Bachelor of Science
Mechanical Engineering

Academic Assessment Plan

UAA College of Engineering
UNIVERSITY of ALASKA ANCHORAGE

Adopted by

The Mechanical Engineering faculty: 4/26/2021

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The Academic Assessment Committee of the Faculty Senate: 1/11/2022

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TABLE OF CONTENTS

MISSION STATEMENT

The Department seeks to provide the highest quality of education through a learning environment that enables and inspires students to succeed academically and professionally, provides the highest quality instruction, fosters research and other creative activities, and instills a desire to embrace life-long learning.

PROGRAM INTRODUCTION

The Mechanical Engineering (ME) Program falls within the School of Engineering at University of Alaska Anchorage. The bachelor of science degree offered by the ME Program prepares graduates either for employment as entry-level engineers, or for continued study at the graduate level. This degree program is accredited by ABET, the national body which accredits programs in applied science, computing, engineering and technology.

ASSESSMENT PROCESS INTRODUCTION

The Mechanical Engineering faculty have adopted the seven ABET student outcomes as the student outcomes of the Mechanical Engineering Program. Outcomes assessment and implementation of continuous improvement is the responsibility of the faculty of the Mechanical Engineering Program.

The bachelor's degree in mechanical engineering offered at UAA began as a concentration within the Bachelor of Science in Engineering degree. This degree was formally known as the Bachelor of Science in Engineering (BSE), Concentration in Mechanical Engineering (BSE/ME). Two other concentrations were offered, one in electrical engineering and one in computer systems engineering. The BSE Program with its three separate concentrations was approved by the UA Board of Regents on February 17, 2005. The first BSE/ME graduates received their degrees in December of 2007. Despite their technical designations as concentrations within the same BSE program, the ME, EE and CSE concentrations have always offered separate curricula with few common courses, and were initially separately accredited by ABET in 2009. The BSE/ME program has been continuously accredited by ABET since 2009 according to the criteria for bachelor's (4-year) degree programs in mechanical engineering.

The three concentrations of the BSE degree were administered by the BSE Department until AY2011-12, when the BSE Department separated and the ME Department as it now exists was created. This has allowed the ME faculty greater control over BSE/ME curriculum, accreditation activities, student advising and other department-level matters. Starting in AY2015-16, the University of Alaska Board of Regents approved separate degrees for the former BSE programs, creating a Bachelor of Science in Computer Systems Engineering, a Bachelor of Science in Electrical Engineering, and a Bachelor of Science in Mechanical Engineering. This change brought the title of our degree into line with what is usual for similar programs nationally and makes our students easier to track using UAA's internal system, but was not accompanied by any changes to curriculum, mission, or student learning outcomes.

The outcomes assessment strategy of the ME Program is voted upon by the ME faculty. The faculty select the measures which will be used to assess each outcome. Individual faculty members agree to administer these measures on a volunteer basis. One of the ME faculty serves as Chair of the Department Assessment Committee. Among other duties, the Chair of the Department Assessment

Committee keeps central records of all assessment activities, prepares reports, and coordinates with the UAA Academic Assessment Committee.

STUDENT LEARNING OUTCOMES

The Mechanical Engineering faculty have adopted the seven ABET student outcomes as the student outcomes of the Mechanical Engineering Program.

At the completion of this program, students will 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.

TABLE 2: ASSOCIATION OF ASSESSMENT MEASURES TO STUDENT LEARNING OUTCOMES

The ME faculty have identified specific and measurable performance indicators to better quantify student achievement of the student learning outcomes listed. These are presented in Table 2, along with the methods used to assess each outcome. An "X" indicates that the measure is used to assess a particular outcome or performance indicator.

