.	
Compared with graduates of other universities, how well do PFW ME graduates perform?	better = 1 no answer = 1	
Any recommendation that you believe is necessary to improve PFW ME graduates' performance to better prepare them for the job market	I will continue to consider PFW students in the future in no small part due to many of them already living and wanting to stay in this area. We like to draw from the locale talent pool when we can.	
Would you consider hiring additional PFW ME graduates if there were openings?	always = 2	
Any recommendation that is necessary to improve PFW credentials to be more attractive for the job market	Stress the importance of taking the FE test and give them guidance on how to prepare for it. I believe this may be happening, but I know when I was there it was hard to get the required information. I ended up taking it well after I graduated.	

Question on PEO achievement	Response/Score	Comments/Recommendations
PFW ME graduates are prepared to function and communicate effectively to solve technical problems.	strongly agree = 1 agree = 1	
The program does not require any changes to improve this objective.	yes = 1 no answer = 1	

PFW ME graduates have been advancing professionally to roles of greater mechanical engineering responsibilities, and/or transitioning into leadership positions in business, government, and/or education.	agree = 2	
The program does not require any changes to improve this objective.	yes = 1 no answer = 1	
PFW ME graduates are able to participate in life-longing learning through the successful completion of advanced degree(s), continuing education, and/or engineering certification(s)/licensure or other professional development.	agree = 2	
The program does not require any changes to improve this objective.	yes = 2	
PFW ME graduates have a commitment to community by applying technical skills and knowledge to support various service activities.	agree = 1 no answer = 1	
The program does not require any changes to improve this objective.	yes = 2	
Overall, the above listed Program Education Objectives are adequate and do not require any modifications or changes.	yes = 2	
Any additional comments or suggestions	Of the 11 engineers in my department, there are 5 PFW ME graduates including myself. I was able to move into a management position with my education and my replacement (as I hopefully keep moving up the ladder) one day will likely be one of the other PFW graduates.	

5.1.2. Admittance to Graduate School

A measure of the achievement of PEOs is admittance and performance in graduate school. The department attempts to keep track of which students decide to pursue graduate study. A list of alumni known to be currently enrolled in graduate program is provided in Table 6. The Assessment Committee is planning to request feedback in January 2019 regarding the preparedness of our graduates to pursuit graduate study from the graduate advisors of the listed alumni.

Table 6. BSME alumni who are in a graduate program.

Name/Degree/Year	Graduate School	Degree Program
Matt Thompson, BSME, 2013	Purdue University	PHDME
Costas Alfonso, BSME, 2016	Purdue University	MSME
Sotirios Lyrintzis, BSME, 2016	Purdue University	MSME
Raihan Mir, BSME, 2015	University of Memphis	MSME
Joseph-shaahu Shaahu, BSME, 2014	University of Denver	MSME
Drew Hudson, BSME, 2011	PFW	MSE
Adam Fullenkamp, BSME, 2017	PFW	MSE
Trenton Kern, BSME, 2017	PFW	MSE
Josh Cripe, BSME, 2018	PFW	MSE
Matthew Bracken, BSME, 2018	PFW	MSE
Jackson Jaworski, BSME, 2018	PFW	MSE
David Ruiz, BSME, 2018	PFW	MSE
Andrew Speck, BSME, 2018	PFW	MSE
Joel Thompson, BSME, 2018	PFW	MSE

5.1.3. Program Outcomes

As shown in Table 1, the program outcomes are related to the program educational outcomes. Attainment of the program outcomes is a necessary condition for the achievement of the program educational outcomes, but not sufficient to demonstrate that our program educational outcomes are being met. Our assessment process requires the achievement of program outcomes be considered as a first step in the achievement of program educational outcomes. In general, our program outcomes are being met. Achievement of the program outcomes is demonstrated in Section 5.2.

5.1.4. Industry Advisory Board Meeting

An advisory board meeting was held on Friday, April 20, 2018. The details of the meeting are summarized in a report (Industrial Advisory Board Meeting – ME Program Report) that archived with the assessment material and posted online. Presentations were given by:

- Nash Younis, department chair, on an overview of the CME department and replacement of the old ABET program outcomes (a)-(k) with the new ABET program outcomes 1-7,
- Manoochehr Zoghi, dean of ETCS, on overview of ETCS,
- Professor Don Mueller on various industry-university engagement opportunities,
- Professor Rebecca Essig, coordinator of the First-Year Engineering Program, on the current status

of the first-year engineering program.
After the meeting the Manufacturing Engineering Conference was held.

Closing the Loop – Program Educational Objectives Assessment

- The department has established a new set of PEOs in 2011-12. The department has developed and implemented a new online survey tool and has begun the process of assessing the PEOs by surveying alumni and employers. According to 2018 alumni and employer surveys, overall the current PEOs are adequate and being achieved. The survey response rate this time is substantially high compared to previous years though, the department should continue seeking a way to improve this rate, especially the response rate of employers, and collect the comments to provide the assessment process with more meaningful input data.
- In a continuous effort to better align with specific needs of Northeast Indiana and serve our students, the department has launched in the fall 2017 two certificate programs: *Advanced Manufacturing Engineering Certificate* (AMEC) and *Bio-mechanical Engineering Certificate* (BMEC). There are 8 and 4 students currently enrolled in the AMEC and BMEC programs, respectively. The department should keep promoting these programs and seek more industrial supports (e.g., company endorsements, scholarships, extra-curricular activities, etc.).
- The department held its annual IAB meeting in April 2018. At this meeting, the IAB
  - confirmed that our PEOs are adequate and relevant,
  - expressed support for the combined BSME/MSE program,
  - expressed support for AMEC and BMEC programs

5.2. Assessment of Program Outcomes

According to the assessment plan, the program outcomes are to be assessed using the measurement tools listed in Table 7. The assessment and evaluation of the student outcomes for the spring 2017 semester is presented as follows.

Table 7. Measurement tools for program outcomes

Measurement Tool	Frequency
Course Assessment by Instructors	Every Semester
Capstone Senior Design Assessment: Industrial Sponsor	Every Semester
Capstone Senior Design Assessment: Faculty	Every Semester
Fundamentals of Engineering (FE) Exam	Every Semester
Assessment by Students	
▪ Course Outcomes	Every Semester
▪ Laboratory Evaluation	Every Semester
▪ Engineering Student Forums	Once a Year
Exit Interview	Every Semester
Co-Op Education Coordinator	Every Semester

5.2.1. Assessment of First Year Engineering Course Outcomes

The first-year engineering program has three overall (two-semester) outcomes. A student who successfully completes the first-year engineering program (ENGR 127 and 128) will be able to:

1. *solve and document the solution of problems involving different elements or configurations not previously encountered (e.g. a new geometric arrangement, a new term to include in an analysis, a new type of starting condition)*
2. *solve problems using multiple approaches including (e.g., equations including varied analytic approaches, diagrams, formal solution steps or simple computer programs)*
3. *describe the broad nature of various engineering majors and the engineering profession and use this information to make appropriate career choices*

Table 8 summarizes the relationship between the course outcomes and the ME program outcomes. Each outcome is mapped to the first-year engineering courses based on the degree to which the outcome is addressed using a scale of Low (L), Medium (M), or High (H).

Table 8. Mapping of first year engineering course outcomes to Mechanical Engineering program outcomes.

Course	ME Program Outcomes										
	a	b	c	d	e	f	g	h	i	j	k
ENGR 127 Engineering Fundamentals I	H	M		H	L	H	M		L		H
ENGR 128 Engineering Fundamentals II	H		M	H	L	L	H				H

The assessment of the freshman engineering courses was independently conducted by the First-Year Engineering Program Committee which includes faculty members from both Civil and Mechanical Engineering and Electrical and Computer Engineering departments. The 2017-2018 assessment report for first year engineering courses is archived in departmental assessment library for faculty to review. The following is a summary of the report.

The results of the assessment process indicate that course and program outcomes related to first-year engineering are being achieved. Specifically,

- Student and faculty assessment indicate that overall the course outcomes are being achieved.
- Student success within subsequent sophomore-level courses showed an increase in two out of three courses evaluated.
- When looking at the first-year engineering exit survey results, students showed satisfaction in all assessed areas except the textbook. Upon further investigation of the student comments, it appears that students did not understand the survey covered both ENGR 127 and ENGR 128 because many comments stated the course did not require a textbook which is only true for the ENGR 128 course. This mistake is understandable given the number of surveys students are given at the end of the semester, so greater emphasis on the scope of the exit survey provided by the administrator is recommended in future semesters.

Additional FYE program studies reveal that:

1. A previous study indicated that students with a grade of C in dual-credit math courses might not be prepared for success in an engineering program.
2. Retention rates within the FYE program increased by 16% over the last school year.
3. ABET evaluators highlighted the strengths of the FYE program in their Final Statement granting reaccreditation to the engineering programs at Purdue Fort Wayne. No areas for improvement were indicated.

Efforts to close-the-loop with regards to issues from previous semesters include:

1. Lab materials for ENGR 12700 were adjusted to better convey real world example problems as well as emphasize the multiple methods available to solve problems.
2. Activities were developed to better coordinate the lab and studio material to allow students to practice concepts in multiple contexts.

Topics for the first-year engineering committee to consider in 2018-2019 include:

1. Additional study between math placement and student performance. The committee plans to investigate the possibility of requiring the math placement test or AP exam for admission into an engineering program.
2. Making slight modifications to scheduling to better accommodate students and avoid scheduling conflicts with other required courses.

5.2.2. Faculty Assessment of Course Outcomes

A historical record of course assessment along with a schedule of future courses to be assessed is listed in the Appendix A.