Outcomes	CLA, direct	CLA, indirect	ME A438 Capstone Design	Senior Exit Survey
1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	**X**		**X**	**X**
(b) Selects appropriate theory, model or governing equation	X		X	
(c) Identifies relevant known and unknown factors	X		X	
(d) Assesses the validity of the solution based on an understanding of simplifying assumptions and/or limitations of chosen model	X		X	
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	**X**		**X**	**X**
(a) Produces a reasonable design strategy, including tasks and subtasks, timelines, and evaluation of progress	X		X	
(b) Defines clear specifications and objectives that take into consideration the needs of the project	X		X	
(c) Reflects upon efficacy of solution in terms of the needs of the project and the various trade-offs required for the design	X		X	
3. an ability to communicate effectively with a range of audiences	**X**		**X**	**X**

Outcomes	CLA, direct	CLA, indirect	ME A438 Capstone Design	Senior Exit Survey
(a) Communicates information in a logical, well-organized manner using language appropriate to the audience	X		X	
(b) Uses graphics effectively to illustrate concepts	X		X	
(c) Presents material that is factually correct, supported with evidence, explained in sufficient detail and properly documented	X			
(d) Listens and responds appropriately to questions, including using language appropriate for the audience (for oral communication)	X		X	
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	**X**		**X**	**X**
(a) Is aware of the codes of conduct and ethics that guide the profession of engineering	X			
(b) Evaluates the value and credibility of information and the various sources used in order to make sound judgments	X		X	
(c) Identifies issues of economic, environmental and societal importance	X		X	
(d) Makes a case that their solution is responsible according to the professional code of ethics	X		X	
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	**X**	**X**	**X**	**X**
(a) Team shows evidence of regular communication among members	X	X	X	
(b) Team shows evidence that duties are distributed appropriately among	X	X	X	

Outcomes	CLA, direct	CLA, indirect	ME A438 Capstone Design	Senior Exit Survey
team members with individual members held accountable for completion				
(c) Team shows evidence that subtasks are planned and performed on an appropriate schedule	X		X	
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	**X**		**X**	**X**
(a) Selects appropriate equipment or tools, such as software, theoretical equations, etc.	X		X	
(b) Makes appropriate use of data collection/analysis techniques	X		X	
(c) Understands the advantages and disadvantages of the chosen tool in relation to possible choices	X		X	
(d) Interprets data using appropriate judgement that is backed up by theory	X		X	
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies	**X**			**X**
(a) Identifies opportunities and indicates interest for continued education in the field	X			
(b) Seeks information from new sources, such as handbooks, journals, personal contact with practitioners, etc.	X			
(c) Participates in professional activities, such as taking the FE or joining a professional society	X			

ASSESSMENT MEASURES

A description of the measures used in the assessment of the student learning outcomes and their implementation are summarized in Table 3 below. The measures and their relationships to the student learning outcomes are listed in Table 2, above.

There is a separate appendix for each measure that shows the measure itself and describes its use and the factors that affect the results.

TABLE 3: ASSESSMENT MEASURES AND ADMINISTRATION

Measure	Description	Frequency/ Start Date	Collection Method	Administered by
Course Level Assessment, Direct	Student work from selected courses, selected to measure the level of outcome achievement.	Spring and Fall semesters	Evaluation by course instructors	Course instructors
Course Level Assessment, Indirect	Surveys conducted at the end of each course in which students self-assess their perceived level of outcome achievement.	Spring and Fall semesters	Surveys given by computer or hard copy	Course instructors
ME 438, Capstone Design	Student work from ME 438, Capstone Design, in which students examine a real-world engineering problem and present their results orally and in a written report.	Spring and Fall semesters	Surveys of ME faculty and evaluation by ME 438 course instructor	ME 438 instructor and ME faculty
Senior Exit Survey	Survey given to graduating seniors in which students self-assess their perceived level of outcome achievement with relation to the entire ME degree program.	Spring and Fall semesters	Surveys given by computer	College of Engineering

ASSESSMENT PROCESS

General Implementation Strategy

The College of Engineering administration is responsible for:

- Providing sufficient financial and staff support for the implementation of this plan.
- Ensuring faculty assessment efforts are appropriately reflected in annual workload agreements.