Starting in the fall 2011, new faculty assessment report forms have been developed and used. These new forms have improved the quality of the assessment data collected and provide consistency among all courses in the program. These forms ask the faculty to assess student achievement of course outcomes and then the forms translate the course outcome achievement into program outcome achievement. The faculty use a combination of the following criteria when assessing the course outcomes:

Criterion 1: The average of students in the assessment tool is equal to or greater than (e.g., 75%)
Criterion 2: The percentage of students with grade 70 or more is at least equal to (e.g., 70%)
Criterion 3: The percentage of students passing the assessment tool is greater than (e.g., 75%)
Criterion 4: The average grade of students passing the assessment tool is at least equal to (e.g., 75%)
Criterion 5: Overall, students' participation in a team was effective
Criterion 6: Faculty observation of students' function in a team is satisfactory

Current policy is that the faculty assessment report forms are emailed to the faculty at the start of the semester. There is an introduction to CME assessment process every semester, where all instructors are invited and first time instructors are expected to attend. At the end of the semester, faculty members are to email the completed forms to an assessment account (an electronic repository for all assessment related material). Printed versions of these forms, along with student assessment data, are compiled in a course assessment repository maintained by the department. A summary of the faculty assessment of student achievement is given in Table 9 through Table 11.

As shown in Table 9 through Table 11, from the faculty point-of-view all of the course outcomes assessed were achieved – either adequately or strongly. The comments and recommendations from the instructor of ME 361 can be found in the Appendix B. Table 10 and Table 11 show the assessment of the senior capstone design I (ME 487/ENGR 410) and II (ME 488/ENGR 411) courses, respectively. Four projects from senior capstone design I and 3 projects from design II were assessed by the faculty advisors for the projects as well as the senior capstone design coordinator. The results show that all the course outcomes were achieved – either adequately or strongly.

Table 9. Faculty evaluations of course outcomes (COs) for required courses and technical electives.

Course Outcome	ME160	ME293	ME319	ME321	ME361	ME427	ME505	ME545
1	Y/A	Y/A	Y/S	Y/A	Y/A	Y/S	Y/S	Y/A
2	Y/S	Y/S	Y/S	Y/A	Y/A	Y/S	Y/S	Y/S
3	Y/A	Y/S	Y/S	YA	Y/A	Y/S	Y/S	Y/S
4	Y/S	Y/A	Y/S	Y/A	Y/A	Y/S	Y/S	Y/A
5	Y/A	Y/A	Y/S	Y/A	Y/A		Y/S	Y/A
6	Y/A	Y/S	Y/S	Y/A	Y/A		Y/S	
7		Y/A	Y/S	Y/A	Y/A		Y/S	
8			Y/S	Y/A	Y/A		Y/S	
9			Y/S	Y/A	Y/A			
10			Y/S	Y/S				
11			Y/S					
12			Y/S					
13			Y/S					
14			Y/S					
15			Y/S					
POs mapped to achieved COs	a, g, k	a, b, g, k	a, b, c, d, e, g, h, k	a, c, e, g, k	a, c, e, g, k	a, c, e, f, g, h, i, j	a, e	a, c, e, k, g
POs mapped to not achieved COs								

Note: 1) Y/A = Yes, adequately; Y/S = Yes, strongly; NO = Not achieved

Table 10. Faculty evaluations of course outcomes (COs) for senior capstone design I course.

COs	ME 487/ENGR 410			
	Projects 1	Projects 2	Project 3	Project 4
1	Y/A	Y/S	Y/S	Y/S
2	Y/A	Y/A	Y/S	Y/S
3	Y/A	Y/A	Y/S	Y/S
4	Y/A	Y/A	Y/S	Y/S
5	Y/A	Y/A	Y/S	Y/S
6	Y/A	Y/A	Y/S	Y/S
POs mapped to achieved COs	a, c, d, e, f, g, h	a, c, d, e, f, g, h	a, c, d, e, f, g, h	a, c, d, e, f, g, h
POs mapped to not achieved COs				

Table 11. Faculty evaluations of course outcomes (COs) for senior capstone design II course.

COs	ME 488/ENGR 411			
	Project 1	Project 2	Project 3	Coordinator Assessment
1	Y/S	Y/S	Y/S	
2	Y/S	Y/S	Y/S	
3	Y/A	Y/S	Y/A	
4	Y/S	Y/S	Y/S	
5				Y/S
6				Y/S
7				Y/S
8				Y/S
9				Y/S
POs mapped to achieved COs	c, d, g	c, d, g	c, d, g	f, g, h, i, j
POs mapped to not achieved COs				

Note: 1) Y/A = Yes, adequately; Y/S = Yes, strongly; NO = Not achieved

5.2.3. Assessment of Capstone Senior Design Course Outcomes

The achievement of the capstone senior design course outcomes was assessed by the department faculty. Also, representatives from the sponsoring companies attended the Capstone Senior Design I (ME 487/ENGR 410) and II (ME 488/ENGR 411) presentations at the end of the fall 2017 semester, and all were invited to participate in the evaluations of course outcomes. The faculty and sponsors reported their evaluation using a formal assessment form. A copy of this form can be found in the Mechanical Engineering Assessment Plan. In the Senior Design I Form, the faculty and other attendees were asked to evaluate the ability of senior design students to formulate a problem statement, to generate and evaluate solutions, to obtain a final design, and to communicate effectively. In the Senior Design II form, the attendees were asked to evaluate the ability of senior design students to build, to test, and to evaluate their design, and to communicate effectively. A score of 4 indicates that the level of the achievement of the outcome is high while a score of 1 indicates that the level of the achievement of the outcome is low. The desired level is at least 2.8.

The course outcomes of Senior Design I and II courses incorporate 9 POs: *a, c, d, e, f, g, h, i,* and *j*. The average results are shown in Table 12 for Senior Design I and Table 13 for Senior Design II.

The faculty assessment on the Senior Design I (see Table 12) shows that the course outcomes are achieved to a high degree, indicating that program outcomes *a*, *c*, *d*, *e*, *f*, *g* have been achieved. Furthermore, the faculty assessment on the Senior Design II (see Table 13) indicates that program outcomes *c*, *d*, *f*, g, *h*, *i*, and *j* have been achieved to a high degree as well. The sponsor evaluations are also very positive with an average rating of 3.6 out of 4. The sponsor evaluations for senior capstone design projects are included in Appendix C.

Table 12. Faculty assessment of Senior Design I course.

The ability of the students to	ME 487/ENGR 410 (4 projects)
Formulate a problem statement	3.9
Generate solutions	3.8
Evaluate concepts	3.7
Obtain a final design	3.7
Communicate effectively	3.5
Overall	3.7

Table 13. Faculty assessment of Senior Design II course.

The ability of the students to	ME 488/ENGR 411 (3 projects)
Build their design	3.9
Test their design	3.9
Evaluate their design	4.0
Communicate effectively	4.0
Overall	4.0

Closing the Loop – Course and Senior Capstone Design Assessment by Instructors

- According to the faculty, all course outcomes are being met and all program outcomes are being achieved. The sponsor evaluations are also very positive.
- All faculty assessment reports are included in the course repository as a resource for future instructors.

5.2.4. Fundamentals of Engineering (FE) Exam

One independent measure that our program outcomes are being achieved is the Fundamentals of Engineering (FE) Exam. The FE exam is conducted by the National Council of Examiners for Engineering and Surveying (NCEES). It is held in two sessions: the AM session tests the lower division subjects and the PM session tests the upper division subjects. All graduating seniors are strongly encouraged to take the exam. Our desired level achievement on the FE Exam is that PFW students perform at least at the National Average.

In the spring 2018, 2 mechanical engineering students took the exam. All 2 students passed the exam. A copy of the score report is provide in Appendix C. The data size is not large enough for meaningful interpretation of the result this time.

Closing the Loop – FE Exam

Students should be informed of the value of being a licensed engineer when they are enrolled in the freshman engineering courses and continuously encouraged to take the FE exam as they become eligible to take it. The department is currently subsidizing 50% of the FE exam registration fee for our students. The department also provides review sessions twice a year for those who plan to take the exam. In addition, there is a discussion in the freshman engineering courses and senior design courses on how to become a competitive engineer including PE licensing.

5.2.5. Student Assessment of Course Outcomes

Course outcome assessment by students was carried out during the week before the finals exam week at the end of the semester. Based on the recommendations from the previous assessment report (Fall 2017) all the students enrolled in the following courses were asked to assess the course outcomes. Note that these are the same courses for which the course outcomes were assessed by faculty (Section 5.2.2).

Students state the level at which they believe that the course outcome has been achieved on a scale of 1 to 4. The desired level achievement is at least 2.8.

Table 14 summarizes the results of the student evaluations of the course outcome achievement for ME courses assessed in the spring 2018. Note that the number of course outcomes varies by course. Overall, the students feel that course outcomes are being achieved.

The data in Table 14 show that according to the students, course outcome #6 of ME 160 - the POs mapped to this course outcome are *a* and *e*. In addition, course outcome #7 of ME 319 has not been achieved - the PO mapped to this course outcome is *k*. As part of the assessment process, the instructor of ME 160 was requested to comment on the student assessment data and make recommendations as to how the outcomes may better be achieved in the future. Instructor feedback is provided in Appendix E. Department chair has informed that the instructor of ME 319 is no longer associated with the department. These two courses will be reassessed in Fall 2018.

Table 14. Student evaluation of course outcomes (COs). Desired level: 2.8 or higher.

Course Outcome	ME 160	ME 293	ME 319	ME 321	ME 361	ME 427	ME 487	ME 488	ME 505	ME 545
1	3.3	3.5	2.9	3.8	3.4	3.9	3.4	3.6	3.0	3.4
2	3.3	3.8	3.6	3.7	3.6	3.7	3.6	3.7	3.3	3.1
3	3.1	3.4	3.4	3.3	3.8	3.8	3.5	3.7	3.2	3.3
4	3.3	3.6	3.3	3.7	3.7	3.8	3.8	3.5	3.3	3.1
5	3.0	3.6	3.1	3.7	3.1		3.6	3.7	3.3	2.9
6	2.7	3.5	3.3	3.5	3.3		3.5		3.2	
7		3.9	2.7	3.2	3.1				3.2	
8			3.0	3.2	3.3				3.2	
9			3.6	3.1	3.4					
10			3.4	3.1						
11			3.2							
12			3.0							
13			3.7							
14			3.3							
15			3.4							
POs mapped to achieved COs	a, g, k	a, b, g, k	a, b, c, d, e, g, h, k	a, c, e, g, k	a, c, e, g, k	a, c, e, f, g, h, i, j	a, c, d, e, f, g, h	c, d, f, g, h, i, j	a, e	a, c, e, k, g
POs mapped to not achieved COs	a, g		k							

Note: 1) strongly agree = 4, agree = 3, disagree = 2, strongly disagree= 1 that the outcome has been achieved.
2) Lab outcomes
3) ME 487 and ME 488 include ENGR 410 and ENGR 411, respectively.
4) Values in parentheses are previous evaluations, presented for comparison.
5) Multiple COs are mapped to the same POs, thus some POs are shown to be mapped to both achieved and not-achieved COs.