The ME Program faculty are responsible for:

- Performing assessment as an integral part of teaching activity (course level assessment).
- Participating in meetings to discuss development and implementation of the assessment plan.
- Participating in meetings to discuss interpretation of the data and implementation of continuous improvement, particularly relating to the ME curriculum.
- Preparing the data from their own Course Level Assessments for the Chair of the Department Assessment and Curriculum Committee.

The Chair of the Department Curriculum and Assessment Committee is responsible for:

- Keeping central records of all assessment activities.
- Preparing reports related to assessment activities, subject to the approval of the ME faculty.
- Coordinating with the UAA Academic Assessment Committee.
- With the ME Department Chair, coordinating with ABET and any other external accrediting bodies.

The Chair of the ME Department is responsible for:

- Presiding at ME faculty meetings in which assessment issues are discussed.
- Communicating the assessment-related activities and needs of the ME Department to the College of Engineering administration.
- Coordinating as needed with ABET and any other external accrediting bodies.

The ME Program aims to evaluate all seven outcomes on a three-year cycle, with two years dedicated to assessing all outcomes and the third year dedicated to finishing up any missed outcomes, re-assessing outcomes if necessary, and completing periodic constituent feedback surveys of our students, alumni, and employers. A typical timeline is presented in Table 4.

Table 4: Proposed three-year assessment schedule for the ME Program.

Outcome	**1**	**2**	**3**	**4**	**5**	**6**	**7**
AY 2019-20	**X**	**X**			**X**	**X**	
AY 2020-21			**X**	**X**			**X**
AY 2021-22	Closing the loop, constituent surveys						

Description of Faculty Involvement

The ME faculty are ultimately responsible for all aspects of the assessment process.

Development of assessment plans:

- Assessment plans are implemented following a vote of the ME faculty at a faculty meeting attended by a quorum.

Implementation of assessment measures:

- Direct and indirect course level assessments (CLAs) are undertaken on a volunteer basis by the instructors of certain courses, as discussed in the approved assessment plan.
- Course instructors collect data for direct and indirect CLAs and perform preliminary analysis and interpretation before turning the data over to the Chair of the Department Curriculum and Assessment Committee.
- Other assessment activities are led by individual faculty members or special committees on a volunteer basis. The formation of special committees for the purpose of assessment is subject to a vote by the ME faculty. These individual faculty members of special committees are responsible for preliminary analysis and interpretation of the data.

Recommendations for continuous improvement:

- The Chair of the Department Curriculum and Assessment Committee prepares reports on the findings of assessment activities, which may contain analysis of the data and recommendations for continuous improvement. These reports are subject to the approval by the full ME faculty before adoption or dissemination.
- ME faculty members are free as instructors take action for continuous improvement within their own courses as suggested by the results of their assessment activities and the assessment activities of their colleagues.
- Recommendations for actions to be taken for continuous improvement at the Department level may be suggested by any ME faculty member, to be discussed and voted upon at an ME faculty meeting. These suggestions may include:
    - Changes in course content, sequencing, or prerequisites,
    - Substitution, creation or deletion of courses in the current curriculum,
    - Changes in instructor assignments,
    - Changes in advising methods, or
    - Additions or replacement of equipment, such as lab equipment.

Modification of the Assessment Plan

Potential changes to the assessment plan may be suggested by any faculty member to be discussed at one of the regular faculty meetings. Changes to the assessment plan are implemented following a discussion and a vote at a faculty meeting at which a quorum (2/3 of full-time faculty) is present.

APPENDIX A: COURSE LEVEL ASSESSMENT, DIRECT

Measure Description:

Course instructors will evaluate student work to measure the level of outcome achievement. Assessment tools may include quiz and exam questions, projects, laboratory reports or other writing assignments, and in-class presentations. Instructors may choose which assessment tool or tools they wish to use. Factors that affect the collected data:

- Clarity of the assignment or question.
- Student motivation.
- Instructor bias in evaluating results.
- Instructor style with respect to grading.