Closing the Loop – Course Assessment by Students

- ME 160: The instructor of ME 160 has submitted feedback in Appendix D. This course will be reassessed in Fall 2018.
- ME 319: This course will be taught by a new instructor and thus will be reassessed in Fall 2018.

5.2.6. Laboratory Evaluation

This assessment is typically carried out during the week before the finals exam week at the end of semester. Students are asked to give a score of 1 to 4 for each question on the assessment form. The desired level is at least 2.8. The evaluation form used can be found in the Assessment Plan.

No laboratory evaluation by students was conducted in the spring 2018 semester. The most recent student evaluation was carried out Fall 2017 and the results show that the students are satisfied with the lab equipment to a high degree.

Closing the Loop – Laboratory Evaluation

- The department, following the 5-year laboratory improvement plan (see Appendix F) prepared by the Laboratory and Safety Committee, updated/upgraded the lab equipment for ME 293, ME304, ME 319, and ME 322 in 2017. As a result, student evaluations have greatly improved to a high degree. In the fall 2018 semester, ME 293 and ME 319 labs will be assessed as these labs have some new equipment.
- All labs in the department are safety-certified by the university. The certification is to be renewed every year.

5.2.7. Student Forum

A student forum was held on March 26, 2018 and its summary can be found in the Appendix G.

5.2.8. Exit Interview

All graduating seniors are required to complete an exit survey on ME POs at the end of their last semester. A part of the exit survey is devoted to assess the curriculum, the laboratories, and the achievement of the program outcomes. The exit survey form can be found in the ME Assessment Plan.

In the spring 2018, 14 mechanical engineering students graduated. All 14 students completed and returned the exit survey. The original exit survey forms completed by the students are kept in a file. The survey results are summarized in Table 15. To give a historical perspective, results from the spring 2017 and fall 2017 semesters are also included in the table. It can be seen that overall our graduating students strongly believe our mechanical engineering program outcomes are being achieved. In most categories, the score is significantly higher than the desired level of 2.8. It is noticed that the student evaluations on program outcomes j are lower than other categories, which requires further monitoring to determine if it is a trend or just an isolated case.

The exit survey data is available to the faculty through the data collection binders.

Table 15. Results from Spring 2017 (20 responses), Fall 2017 (14 responses), and Spring 2018 (14 responses) exit surveys on ME POs.

	Program Outcomes	Spring 2017	Fall 2017	Spring 2018
a.	Adequately prepared you to apply the knowledge of mathematics, science, and engineering	3.5	3.5	3.6
b.	Adequately prepared you to design and conduct experiments, as well as to analyze and interpret data	3.5	3.2	3.4
c.	Adequately prepared you to design systems, components, or processes to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	3.4	3.2	3.3
d.	Has cultivated in you an ability to function in group or on multi-disciplinary teams	3.2	3.2	3.4
e.	Has enabled you to identify, formulate, and solve engineering problems	3.3	3.4	3.6
f.	Adequately familiarized you with an understanding of professional and ethical responsibilities	3.4	2.9	3.3
g.	Provided you the means by which to communicate technical information effectively	3.4	3.1	3.4
h.	Given you the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	3.3	3.0	3.4
i.	Familiarized you with the recognition of the need for, and an ability to engage in life-long learning	3.4	3.2	3.4
j.	Familiarized you with the knowledge of contemporary issues	3.4	2.8	3.2
k.	Enabled you to use techniques, skills, and modern engineering tools necessary for engineering practice	3.4	3.3	3.5

Note: Strongly agree = 4, agree = 3, disagree = 2, strongly disagree = 1

Figure 1 shows the student responses related to the ME curriculum. Students are satisfied with frequency of courses in the major – note that all required mechanical engineering courses and labs are offered every semester. Students seem satisfied with their background in science and mathematics to a high degree.

Student satisfaction with general education courses has slightly increased, but still low. A list of topics that students felt should be included or emphasized more in the curriculum have been extracted from the exit surveys and included in Appendix H.

Figure 2 shows the level of satisfaction with labs and computer hardware. Students seem satisfied with computer hardware and software. Note that the Engineering & Technology Building underwent a $500K network wiring upgrade in the summer of 2015. Note also that the computers in ET315 (CME Computer Lab) were replaced with new computers in the fall of 2015.

Figure 3 shows that students are highly satisfied with the mechanical engineering faculty.

In the students' comments about the current ME curriculum and faculty, the assessment committee has noticed a number of comments expressing dissatisfaction with one particular course; ME 318 Fluid Mechanics. Similar comments were also found in the Fall 2017 exit survey. The followings are the comments from the exit survey:

What topics would you recommend to be given more emphasis or to be introduced in the curriculum?

Respondent	Comment
1	Better Fluid Mechanics
2	Programming
3	Dynamics and Fluid Mechanics
4	Calculus
5	More emphasis on Quality, Six Sigma, etc.
6	None
7	MEP Design, ASHREA Courses
8	Fluid Mechanics needs to be taught better.
9	Mechanics of Materials, Fluid Mechanics
10	Make course less theoretical and include more real-life examples.
11	Real-life examples
12	Statics, Dynamics, Fluid Mechanics
13	Fluid Mechanics
14	Fluid Mechanics

Additional comments about the faculty

Respondent	Comment
1	
2	Dr. [redacted] should be removed.
3	
4	
5	The Fluid Mechanics course was very poorly taught.
6	The only professor I had an issue with was Dr. [redacted]. His grading and teaching style were unsatisfactory.
7	
8	Good teachers
9	Certain professors shouldn't be allowed to teach the same courses every semester.
10	There are several outstanding professors who were great to have teach, many were exceptional, and then there was one who made it difficult to learn and comprehend Fluid Mechanics.
11	
12	
13	
14	

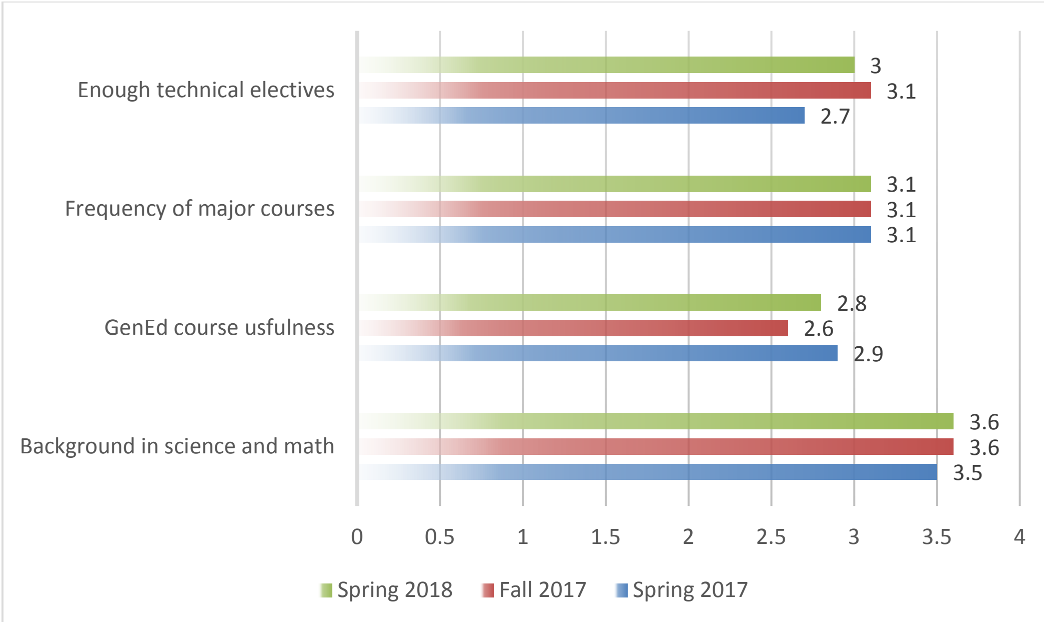


Figure 1. Spring 2017 (20 responses), Fall 2017 (14 responses), and Spring 2018 (14 responses) exit survey – curriculum.

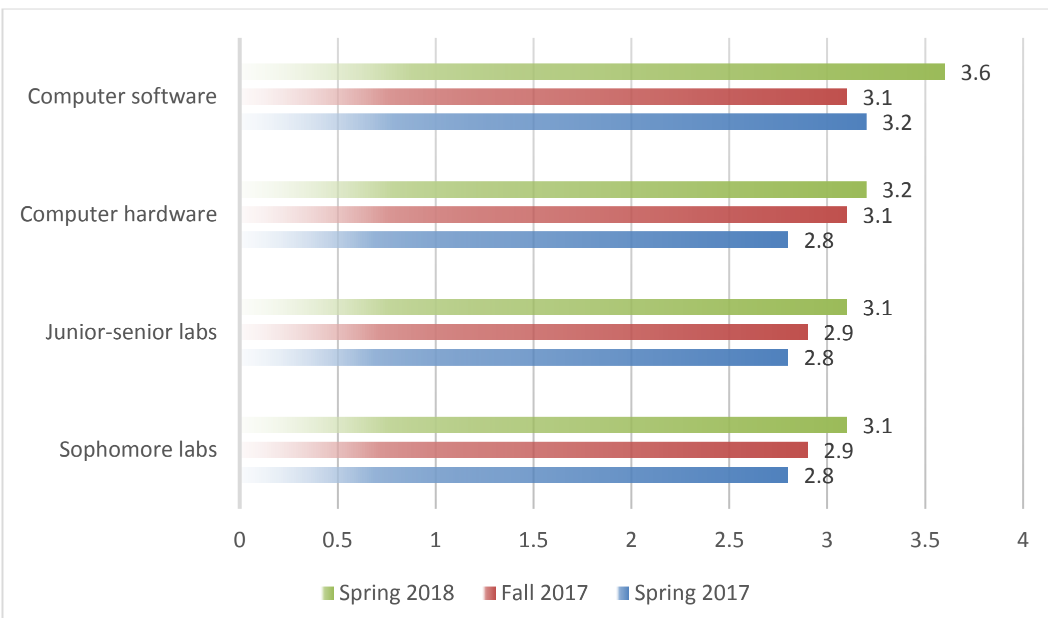


Figure 2. Spring 2017 (20 responses), Fall 2017 (14 responses), and Spring 2018 (14 responses) exit survey – computers and labs.