How to interpret the data:

Instructors may choose one of two methods for assessing outcomes and/or individual performance indicators. Instructors may choose to assess student work based on one of the attached rubrics, or to examine student grades on exam questions or projects that relate to particular outcomes or performance indicators.

The procedure for direct CLA using one of the attached rubrics is as follows:

1. Rate each student according to one of the attached rubrics on a scale of "Excellent," "Satisfactory," "Developing," or "Unsatisfactory."
2. Determine the percentage of students who have shown "Satisfactory" or "Excellent" achievement of the outcome.

The procedure for direct CLA using student grades is as follows:

1. Choose a project or exam problem which relates directly to a particular outcome or performance indicator.
2. Determine the percentage of students whose grades put them in the categories of "Excellent," "Satisfactory," "Developing," or "Unsatisfactory."

This data will be used to suggest the effectiveness of the ME degree program, and will also be used by the course instructor to gage student learning effectiveness at the course level.

Rubrics for Direct Course Level Assessment

Outcome 1: an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics				
Performance Indicator (PI)	**Poor**	**Developing**	**Satisfactory**	**Excellent**
1. Selects appropriate theory, model or governing equation	Does not demonstrate understanding of appropriate models	Demonstrates some idea of appropriate models, but does not select appropriate model for all parts of complex problem	Selects appropriate model or theory for each part of the complex problem	Selects appropriate model or theory for each part of the complex problem and can explain in detail why each was selected
2. Identifies relevant known and unknown factors	Does not demonstrate understanding of what info is known and what is still needed to solve the problem	Demonstrates incomplete understanding of what info is known and what is still needed	Identifies known and unknown factors, and is able to find and explain most of the unknown info needed	Identifies known and unknown factors, and is able to find and explain all of the unknown info needed
3. Assesses the validity of the solution based on an understanding of simplifying assumptions and/or limitations of chosen model	No attempt to validate solution, or attempt is completely incorrect	Begins analysis of validity but is unable to see it to completion, or attempt is largely incorrect or superficial	Assesses validity of solution in a way that is minimally acceptable	Assesses validity of solution while communicating deep understanding of process

Outcome 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				
Performance Indicator	**Poor**	**Developing**	**Satisfactory**	**Excellent**
1. Produces a reasonable design strategy, including tasks and subtasks, timelines, and evaluation of progress	Minimal effort made, or design strategy unreasonable	Design strategy might be overly ambitious in terms of timeline, or tasks/subtasks not sufficiently broken out, or no way to evaluate progress	Design strategy is minimally acceptable in terms of timeline, tasks & subtasks, and evaluation of progress	Design strategy is particularly robust and well-considered
2. Defines clear specifications and objectives that take into consideration the needs of the project	Minimal attempt to break the project into objectives and/or define clear specifications	Objectives and specifications might miss key points, or some might not be appropriate to the needs of the project	Specifications and objectives are appropriate for the project and clearly defined	Specification and objectives are appropriate, clearly defined, well-researched and explained
3. Reflects upon efficacy of solution in terms of the needs of the project and the various trade-offs required for the design	Makes no attempt to reflect on efficacy, or assertions provided are incorrect or inappropriate	Makes limited attempts to reflect on efficacy; parts of discussion might be incorrect or inappropriate, or discussion might be incomplete	Discussion of efficacy in terms of trade-offs is acceptable and largely appropriate, demonstrates good understanding of optimization	Discussion of efficacy in terms of trade-offs is systematic and demonstrates excellent understanding of design optimization considerations