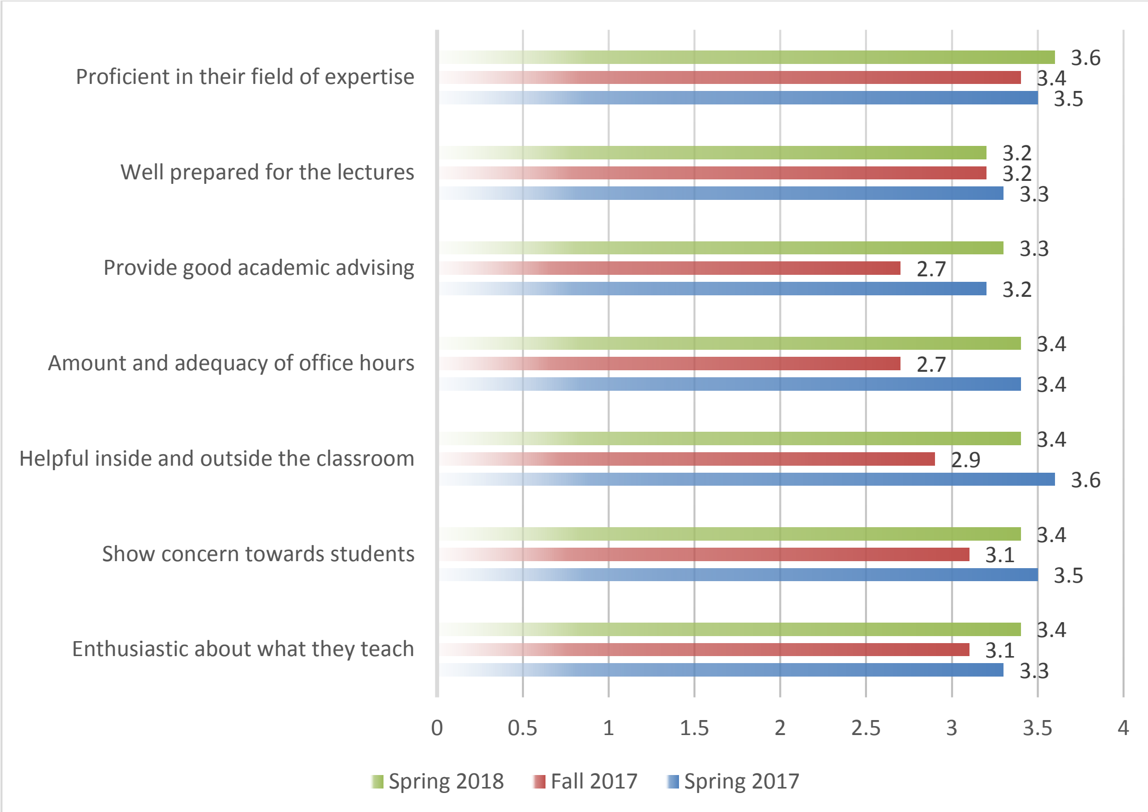


Figure 3. Spring 2017 (20 responses), Fall 2017 (14 responses), and Spring 2018 (14 responses) exit survey – faculty.

Closing the Loop

1. *Laboratories* – Efforts have been successful in updating/upgrading the labs. The exit survey results show that students are satisfied to a high degree. The university provided $100,000 for the plan in 2017 prior to the ABET visit in 2017 for accreditation. ME293, ME 304, ME 319, and ME 322 labs were updated in 2017. Continuous efforts and timely funding from the university are required in maintaining the labs and lab facilities updated, especially engineering software. The 5-year lab improvement plan is to be efficiently implemented.
2. *Availability of Courses* (especially technical electives) – Currently, all required courses are offered each semester. The department tries to offer at least five or six technical elective each year (assuming sufficient demand). In addition, students have the option to take at least one technical elective course from outside the department. The curriculum committee continuously reviews the curriculum and expands the list of eligible technical elective courses. ME 545 *Finite Element Analysis: Advanced Theory and Application* and ME 546 *CAD/CAM Theory and Advanced Applications*, and ME 547 *Mechatronics, Robotics, and Automation* have been added to the technical elective course list.
3. The department should be concerned about the student comments from the Fall 2017 and Spring 2018 exit surveys regarding ME 318 Fluid Mechanics. The department may need to work with the instructor to address the issue. This course will be assessed in the Fall 2018 semester.

5.2.9. Co-op Education Coordinator Report

The department encourages students to participate in the University's Cooperative Education Program (co-op). Employment with private industry or government agencies is arranged by the University's Cooperative Education Program Office. Students are paid by the employer. Participating students must maintain a 2.5 GPA average, but credits earned for co-op work cannot be used to satisfy the requirements for a major.

In the spring 2018 semester, 4 mechanical engineering students were participating in the co-op program. Table 16 shows the student level and the sponsoring companies, along with the student's self-rating and supervisor's rating. In all cases, the ratings are all either Outstanding or Very Good.

Table 17 indicates performance factors and areas of competence the students (1 through 5) can achieve through the co-op experience. The items below can be mapped to the mechanical engineering program outcomes. The number indicates the student's level of performance in these areas during the current work term as reported by the supervisors.

As can be seen in the table, most scores are either 2 (Very Good) or 3 (Average). There are no scores of marginal or unsatisfactory.

In the spring 2018 co-op report, the co-op coordinator reported that "the Mechanical Engineering curriculum is preparing the students well for the Cooperative Education jobs. Overall, the employers are satisfied with the academic preparations of the students".

The complete report by the co-op coordinator can be found in the assessment materials repository.

Table 16. Employer (supervisor) and student's rating of co-op performance.

Student(class)	Employer	Student's rate of the overall performance	Employer's rate of the overall performance
Student 1 (Sr)	Trelleborg	Very Good	Very Good
Student 2	Wayne Metals	Very Good	Very Good
Student 3 (Jr)	Zimmer Biomet	Average	Very Good
Student 4 (Sr)	Wayne Metals	Very Good	Very Good

Table 17. Employer (supervisor) rating of co-op performance.

Measurements Related to the Program Outcomes	Student			
	1	2	3	4
Ability to integrate theory (academic learning) and practice (co-op experience)	3	3	2	2
Academically prepared for this job (course preparation)	3	3	2	2
Communicates clearly in written form	3	3	2	1
Communicates clearly verbally	2	3	2	2
Demonstrates ability to use decision making skills	3	2	2	2
Demonstrates analytical problem solving skills	3	3	2	2
Demonstrates necessary technical skills	3	3	2	2
Demonstrates ability to apply technical knowledge/skills	2	3	2	2
Demonstrates the necessary computer skills	2	3	2	2
Demonstrates ability to design	3	2	2	2

1 = Outstanding, 2 = Very Good, 3 = Average, 4 = Marginal, 5 = Unsatisfactory, – = Not Applicable

5.3. ABET Evaluation of ME Program

In fall 2017, the Engineering Accreditation Commission (EAC) of ABET visited the PFW campus and evaluated the ME program for accreditation. In its Final Statement (August 28, 2018), the EAC has concluded that the current ME program has no *Deficiency*, *Weakness*, *Concern*, or *Observation* and granted the ME program reaccreditation to September 30, 2024. The ABET EAC's Final Statement for the ME program is included in Appendix I.

6. Summary and Recommendations

The results of the assessment process described in this report indicate that the program outcomes are being achieved. The results also indicate that the students are satisfied with the mechanical engineering program. ABET has granted reaccreditation to the ME program in their Final Statement for 2017-2018 engineering program evaluations, with no areas for improvement.

As part of the continuous improvement process, the following measures have been implemented or are being implemented this semester:

- The assessment materials are being archived, in chronological order, into two types of binders. One type of binder is for the course assessment materials and the other type is for the rest of the materials; e.g., surveys, forums, and co-op report. These materials are available for the faculty to review.
- This assessment reports have been circulated among the ME faculty members for their feedback and discussed at the faculty meetings.
- The ME assessment reports have been shared with the IAB members for their input.
- For the continuous improvement process to be effective, any shortcomings exposed by any assessment measure must be addressed accordingly.
- The department should keep seeking ways to improve the response rate of Employer and Alumni Survey for more meaningful assessment results. Currently,
    - co-op office provided us with the most updated contact information (emails) of the alumni
    - survey is sent with a letter (mostly electronically) explaining the importance of the feedback to the program
    - gentle reminder is sent to alumni explaining the importance of doing the survey
- All labs of the department are safety-certified by the university. This certification is to be renewed every year.
- The department should keep encouraging our students to take the FE exam.
- New certificate programs, *Advanced Manufacturing Engineering Certificate* and *Bio-mechanical Engineering Certificate*, are in place from Fall 2017. The department should continue promoting the programs.
- The department should keep offering a CME assessment orientation at the beginning of every fall semester. All new faculty, LTLs and GTAs are expected to attend.

Based on the results of the assessment process described in this report, the courses and laboratories shown in Table 18 are scheduled for assessment at the end of the fall 2018 semester. A historical record of course assessment can be seen in the Appendix A. For each course the instructor will assess the course and program outcomes and the students will assess the course outcomes.

Table 18. Courses and laboratories to be assessed in the fall 2018.

Courses	ME Courses	ME 160, CS 227, ME 318, ME 480, ME 547
	Capstone Senior Design Courses	ME 487, ME 488, ENGR 410, ENGR 411
Laboratories	Course Outcomes	ME 304, ME 319
	Facilities/Equipment	ME 293, ME 319

Appendix A: Course Assessment Schedule

	Course/Lab	S14	F14	S15	F15	S16	F16	S17	F17	S18	F18
Engineering and Fundamentals	ENGR 127 Fundamentals of Engineering I		✓		✓	✓	✓	✓	✓	✓	x
	ENGR 128 Fundamentals of Engineering II			✓		✓	✓	✓	✓	✓	x
	CS 227 Introduction to C Programming					✓					x
	ECE 201 Linear Circuit Analysis		✓	✓	✓	✓	✓				
ME Core Courses	ME 160 Solid Modeling					✓				✓	x
	ME 200 Thermodynamics I			✓					✓		
	ME 250 Statics	✓	✓	✓		✓	✓				
	ME 251 Dynamics				✓	✓	✓	✓			
	ME 252 Strength of Materials					✓	✓	✓	✓		
	ME 293 Measurement & Instrumentation			✓			✓	✓			
	ME 293 Measure & Instrument. Lab									✓	
	ME 293 Measure & Instrument. Lab (Equip. Eval.)			✓			✓	✓			x
	ME 301 Thermodynamics II	✓				✓		✓	✓		
	ME 303 Materials Science & Engineering				✓	✓					
	ME 304 Mechanics & Materials Lab		✓			✓	✓				
	ME 304 Mechanics & Materials Lab (Equip. Eval.)					✓	✓				
	ME 318 Fluid Mechanics				✓						x
	ME 319 Fluid Mechanics Lab	✓	✓		✓		✓	✓		✓	x
	ME 319 Fluid Mechanics Lab (Equip. Eval.)			✓	✓		✓	✓	✓		x
	ME 321 Heat Transfer		✓	✓						✓	
	ME 322 Heat Transfer Lab			✓				✓			
	ME 322 Heat Transfer Lab (Equip. Eval.)			✓				✓			
	ME 331 System Dynamics		✓				✓				
	ME 333 Automatic Control Systems					✓	✓	✓	✓		
	ME 361 Kinematics & Dynamics Mach	✓			✓					✓	
	ME 369 Design of Machine Elements			✓				✓			
	ME 487 / ENGR 410 Senior Design I	✓	✓	✓	✓	✓	✓	✓	✓	✓	x
	ME 488 / ENGR 411 Senior Design II	✓	✓	✓	✓	✓	✓	✓	✓	✓	x
ME Elective Courses (Courses inactive for an extended period are not listed)	ME 421 Heating & Air Conditioning								✓		
	ME 424 Design and Opt of Thermal Systems				✓						
	ME 425 Intermediate Heat Transfer					✓					
	ME 427 Sustainable Energy Sources and Systems			✓						✓	
	ME 432 Manufacturing Processes	✓			✓						
	ME 471 Vibration Analysis			✓				✓			
	ME 480 Finite Element Analysis				✓						x
	ME 505 Intermediate Heat Transfer									✓	
	ME 544 Modeling and Sim. of ME Systems										
	ME 545 FEA: Adv. Theory & Applications							✓		✓	
	ME 546 CAD/CAM Theory and Adv. Application								✓		
	ME 547 Mechatronics, Robotics, and Automation										x
	ME 550 Advanced Stress Analysis						✓				

Note: Freshman engineering courses are assessed by the First-Year Engineering Program Committee as of spring 2016.

Appendix B: Course Outcome Assessment by Faculty – Instructor's Feedback

ME361 Kinematic and Dynamics of Machinery

Most students have very weak background in Statics and Dynamics. Some don't even know how to draw free body diagrams for multi-body dynamic systems...How did they passed the courses? Some students lack in problem solving skills due to problems with basic math (surprisingly algebra!!!).

This is the weakest student group I ever had. Even worse, most students were not willing to put effort to learn.

Students are not properly trained how to write equations/mathematical expressions in standard form. For example, some write '*x*4' or '4*x*' instead of '4*x*'. Some don't put '=' sign in equations. Student needs more training on using Equation Editor.

Students are not properly trained how to prepare graphs. Some don't put axis-labels, units, proper ticks/tick marks, figure number and caption, and legend.

Appendix C: ME 488-Industrial Sponsor Evaluations

PURDUE UNIVERSITY FORT WAYNE

Department of Civil and Mechanical Engineering
Industrial Sponsor's Assessment
Capstone Senior Design Course Outcomes

The Civil and Mechanical Engineering Department faculty at Purdue University Fort Wayne have developed course outcomes for the capstone senior design course sequence. We are in the process of assessing the degree of achievement of these course outcomes. One important measure is the feedback from our constituents which includes the industry. This academic year, your company is sponsoring one of our Capstone senior design projects. With this form, we seek your valuable feedback regarding this issue. Your input will greatly help us improve our engineering programs. Thank you for your assistant and support.

NAME: Mr. Matt Williams POSITION: Staff Engineer
COMPANY: PHD
Signature: M. Wi Date: 5/1/18
Design Project Title: Flow Control "Needle" Assembly Machine
Team Members: Matthew Bracken, Brian Fleckenstein, Jackson Jaworski, Brody Lynn, Jordan Muzzillo
Faculty Advisor: Dr. Zhuming Bi
Academic Year: 2017/2018

Using the scale **1 for weak to 4 for strong**, please rate the following by circling a number.

1. The ability of the students to formulate a problem statement. 1 2 3 4
2. The ability of the students to generate solutions. 1 2 3 4
3. The ability of the students to evaluate the generated solutions. 1 2 3 4
4. The ability of the students to obtain a final design including, safety, economic, and ethical considerations. 1 2 3 4
5. The ability of the students to build their design. 1 2 3 4
6. The ability of the students to test their design. 1 2 3 4
7. The ability of the students to evaluate their design. 1 2 3 4
8. The ability of the students to function within a team. 1 2 3 4
9. The ability of the students to communicate effectively. 1 2 3 4

Comments:

PURDUE UNIVERSITY FORT WAYNE

Department of Civil and Mechanical Engineering

Industrial Sponsor's Assessment

Capstone Senior Design Course Outcomes

The Civil and Mechanical Engineering Department faculty at Purdue University Fort Wayne have developed course outcomes for the capstone senior design course sequence. We are in the process of assessing the degree of achievement of these course outcomes. One important measure is the feedback from our constituents which includes the industry. This academic year, your company is sponsoring one of our capstone senior design projects. With this form, we seek your valuable feedback regarding this issue. Your input will greatly help us improve our engineering programs. Thank you for your assistant and support.

NAME: Adam R. Clark POSITION: Manufacturing Engineer

COMPANY: GM Assembly Plant

Signature: Adam Clark Date: 5-1-18

Design Project Title: Drive to 95 Direct Run Rate (DRR) Improvement Utilizing 3D Printing

Team Members: Christian Guadique, Spencer Roof, John Rosswurm, David Ruiz, Joel Thompson

Faculty Advisor: Dr. Zhuming Bi

Academic Year: 2017/2018

Using the scale **1 for weak to 4 for strong**, please rate the following by circling a number.

1. The ability of the students to formulate a problem statement.	1	2	3	4
2. The ability of the students to generate solutions.	1	2	3	4
3. The ability of the students to evaluate the generated solutions.	1	2	3	4
4. The ability of the students to obtain a final design including, safety, economic, and ethical considerations.	1	2	3	4
5. The ability of the students to build their design.	1	2	3	4
6. The ability of the students to test their design.	1	2	3	4
7. The ability of the students to evaluate their design.	1	2	3	4
8. The ability of the students to function within a team.	1	2	3	4
9. The ability of the students to communicate effectively.	1	2	3	4

Comments:

The guys did a great job. They asked great questions and provide great feed back. It was a pleasure working with them

PURDUE UNIVERSITY FORT WAYNE

Department of Civil and Mechanical Engineering

Industrial Sponsor's Assessment

Capstone Senior Design Course Outcomes

The Civil and Mechanical Engineering Department faculty at Purdue University Fort Wayne have developed course outcomes for the capstone senior design course sequence. We are in the process of assessing the degree of achievement of these course outcomes. One important measure is the feedback from our constituents which includes the industry. This academic year, your company is sponsoring one of our capstone senior design projects. With this form, we seek your valuable feedback regarding this issue. Your input will greatly help us improve our engineering programs. Thank you for your assistant and support.

NAME: Zachary A. Katter POSITION: Engineering Associate
COMPANY: City Utilities Engineering/City of Fort Wayne
Signature: Zachary A. Katter Date: 4/30/18
Design Project Title: 3 Rivers Festival Race Raft
Team Members: Josh Cripe, Seth Fiechter, Evan Lunceford, Andrew Speck, Mitchell Sullivan
Faculty Advisor: Dr. Donald Mueller
Academic Year: 2017/2018

Using the scale **1 for weak to 4 for strong**, please rate the following by circling a number.

1. The ability of the students to formulate a problem statement. 1 2 3 4
2. The ability of the students to generate solutions. 1 2 3 4
3. The ability of the students to evaluate the generated solutions. 1 2 3 4
4. The ability of the students to obtain a final design including, safety, economic, and ethical considerations. 1 2 3 4
5. The ability of the students to build their design. 1 2 3 4
6. The ability of the students to test their design. 1 2 3 4
7. The ability of the students to evaluate their design. 1 2 3 4
8. The ability of the students to function within a team. 1 2 3 4
9. The ability of the students to communicate effectively. 1 2 3 4

Comments: OVERALL THE PROJECT WAS A GREAT SUCCESS. PROBLEM STATEMENT AND EXECUTION OF THE DESIGN WERE WELL DONE. WAS SURPRISED MORE CALCULATIONS WERE NOT COMPLETED BETWEEN THE PROPELLER AND WATER POWER TRANSMISSION. ALL OTHER CALCS AND TESTING WERE GOOD.