Outcome 3: an ability to communicate effectively with a range of audiences				
Performance Indicator	**Poor**	**Developing**	**Satisfactory**	**Excellent**
1. Communicates information in a logical, well-organized manner using language appropriate to the audience	Communication is poorly organized, or grammar and usage is poor	Organization of communication is limited; jargon inappropriate to the audience used without explanation	Communicates information in a way that is satisfactorily well-organized, jargon is explained when appropriate	Communicates information in an exceptionally well-organized manner with consideration to audience
2. Uses graphics effectively to illustrate concepts	Does not attempt to clarify ideas with graphics, or graphics are inappropriate to the idea being expressed	Limited attempts to clarify ideas with graphics, or graphics are of limited effectiveness	Makes satisfactory use of graphics with acceptable explanations	Makes exceptional use of graphics, with explanations seamlessly integrated
3. Presents material that is factually correct, supported with evidence, explained in sufficient detail and properly documented	Much of the material presented is factually incorrect, poorly supported and/or documented incorrectly	Some of the material presented is factually incorrect, poorly supported and/or documented incorrectly	Factually correct material is satisfactorily supported with evidence, explained in sufficient detail and properly documented	Factually correct material is supported with an exceptional amount of evidence or explained particularly well
4. Listens and responds appropriately to questions using language appropriate for audience (for oral communication)	Does not respond to questions appropriately or does not listen to questions	Makes limited attempts to respond to questions, or questions may include unexplained jargon	Provides satisfactory response to questions in language appropriate for audience	Provides exceptional response to questions in language appropriate for audience

Outcome 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				
Performance Indicator	**Poor**	**Developing**	**Satisfactory**	**Excellent**
1. Is aware of the codes of conduct that guide the profession of engineering	Demonstrates no knowledge of professional codes of conduct	Demonstrates limited knowledge of professional codes of conduct	Demonstrates a reasonable level of knowledge of professional codes of conduct and implications	Demonstrates exceptional knowledge of professional codes of conduct and implications
2. Identifies issues of economic, environmental and societal importance	No attempt made to identify issues in the contexts required	Issues in context receive superficial attention, or might be missing something obvious	Identifies reasonable issues associated with engineering solutions in context	Identifies issues that may be particularly interesting or unexpected, but relevant

3. Evaluates the value and credibility of information and the various sources used in order to make sound judgments	Does not analyze issues in context, or analysis is particularly poor; no attempt made to link information from sources into coherent arguments	Makes limited attempts to analyze issues in context, makes limited attempts to link information from sources into coherent arguments	Multiple sources are integrated into reasonably coherent analysis of issues in the contexts required	Multiple sources integrated into exceptionally cogent analysis of issues in the contexts required
4. Makes a case that their solution is responsible according to the professional code of ethics	Does not attempt to make a case, or case is not supported at all	Attempts to make a case but in an incomplete or largely unsupported way	Reasonable case made the solution is appropriate according to professional ethics	Case for responsibility of solution particularly well-made and well-researched

Outcome 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				
Performance Indicator	**Poor**	**Developing**	**Satisfactory**	**Excellent**
1. Team shows evidence of regular communication among members	Team shows no evidence that members are communicating with each other	Some evidence of inter-team communication, but may be superficial, ad hoc, or missing some team members	Evidence presented that all team members communicating on a regular basis	Team demonstrates frequent meaningful communication among all team members, including regular scheduled meetings
2. Team shows evidence that duties are distributed appropriately among team members with individual members held accountable for completion	No attempt made to distribute duties among team members, or one team member ends up doing everything	Distribution of duties may be lopsided, or individual members not held accountable for completion leading to ad hoc damage control	Distribution of duties is appropriate, individual members held accountable through frequent communication	Distribution of duties is appropriate, with team members actively supporting each other to accomplish tasks
3. Team shows evidence that subtasks are planned and performed on an appropriate schedule	Little to no evidence of a schedule, group activities largely ad hoc	Attempt made to create appropriate schedule but much team activity still completed in ad hoc manner	Appropriate schedule created and modified as necessary, very little ad hoc activity needed	Appropriate schedule created and modified as necessary leading to project being completed on schedule