Appendix D: FE Exam Report

NCEES
advancing licensure for engineers and surveyors

Examination:	Fundamentals of Engineering (FE)
Report title:	Subject Matter Report by Major and Examination
Exams administered:	Jan 01—Jun 30, 2018
Examinees Included:	First-Time Examinees from EAC/ABET-Accredited Engineering Programs
Graduation Date:	Examinees Testing within 12 months of Graduation Date

Name of Institution:	Indiana University/Purdue University, Fort Wayne		
Major:	**Mechanical**	FE Examination:	**Mechanical**

	Institution	ABET Comparator[2]
No. Examinees Taking [1]	2	4,329
No. Examinees Passing	2	3,444
Percent Examinees Passing	100%	80%

Uncertainty Range for Scaled Score [4]: ± 0.71

	Number of Exam Questions	Institution Average Performance Index [3]	ABET Comparator Average Performance Index	ABET Comparator Standard Deviation	Ratio Score [4]	Scaled Score [4]
Mathematics	6	12.7	10.0	2.8	1.27	0.96
Probability and Statistics	4	8.7	9.8	3.3	0.89	-0.33
Computational Tools	3	15.0	10.5	4.0	1.43	1.13
Ethics and Professional Practice	3	11.1	11.2	3.9	0.99	-0.03
Engineering Economics	3	10.9	10.1	4.1	1.08	0.20
Electricity and Magnetism	3	11.3	10.4	4.0	1.09	0.23
Statics	8	9.6	9.7	2.3	0.99	-0.04
Dynamics, Kinematics, and Vibrations	9	8.9	9.6	2.2	0.93	-0.32
Mechanics of Materials	8	9.0	9.5	2.0	0.95	-0.25
Material Properties and Processing	8	8.4	9.6	2.1	0.88	-0.57
Fluid Mechanics	9	9.9	9.6	2.1	1.03	0.14
Thermodynamics	13	10.7	9.3	1.5	1.15	0.93
Heat Transfer	9	10.9	9.7	2.1	1.12	0.57
Measurements, Instrumentation, and Controls	5	12.3	9.4	3.2	1.31	0.91
Mechanical Design and Analysis	9	8.8	9.2	2.2	0.96	-0.18

1. 0 examinees have been removed from this data because they were flagged as a random guesser.
2. Comparator includes all examinees from programs accredited by the ABET commission noted.
3. Performance index is based on a 0–15 scale.
4. These scores are made available for assessment purposes. See the NCEES publication entitled Using the FE as an Outcomes Assessment Tool at http://ncees.org/licensure/educator-resources/.

TERMS AND CONDITIONS OF DATA USE

This report contains confidential and proprietary NCEES data. The report itself may not be provided to third parties or used for any purpose other than that contemplated by NCEES and the recipient of this report. The information contained in this report however may be shared with accrediting bodies so long as the report recipient expressly informs the accrediting body that the information is confidential and proprietary and may not be used for any purpose unrelated to the accreditation review of the institution or program in question.

By using any of the information contained in this report the report recipient agrees to respect and be bound by these terms conditions and limitations regarding the use of NCEES data. Your cooperation is appreciated.

Appendix E: Instructor Feedback

ME 160

Dear Assessment Committee,

Thanks for sharing students' assessment feedbacks and concern with me. For the course outcome 'use a solid model for motion, simulation, or manufacturing', please find my response as below,

"I have not changed the lectures specially for the specified course outcome for a few of semesters. This is the first time that students felt not sufficient coverage was provided on it. In regards to the concern, I would review the lectures for motion simulation and engineering analysis; I will strength the lecture and demonstration if I find anything missed. Meanwhile, I observed that this was mainly caused by a low participation of lectures and in-class exercises close to the end of semester for those students. In coming semesters, I will make sure that students will be required to learn and complete required exercises on motion simulation and engineering analysis during labs."

Please let me know if it is appropriate. Thanks.

Best regards,

Zhuming

Appendix F: Improvement Plan for ME Labs

Improvement Plan for Civil & Mechanical Engineering Labs

One of the goals for the Civil and Mechanical Engineering Department (CME) is to provide undergraduate civil and mechanical engineering students access to high-quality, ***accredited*** programs that include relevant curriculum, engaged and experiential learning environments, and up-to-date laboratory activities.

Providing our students with up-to-date and safe labs, as well as, new experiential learning environments is important to our evolving curriculum and necessary to produce qualified civil and mechanical engineers to meet the needs of the NE Indiana region. The status of our labs is continuously being monitored as part of our assessment process which is detailed in our assessment plan. In addition, it is required for ABET accreditation of our programs. As shown in Figures 1 and 2, the current assessment measures indicate that our labs are not adequate.

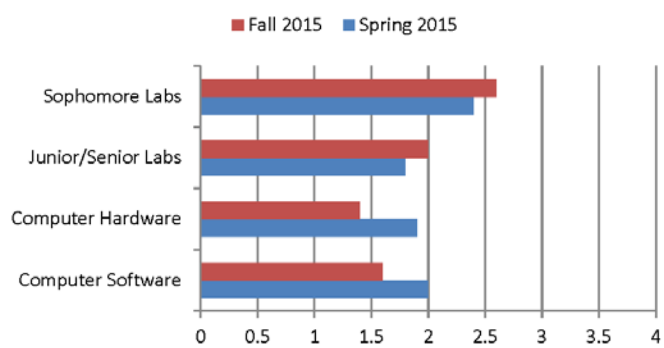


Figure 1. Spring 2015 (12 responses) and Fall 2015 (5 responses) ME exit surveys – computers and labs.

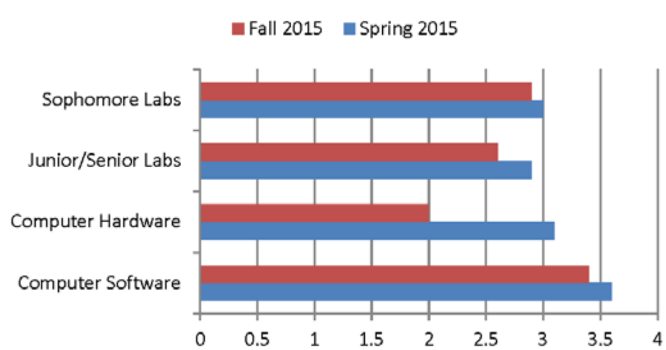


Figure 2. Spring 2015 (8 responses) and Fall 2015 (9 responses) CE exit surveys – computers and labs.

This Lab Plan is part of our continuous improvement process that is an important part of ABET accreditation Criterion 7; "*Classrooms, offices, laboratories, and associated equipment must be adequate to support attainment of the student outcomes and to provide an atmosphere conducive to learning. Modern tools, equipment, computing resources, and laboratories appropriate to the program must be available, accessible, and systematically maintained and upgraded to enable students to attain the student outcomes and to support program needs. Students must be provided appropriate guidance regarding the use of the tools, equipment, computing resources, and laboratories available to the program.*"

The funding of this lab plan will provide students access to current labs by implementing our lab plan. It involves developing new labs, upgrading lab equipment, and maintaining others.

Improvement Plan for Civil & Mechanical Engineering Labs

Labs	Required Course	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Materials and Solids Lab	ME 304 MET 180	0	16,000	108,000	0	0	124,000
	- Required lab equipment: Tensile tester, strain indicator, creep tester, and vibration tester - Equipment will be shared with MCET department - The cost is to be equally split between CME and MCET departments.						
Fluid Mechanics Lab	CE/ME 319	0	0	0	0	78,000	78,000
	- Required lab equipment: wind tunnel, smoke tunnel						
Surveying Lab	CE 210 CET 104 CET 206 CET 209	122,000	0	0	0	0	122,000
	- Lab equipment: 8 surveying stations - Equipment will be shared with MCET department - The cost is to be equally split between CME and MCET departments.						
Environmental Lab	CE 366 CHM 241 CHM 343 CHM 424 CHM 535	0	0	0	60,000	0	60,000
	- Required lab equipment: ion chromatography - Equipment will be shared with CHM department - The cost is to be split between CME and CHM departments based on usage						
Geotechnical Lab	CE 381 CET 431	0	15,000	0	0	0	15,000
	- Required lab equipment: soil sampling and permeability tester - Equipment will be shared with MCET department - The cost is to be split between CME and MCET departments based on usage						
CE Materials Lab	CE 316 CET 266	0	30,000	0	0	0	30,000
	- Required lab equipment: superpave asphalt binder tester - Equipment will be shared with MCET department - The cost is to be split between CME and MCET departments based on usage						
Total		122,000	61,000	108,000	60,000	78,000	429,000

See next page for enrollment data for lab courses.

Enrollment Data for Lab Courses

Course	Summer 2015	Fall 2015	Spring 2016	Total
CE 210	8	7	0	34
CET 104	1	8	5	
CET 206**	0	0	0	
CET 209	0	0	6	
CE 316	0	14	0	34
CET 266	0	0	20	
CE 366	0	0	6	45
CHM 241	0	0	15	
CHM 343	0	0	3	
CHM 424	0	0	15	
CHM 535	0	0	6	
CE 381	0	0	11	27
CET 431	0	16	0	
CE/ME 319	0	24	28	52
ME 304	0	13	26	120
MET 180	0	45	36	

0 = not offered
** will be offered Fall2016

Appendix G: Student Forum

Student Forum

Organized by ASCE Student Chapter

Monday, March 26, 2018

12:00 – 1:00 PM, ET 107

Present: Nash Younis, CME Chair, Mechanical Engineering Students – 2, Civil Engineering Students - 4

Dr. Younis presented his slide show, providing the students with CME Department Statistics for Fall 2017 which include:

- Enrollment for Engineering Students in Fall for the last ten years
- Funds from the State is determined by number of students and number of credit hours
- Enrollment for Graduate and Undergraduate students for Engineering
- Number of students enrolled by major
- Class enrollment has to be 15 students
- Breakdown between CME and ECE majors
- Graduate breakdown for major

Civil Engineering is hiring for Assistant Professor and have interviewed candidates and a decision will be made soon.

CME was up for reaccreditation last October. Our CME program had no issues, and we anticipate reaccreditation for 6 years.

Registration starts today and there were several changes to the Fall 2018 schedule.

The floor was then opened for a Q & A session, where the students could ask questions of Dr. Younis and he would answer them to the best of his ability or he would find the answer out for them. Grades will not be discussed.

Q1: Is co-op only summer or fall?

A1: Co-op is any semester depending on the company. You can take up to 6 credit hours with co-op. Internship you can just do in the summer.

Respectfully Submitted by:

Rita Reed, Administrative Assistant CME

Appendix H: Representative Comments from Exit Surveys

What topics would you recommend to be given more emphasis or to be introduced in the curriculum?

Respondent #1:
Better Fluid Mechanics

Respondent #2:
Programming

Respondent #3:
Dynamics and Fluid Mechanics

Respondent #4:
Calculus

Respondent #5:
More emphasis on Quality, Six Sigma, etc.

Respondent #6:
None

Respondent #7:
MEP Design, ASHRAE Courses

Respondent #8:
Fluid Mechanics needs to be taught.

Respondent #9:
Mechanics of Materials, Fluid Mechanics

Respondent #10:
Make courses less theoretical and include more real-life examples.
I feel since mechanical engineers has a decent chance to end up working in a manufacturing field, basic machining or a similar class should be required to help understand all the details of machining as well as help explain GD&T.
Respondent #11:
Real-life examples

Respondent #12:
Statics, Dynamics, Fluid Mechanics

Respondent #13:
Fluid Mechanics

Respondent #14:
Fluid Mechanics.
Engineering Economics

Appendix I: ABET EAC Final Statement

FINAL STATEMENT

**INDIANA UNIVERSITY-
PURDUE UNIVERSITY FORT WAYNE**

Mechanical Engineering
BSME Program

Program Criteria for Mechanical and Similarly Named Engineering Programs

Introduction

The mechanical engineering BSME program is offered by the Department of Civil and Mechanical Engineering. The program, is administered by seven faculty members, three adjunct faculty members, and two professional staff members. The program currently enrolls 177 undergraduate students and awarded 21 bachelor's degrees in the 2016-17 academic year.

Program Strength

1. A dedicated first-year engineering program is used to refresh and reinforce students' foundational skills. In this first-year program, students receive valuable instruction on computerized design, gain significant lab experience, and learn about careers associated with various engineering disciplines. This unique approach to providing key fundamental information and instruction to students as early as possible strengthens their skills and better prepare them to excel in their studies and future careers.

Program Concern

1. Criterion 8. Institutional Support This criterion requires that the resources available to the program must be sufficient to attract, retain, and provide for the continued professional development of a qualified faculty. For the first time in many years, the program has provided funds in the 2017-18 academic year to support faculty members' travel to scientific conferences and workshops. If such support is not provided on a continual basis, the professional development of the program's faculty members may suffer, and future compliance with this criterion may be jeopardized.

    - 30-day due-process response: The EAC acknowledges receipt of a statement from the vice chancellor for academic affairs dated February 16, 2018, that formally documents how the university will compute the amount of funds to be dedicated to faculty development. The funding formula set forth in this statement will ensure that future support will be sufficient

8

to permit faculty members to attend scientific conferences, workshops, and other professional development activities.

- The concern is resolved.

TO: Nash Younis, Chair
FROM: ETCS Assessment Committee
SUBJ: 2017-2018 Assessment Report for ME
DATE: January 31, 2019

The ETCS Assessment Committee has received and reviewed the ME's 2017-2018 Assessment Report. Our comments below follow the rubrics derived from the revised Senate Document 98-22. Appendix D.

BS report of 2017-2018 assessment activities:

Reporting results:

- Results are clearly presented (e.g., student evaluation of course learning outcomes).
- Some past iterations of results are provided (e.g., exit survey results). It might be helpful to provide historical data of faculty evaluations and students' evaluations regarding SLOs at the course level.

Report dissemination and collaboration:

- The Assessment Report indicates that information gathered by the assessment committee is shared with faculty and industrial advisory board (IAB) members per the procedural mechanism outlined in the Mechanical Engineering Assessment Plan.
- However, with regard to the IAB, the Assessment Report only indicates that the "assessment report is also shared with the Industry Advisory Board members for their feedback." Please indicate if action was implemented based on the IAB's feedback.

Use of results for programmatic change to improve student learning, achievement and success:

- Some recommendations for continuous improvement based on last year's results are provided.
- ME is encouraged to include more evidence on how curricular and/or pedagogical changes positively influence student learning.

Overall, the ME program has an established plan for collecting and reporting data for assessment purposes. For next year's report we suggest you:

- The response rate on the alumni survey has improved (50% response rate is commendable). Suggest indicating in the report if additional measures were taken this year to increase the response rate.
- The report mentions surveying graduate advisors to determine if PFW ME students are adequately prepared for graduate work. This is an excellent idea; have you also considered surveying the students regarding their undergraduate preparation?
- Less than 50% of the alums indicated that the "ME PEOs are adequate." Should the department be concerned? Recommend indicating whether this response needs further attention.

Please contact us if we can provide any assistance as you move forward with your assessment process.

OL ASSESSMENT REPORT 2017-18

DEPARTMENT: Organizational Leadership

PROGRAM: Bachelor of Science in Organizational Leadership and Supervision

DATE: November 1, 2018

DEPT. CHAIR: Gordon Schmidt

Assessment Report for (year): 2017

The Organizational Leadership department has a set of six program level goals. Every year we assess two program goals such that all the program goals are assessed over a 3-year rotation period. We had assessed goals # 3 and 4 for the 2016-17 academic year. Thus, we assessed the next two goals (viz., Goal # 5 and Goal # 6) for the 2017-18 academic year. These goals are described below:

Goal 5: Design, lead and participate in a multi-disciplinary team environment.

Goal 6: Understand the professional and ethical implications and responsibilities of leadership

The members of the Organizational Leadership Assessment Committee prepared this report with data from learning examples from the different courses that had been identified *a priori* to assess goals # 5 and 6. Details of the specific learning outcomes that were assessed within each goal and the learning material used to assess them are described in detail below:

Goal 5: Design, lead and participate in a multi-disciplinary team environment.

- **Outcome 1**: Students will be able to identify the key characteristics of teams.
    - Exam items from OLS 25200, 27400 & 48500
- **Outcome 2**: Students will be able to explain, critique, integrate and apply concepts regarding team leadership and membership
    - OLS 48500 individual end of term papers
- **Outcome 3**: Students will be able to discuss their own motivations, values, and skills relative to collaborative work
    - OLS 48500 individual end of term papers or interim reflection papers

Goal 6: Understand the professional and ethical implications and responsibilities of leadership.

- **Outcome 1**: Students will be able to identify ethical issues involved in the leadership process
    - Exam items from OLS 38400 & 49600
- **Outcome 2**: Students will be able to articulate ways to resolve ethical issues.
    - Case analysis from OLS 25200; artifacts from OLS 49600
- **Outcome 3**: Students will be able to identify ways to create an ethical climate within an organization and a unit.
    - CSR project from OLS 26800; artifacts from OLS 49600

Procedure of Assessment:

For each test item, we identified the percentage of students that answered the test item correctly. When the materials used for assessment were Multiple Choice or True/False questions, the percentage of correct responses for the entire class was used. When there are multiple sections of the same class offered, the percentage of correct responses from all the sections were averaged.

We calculated means on key items on grading rubrics. For the writing assignments and electronic presentations, we randomly selected samples and evaluated these based on rubrics with items measuring students' effectiveness with regard to meeting sub-goals.

Consistency. The effectiveness of written assignments and electronic presentations was always measured using a five-point rating scale that ranged from l=ineffective to 5 =effective. An average score was calculated for each rubric item across all samples for both the writing assignments and the electronic presentations.

Randomization. The random selection of samples was done through the generation of random numbers on Microsoft Excel. Specifically, each sample was a random number through the function of “=RAND()”; next, these random numbers were sorted in ascending order, and the necessary number of samples were picked from the top of the pile for assessment.

Independence. Each sample was evaluated and scored independently by two reviewers. The reviewers were all faculty members in the Organizational Leadership department. Independence of the ratings was ensured by making sure that faculty members did not rate their own classes.

The results of our analyses and plans for program improvements are detailed in the below tables:

Goal 5: Design, lead and participate in a multi-disciplinary team environment.

Outcome 1	**Students will be able to identify the key characteristics of teams.**
Assessment Material Used	**OLS 25200:** • A set of 5 MC questions in the cumulative final exam tested for students' learning about teams. Data from nine different sections of OLS 25200 was analyzed. **OLS 27400:** • A set of 7 MC and 7 True/False questions from the final exam were used from four sections of OLS 27400. • A set of 6 MC questions from the final exam were used from two sections of OLS 37600. • To evaluate students' performance on an essay question, a random set of 15 responses were picked and evaluated by two independent raters. **OLS 48500:** • A set of 4 MC questions were used in the Cumulative Final Exam in three different classes of OLS 38400.
Criteria for Success	• 80% of the students' responses to the exam questions related to the topic of teams will be correct. • For essay questions, students' responses will be considered sufficiently effective if aggregated means are at a 3.5 or above (out of a 5 point scale, 1=ineffective to 5 = effective).
Results	**OLS 25200:** • In the 25200 course, which is the foundational course in Organizational Behavior for OL students, 74% of the student responses were found to be correct. **OLS 27400:** • 75% of the student responses were found to be correct on the Multiple Choice questions. • 86% of the student responses were found to be correct on the True/False questions. • Students' responses were found to have ratings of 2.96 for demonstrating an understanding of the team environment, and 2.92 for providing evidence to support conclusions about teams.