Outcome 6: an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions				
Performance Indicator	**Poor**	**Developing**	**Satisfactory**	**Excellent**
1. Selects appropriate equipment or tools, such as software, theoretical equations, etc.	Does not demonstrate understanding of appropriate tools for a given task	Selects appropriate tool, but does not demonstrate understanding of why appropriate	Selects appropriate tool, demonstrates understanding of why appropriate to minimal satisfaction	Selects appropriate tool, demonstrates excellent understanding of why appropriate
2. Understands the advantages and disadvantages of the chosen tool in relation to possible choices	Cannot describe advantages and disadvantages of a particular tool, or description is incorrect	Can provide limited description of advantages and disadvantages of a particular tool	Can provide satisfactory description of advantages and disadvantages of a particular tool	Provides description of advantages and disadvantages that is multifaceted and/or well researched
3. Makes appropriate use of data collection/analysis techniques	Is unable to utilize correct technique, or analysis particularly poor	Ability to utilize technique limited, or analysis is largely incorrect	Utilizes technique satisfactorily, analysis is largely correct and justified	Utilizes technique satisfactorily, analysis is multifaceted and/or particularly effective
4. Interprets data using appropriate judgement that is backed up by theory	No attempt to back up judgement with theory	Attempts to back up judgement with theory, but might be incomplete or incorrect	Judgement adequately backed up with theory	Judgement backed up with theory in a way that is multifaceted and/or well researched

Outcome 7: an ability to acquire and apply new knowledge as needed, using appropriate learning strategies				
Performance Indicator	**Poor**	**Developing**	**Satisfactory**	**Excellent**
1. Identifies opportunities for continued education in the field	Is unable to identify opportunities for continued education in the field	Can only identify one or two generic opportunities for continuing education	Identifies several appropriate opportunities for continuing education in the field	Demonstrates exceptional knowledge of opportunities for continuing education in the field
2. Seeks information from new sources, such as handbooks, journals, personal contact with practitioners, etc.	No attempts to seek additional information, or seeks from inappropriate sources	Seeks information from sources, some of which may be inappropriate, or attempt to seek info may be superficial	Successfully identifies information from minimum required appropriate sources, synthesis of information adequate	Successfully identifies and synthesizes information from multiple appropriate sources
3. Participates in professional activities, such as taking the FE or joining a professional society	Indicates no interest in professional activities	Indicates limited interest in professional activities	Indicates interest in professional activities and participates in at least one	Active participation in at least one professional activity

APPENDIX B: COURSE LEVEL ASSESSMENT, INDIRECT

Measure Description:

Course instructors may ask students to rate their own achievement of certain outcomes on a scale of "Poor," "Fair," "Good," "Excellent," or "Outstanding." The data collected gives insight into student perception of their level of achievement.

Factors that affect the collected data:

- Number of students who complete a survey
- Clarity of survey questions
- Student bias in answering survey questions
- Differing student perception of the terms "Poor," "Fair," "Good," "Excellent," and "Outstanding"

How to interpret the data:

As an indirect assessment method, self-assessment by students arguably not as accurate a method of outcomes assessment as direct evaluation of student work. However, it is valuable to ascertain whether a gap exists between student performance/preparedness and student perception of performance/preparedness. The data can show which aspects of the curriculum the students identify as having only a "Poor," "Fair" or "Good" understanding of. Improvements in those areas can then be discussed.

APPENDIX C: ME 438, CAPSTONE DESIGN

Measure Description:

All seniors in the ME Program are required to complete ME 438, Capstone Design. In this class, teams of students are given real-world engineering problems. Student teams are responsible for designing, building and evaluating a prototype to meet a set of specifications. Their work is evaluated by the instructor of ME 438. Student teams also give oral presentations of their work which are evaluated by the ME faculty. Faculty rate the performance of the student groups with respect to certain outcomes on a scale of "Poor," "Developing," "Satisfactory" or "Excellent."