	OLS 48500: • Students' responses were found to have ratings of 4.2 for demonstrating an understanding of the team environment; 3.47 for providing evidence to support conclusions about teams; 3.53 for demonstrating depth of insight about teams.
Plan for Program Improvement	• **OLS 25200:** While not all classes could achieve the 80% criterion for success determined for this outcome, it can largely be inferred that the students in the assessed classes are grasping the relevant concepts well. The final exam in OLS 25200 is a cumulative exam covering a large number of concepts and theories, so 74% success rate may not be considered bad for that class. Nevertheless, instructors of this class may have to place greater emphasis on the topic of teams. • **OLS 274000:** Students' performance on the True/False questions of the final exam met the criterion for success. However, students missed the performance criteria for multiple choice and essay questions. Again, because these are final exam questions, the criteria for success that we have set for the department may be a little too rigorous. Nevertheless, instructors are advised to place greater emphasis on the topic of teams, especially in the context of essay questions. • **OLS 48500:** Students exceeded or were close to the performance criteria for success for this class. So, instructors may continue with their current strategies of teaching, with additional emphasis on helping students to provide evidence in support of their arguments regarding teams.

Outcome 2	**Students will be able to explain, critique, integrate and apply concepts regarding team leadership and membership.**
Assessment Material Used	**OLS 48500:** • A random set of 15 individual end-of-term papers was selected for evaluation and was rated by two independent reviewers.
Criteria for Success	Students' responses will be considered sufficiently effective if aggregated means are at a 3.5 or above (out of a 5 point scale, 1=ineffective to 5 = effective).

Results	• Students' papers got average ratings of 2.8 for demonstrating an understanding of the team environment; 3.0 for providing evidence to support conclusions about teams; 2.86 for doing more analysis on teams than mere description, and 2.43 for demonstrating depth of insight about teams.
Plan for Program Improvement	• Since students' papers were rated lower than the success criteria on all the success criteria, instructors are advised to provide feedback to students on their papers and give them the opportunity to revise their papers based on that feedback. • The assessment committee also thought that the success criteria was likely not achieved because the assessment material did not align properly with the outcome. Thus, the assessment committee will conduct a review of completed assignments across the curriculum to identify assessment materials that may better address the intended goal and outcome.

Outcome 3	**Students will be able to discuss their own motivations, values and skills relative to collaborative work.**
Assessment Material Used	**OLS 48500:** • Team reflection papers from OLS 48500 were used to assess Outcome 5.3. There were a total of 7 team papers, and all these papers were evaluated by two independent raters.
Criteria for Success	• The reflection papers will be considered sufficiently effective if aggregated means are at a 3.5 or above (out of a 5 point scale, 1=ineffective to 5 = effective).
Results	• The team papers got an average rating of 4.14 for demonstrating an understanding of team environment and their own skill; 3.93 for providing evidence and reflection to support conclusions related to collaborative work; 3.71 for doing more analysis than description; 3.64 for demonstrating depth of insight into the topic
Plan for Program Improvement	• Students exceeded the performance criteria of 3.5 on all the rating parameters. Thus, not program improvement suggestions are recommended.

Goal 6: Understand the professional and ethical implications and responsibilities of leadership.

Outcome 1	**Students will be able to identify ethical issues involved in the leadership process.**
Assessment Material Used	**OLS 38400** • Seven MC questions from the cumulative final exam of five different sections were used to evaluate students' knowledge on the ethical aspects of leadership process. • A random set of 15 essay-responses to a case analysis question from the cumulative final exam was rated by two independent raters. **OLS 49600** • A random set of 7 essays was rated by independent raters.
Criteria for Success	• 80% of the students' responses to the exam questions on concepts and theories related to ethics will be correct. • Response to essay questions will be considered sufficiently effective if aggregated means are at a 3.5 or above (out of a 5 point scale, 1=ineffective to 5 = effective).
Results	**OLS 38400:** • 90.5% of the student responses to the questions related to leadership ethics were found to be correct. • Students' essays got average ratings of 4.17 for demonstrating an understanding of the ethical issues in leadership process; 3.97 for providing evidence to ethical issues found; 3.87 for doing more analysis on ethical issues than mere description, and 3.77 for demonstrating depth of insight on ethical issues. **OLS 49600:** • Students' essays got average ratings of 2.86 for demonstrating an understanding of the ethical issues in leadership process; 2.43 for providing evidence to ethical issues found; 2.71 for doing more analysis on ethical issues than mere description, and 2.43 for demonstrating depth of insight on ethical issues.
Plan for Program Improvement	• The assessment committee also felt that the essays used to assess the outcomes from OLS 49600 were not particularly suitable to test for students' understanding of ethical issues of leadership. Thus, it is recommended that an appropriate assignment is chosen that correctly tests for students' learning about ethical issues of leadership.

	• No recommendations are made for OLS 38400.

Outcome 2	**Students will be able to articulate ways to resolve ethical issues.**
Assessment Material Used	**OLS 25200:** • Team case-analysis papers from OLS 25200 were used to assess Outcome 6.2. A random set of 9 papers were evaluated by two independent raters. **OLS 49600:** • 10 random writing artifacts were used from OLS 49600 were used to assess this outcome. The artifacts were rated by two independent raters.
Criteria for Success	A random set of students' assignments will be rated by independent raters on a 5 point scale. Papers will be considered sufficiently effective if scored at 3.5 using multiple criteria (out of a 5 point scale, 1 = ineffective to 5 = effective).
Results	**OLS 25200:** • Students' essays got average ratings of 3.53 for demonstrating an understanding of the ethical issues in leadership process; 3.08 for providing evidence to ethical issues found; 3.24 for doing more analysis on ethical issues than mere description, and 3.19 for demonstrating depth of insight on ethical issues. **OLS 49600:** • Students' essays got average ratings of 4.0 for demonstrating an understanding of the ethical issues in leadership process; 3.85 for providing evidence to ethical issues found; 3.8 for doing more analysis on ethical issues than mere description, and 3.8 for demonstrating depth of insight on ethical issues.
Plan for Program Improvement	• Students from OLS 25200 only met the criterion for demonstrating an understanding of ethical issues out of the four items used to evaluate Outcome 6.2. In contrast, students in OLS 49600 met the criteria for success on all the items. This means students seem to be developing their abilities related to understanding, analyzing and dealing with ethical issues as they move from their first OLS class to the capstone class. It is recommended that OLS 25200 instructors expand their teaching objectives from understanding ethical issues to analyzing them.

Outcome 3	Students will be able to identify ways to create an ethical climate within an organization and a unit.
Assessment Material Used	**OLS 26800** • A random set of 10 papers that was on the topic of Corporate Social Responsibility was evaluated by two independent raters. **OLS 49600:** • 10 random writing artifacts assessing the creation of ethical climate were used from OLS 49600 were used to assess this outcome. The artifacts were rated by independent raters.
Criteria for Success	A random set of students' assignments will be rated by independent raters on a 5 point scale. Papers will be considered sufficiently effective if scored at 3.5 using multiple criteria (out of a 5 point scale, 1 = ineffective to 5 = effective).
Results	**OLS 26800:** • Student papers got an average rating of 2.75 for demonstrating an understanding of the ethical issues in leadership process; 2.75 for providing evidence to ethical issues found; 2.9 for doing more analysis on ethical issues than mere description, and 3.05 for demonstrating depth of insight on ethical issues. **OLS 49600:** • Students' essays got average ratings of 3.8 for demonstrating an understanding of the ethical issues in leadership process; 3.0 for providing evidence to ethical issues found; 2.8 for doing more analysis on ethical issues than mere description, and 2.9 for demonstrating depth of insight on ethical issues.
Plan for Program Improvement	Students from both OLS 26800 and OLS 49600 failed to reach most of the criteria of success for this outcome. This indicates the students may need to be provided greater guidance on how to create an ethical climate in organizations and support their recommendations with proper theoretical rationale.

Report Dissemination:

The assessment report was prepared by the assessment committee of the department, ratified by the chair of the OL Department. All department members were also sent a copy of the submitted assessment report. Once we received feedback on our assessment report from the college, we will also discuss the college's recommendations within the department.

Incorporation of Suggestions on Previous Assessment Report:

Several suggestions provided by the college on our last year's assessment report were implemented this year. This includes detailed descriptions of:

1. How consistency, randomization, and independence of ratings was ensured during the assessment process.
2. Description of how averaging was done when multiple sections of the same class were assessed.
3. How the assessment report is disseminated within the department.

There were few suggestions that could not be incorporated into this year's report (such as including feedback from multiple stakeholders, implementing exit surveys and alumni surveys). However, these suggestions will be incorporated into the Program Review document that will be submitted at the end of this academic year.

TO: Gordon Schmidt, Chair

FROM: ETCS Assessment Committee

SUBJ: 2017-2018 Assessment Report for OL

DATE: January 25, 2019

The ETCS Assessment Committee has received and reviewed OL's 2017-2018 Assessment Report. Our comments below follow the rubrics derived from the revised Senate Document 98-22. Appendix D.

Reporting Results:

- The program uses two different scales for showing attainment of outcomes, one is 1-5 scale and other is class percentage. It is recommended that one scale is used for meaningful comparisons between various measures of learning activities.
- It is recommended that assessment results of multiple sections of a course are presented separately in the report instead of showing only the average.
- The random selection procedure needs further explanation on how the sample size is chosen and how the procedure is followed consistently.
- It would be better if the program includes the results of the two reviewers separately, wherever possible.
- The program may consider having different acceptance threshold for analyzing data from final exams and essay papers, and the rest of the activities.
- It will be helpful to include past assessment results of the two goals being assessed to provide basis and content for the interpretation of the current results.
- It is recommended that the program provides results on indirect measures as well (e.g., exit surveys, alumni surveys).

Report Dissemination and Collaboration:

- The department should come up with a simple procedure to distribute the report information to other stakeholders besides the faculty members.

Please contact us if you have any questions.