Factors that affect the collected data:

- Instructor bias in evaluating results
- Instructor bias with respect to grading
- Different faculty perceptions of the terms "Poor," "Developing," "Satisfactory" or "Excellent"

How to interpret the data:

Because ME 438 is meant to be the culmination of the ME degree program, it provides an excellent opportunity to rate most of the student outcomes with respect to a single, large project in students nearing completion of their degrees. Identifying areas in which a significant percentage of students are only achieving "Poor" or "Developing" achievement of outcomes with respect to capstone design might drive significant changes to the curriculum.

ME A438 Presentation Evaluations
Fall 20XX

Presentation Date:

Project Name: _____

Evaluator: _____

Presentation assessment/Feedback

Please rate each category on a scale of 1 to 10 where 1 is poor and 10 is excellent.

1) Did the Introduction state the project objective clearly? (1 2 3 4 5 6 7 8 9 10)
Comments:

2) Was the Discussion adequate to describe the project? (1 2 3 4 5 6 7 8 9 10)
Comments:

3) How was the quality of the visuals? (1 2 3 4 5 6 7 8 9 10)
Comments:

4) Did you get the sense the presenters were interested in their project? (1 2 3 4 5 6 7 8 9 10)
Comments:

5) Did the presenters appear practiced with the presentation? (1 2 3 4 5 6 7 8 9 10)
Comments:

6) Did the presenters appear professional? (1 2 3 4 5 6 7 8 9 10)
Comments:

7) As a manager, would you feel comfortable with the status of this project? (1 2 3 4 5 6 7 8 9 10)

Comments:

Other comments:

APPENDIX D: SENIOR EXIT SURVEY

Measure Description:

Seniors in the ME Program are given an exit survey toward the end of their final semester before graduation. This survey gives the students the opportunity to provide feedback on their experience at UAA from the prospective of having gone through the entire ME degree program. Students are asked to rate both their level of understanding and the ME Program's effectiveness at teaching certain concepts on a scale of "Poor," "Fair," "Good," "Excellent," or "Outstanding." The seven student outcomes are addressed directly in this survey.

Factors that affect the collected data:

- Clarity of survey questions
- Student bias in answering survey questions
- Differing student perception of the terms "Poor," "Fair," "Good," "Excellent," and "Outstanding"

How to interpret the data:

As an indirect assessment method, self-assessment by students arguably not as accurate a method of outcomes assessment as direct evaluation of student work. However, there is value in collecting feedback from students who have completed the degree program and are able to comment on the program in its entirety. It is valuable to ascertain whether a gap exists between student performance/preparedness and student perception of performance/preparedness. The data will be analyzed to show which aspects of the curriculum the students identify as having only a "Poor," "Fair" or "Good" understanding of. Improvements in those areas can then be discussed.

The Mechanical Engineering Program implements an outcomes based assessment program to enable continuous improvement and for the University and the Accreditation Board for Engineering and Technology (ABET). As a part of the program, we are surveying graduating students to find ways of improving our program. Your feedback will go a long way in helping us determine how well we are doing and what we can do to better serve our students, alumni, and the engineering community.

Have you received any job offers, and if so, how many?

- No, because I did not apply for any jobs
- No, not yet
- 1
- 2
- 3
- 4+
- I am planning to go straight to graduate school, so n/a

Q3

Have you accepted a permanent position, and if so, where?

- No, still looking
- I am going to graduate school (name school)
- I have accepted a job offer (name company)

Q4

If you are willing to share the information with us, what is your starting salary?

Q5

Have you done any internships or held any engineering or related jobs during your time in our program?

- Yes , if you're willing to share, where did you intern?
- No

Q6

Have you passed the FE exam?

- Yes
- No
- Results pending

- Haven't taken it yet

Q7

Primary Mechanical Engineering Field that you hope to work in: (select one)?

- Construction
- Controls
- Structural
- HVAC
- Machine Design
- Materials Design
- Energy/Power Systems
- Hydraulics & Fluid
- Power Plant Design
- Not working in engineering
- Other, please describe

Q9

Expected Outcomes

The UAA Mechanical Engineering Program has adopted several expected outcomes. Please rate your knowledge/skills and the program's effectiveness in teaching you knowledge/skills relative each objective. In this survey, we ask for your opinion relative to each of these objectives. Second, rate each item according to how well you think you are able to function in relation to each objective. Please feel free to use the space after the list to briefly explain any of your responses or for additional comments. The objectives of the UAA Mechanical Engineering Program are to produce graduates with the following abilities.

An ability to apply knowledge of advanced mathematics including differential equations, science, and engineering.

	Poor	Below expectations	Satisfactory	Exceeds expectation	No opinion
What is your understanding/ability now?					
How well did we do teaching this?					

Q10

An ability to design and conduct experiments, as well as to analyze and interpret data.

	Poor	Below expectations	Satisfactory	Exceeds expectation	No opinion
What is your understanding/ability now?					
How well did we do teaching this?					

Q11

An ability to design a mechanical system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

	Poor	Below expectations	Satisfactory	Exceeds expectation	No opinion
What is your understanding/ability now?					
How well did we do teaching this?					

Q12

An ability to function on multi-disciplinary teams.

	Poor	Below expectations	Satisfactory	Exceeds expectation	No opinion
What is your understanding/ability now?					
How well did we do teaching this?					

Q13

An ability to identify, formulate, and solve mechanical engineering problems.

	Poor	Below expectations	Satisfactory	Exceeds expectation	No opinion
What is your understanding/ability now?					
How well did we do teaching this?					

Q14

An understanding of professional and ethical responsibility.

	Poor	Below expectations	Satisfactory	Exceeds expectation	No opinion
What is your understanding/ability now?					

	Poor	Below expectations	Satisfactory	Exceeds expectation	No opinion
How well did we do teaching this?					

Q15
An ability to communicate effectively.

	Poor	Below expectations	Satisfactory	Exceeds expectation	No opinion
What is your understanding/ability now?					
How well did we do teaching this?					

Q19
The broad education necessary to understand the impact of engineering solutions in a global and societal context.

	Poor	Below expectations	Satisfactory	Exceeds expectation	No opinion
What is your understanding/ability now?					
How well did we do teaching this?					

Q21
A recognition of the need for and an ability to engage in life-long learning.

	Poor	Below expectations	Satisfactory	Exceeds expectation	No opinion
What is your understanding/ability now?					
How well did we do teaching this?					

Q22
A knowledge of contemporary issues in professional practice.

	Poor	Below expectations	Satisfactory	Exceeds expectation	No opinion
What is your understanding/ability now?					
How well did we do teaching this?					

Q23

An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

	Poor	Below expectations	Satisfactory	Exceeds expectation	No opinion
What is your understanding/ability now?					
How well did we do teaching this?					

Q24

An ability to apply knowledge of probability and statistics, including applications appropriate to mechanical engineering systems.

	Poor	Below expectations	Satisfactory	Exceeds expectation	No opinion
What is your understanding/ability now?					
How well did we do teaching this?					

Q25

An ability to apply knowledge of mathematics through differential and integral calculus, basic sciences, and engineering sciences necessary to analyze and design complex mechanical devices.

	Poor	Below expectations	Satisfactory	Exceeds expectation	No opinion
What is your understanding/ability now?					
How well did we do teaching this?					

Q26

Use this space to elaborate on any of your responses if you'd like.

Q23

The following additional information will help us in the improvement of our program.

Please indicate your satisfaction with each of the following aspects of your experience at UAA. Feel free to include some additional comment below.

	Poor	Below expectations	Satisfactory	Exceeds expecations	No opinion
Quality of advising					
Quality of instruction					

	Poor	Below expectations	Satisfactory	Exceeds expecations	No opinion
Quality of physical facilities					
Quality of computer labs					
Quality of physical laboratories					

Q24

Where do you expect to be in five years, and what resources do you hope to take advantage of to make your career goals happen?

Q25

Please use this space to leave any other comment you'd like, especially about strengths and weaknesses of our program, or suggestions for improvement.