Program-Level Assessment Plan

Program: Biomedical Engineering	Degree Level (e.g., UG or GR certificate, UG major, master's program, doctoral program): B.S.
Department: Biomedical Engineering	College/School: School of Science and Engineering
Date (Month/Year): October 2023	Primary Assessment Contact: Marta Cooperstein

Note: Each cell in the table below will expand as needed to accommodate your responses.

#	Student Learning Outcomes What do the program faculty expect all students to know or be able to do as a result of completing this program? Note: These should be measurable and manageable in number (typically 4-6 are sufficient).	Curriculum Mapping In which courses will faculty intentionally work to foster some level of student development toward achievement of the outcome? Please clarify the level at which student development is expected in each course (e.g., introduced, developed, reinforced, achieved, etc.). I – INTRODUCED R – REINFORCED E – EMPHASIZED	Assessment Methods Artifacts of Student Learning (What) 1. What artifacts of student learning will be used to determine if students have achieved this outcome? 2. In which courses will these artifacts be collected?	Assessment Methods Evaluation Process (How) 1. What process will be used to evaluate the artifacts, and by whom? 2. What tools(s) (e.g., a rubric) will be used in the process? Note: Please include any rubrics as part of the submitted plan documents.
1	Graduates will demonstrate an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. **(ABET 1)**	BME 2000 (R) BME 3300 (I) BME 3840 (R) BME 4600 (I) BME 4960 (E) BME 5965 (E)	BME 2000: Homework, quizzes, exams, projects, in-class exercises BME 3300: Homework, exams, class participation BME 3840: Pre-lab and post-lab exercises, reports BME 4600: Projects, Exams BME 4960: Oral presentations, reports BME 5965: Oral presentation, written report	1. The instructor for each course will provide an initial analysis, and the faculty within the program will review the instructor analysis at the annual assessment meeting, held at the conclusion of the academic year. 2. While faculty are responsible for assessing each artifact individually, outcomes are assessed via Form 3.5 and Student Learning Outcomes rubrics each year
2	Graduates will demonstrate an	BME 2000 (R)	BME 2000: Group projects	1. The instructor for each course

	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. **(ABET 5)**	BME 2200 (I) BME 3840 (R) BME 4600 (E) BME 4960 (E) BME 5965 (E)	BME 2200: Group oral presentation BME 3840: Pre-lab and post-lab exercises, reports, in-lab performance BME 4600: Problem sets, projects BME 4960: Peer assessment, reports	will provide an initial analysis, and the faculty within the program will review the instructor analysis at the annual assessment meeting, held at the conclusion of the academic year. 2. While faculty are responsible for assessing each artifact individually, outcomes are assessed via Form 3.5 and Student Learning Outcomes rubrics each year
3	Graduates will demonstrate an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts. **(ABET 4)**	BME 4960 (E) BME 5965 (E)	BME 4960: Oral presentations, reports BME 5965: Written reports	1. The instructor for each course will provide an initial analysis, and the faculty within the program will review the instructor analysis at the annual assessment meeting, held at the conclusion of the academic year. 2. While faculty are responsible for assessing each artifact individually, outcomes are assessed via Form 3.5 and Student Learning Outcomes rubrics each year
4	Graduates will communicate effectively with a range of audiences. **(ABET 3)**	BME 2200 (I) BME 3300 (R) BME 3840 (R) BME 4600 (E) BME 4960 (E) BME 5965 (E)	BME 2200: Homework, exams, presentation BME 3300: group oral report, writing assignment BME 3840: in-lab performance, reports, lab notebook BME 4600: Problem sets, projects BME 4960: Oral presentations, reports BME 5965: Poster presentation, written report	1. The instructor for each course will provide an initial analysis, and the faculty within the program will review the instructor analysis at the annual assessment meeting, held at the conclusion of the academic year. 2. While faculty are responsible for assessing each artifact individually, outcomes are assessed via Form 3.5 and Student Learning Outcomes rubrics each year

5	Graduates will be able to solve bio/biomedical engineering problems, including those associated with the interaction between living and non-living systems. **(ABET BME B)**	BME 2000 (R) BME 3300 (I) BME 3840 (R) BME 4600 (E) BME 4960 (E) BME 5965 (E)	BME 2000: Homework, exams, in-class exercises BME 3300: Homework, quizzes, exams, class participation BME 3840: Pre-lab and post-lab exercises, reports BME 4600: Problem sets, projects BME 4960: Reports BME 5965: Poster presentation, written report	1. The instructor for each course will provide an initial analysis, and the faculty within the program will review the instructor analysis at the annual assessment meeting, held at the conclusion of the academic year. 2. While faculty are responsible for assessing each artifact individually, outcomes are assessed via Form 3.5 and Student Learning Outcomes rubrics each year

Use of Assessment Data

1. How and when will analyzed data be used by program faculty to make changes in pedagogy, curriculum design, and/or assessment practices?
   An annual assessment meeting will be held at the end of the academic year. Faculty will review and discuss the assessment data, and determine any changes that are necessary.
2. How and when will the program faculty evaluate the impact of assessment-informed changes made in previous years?
   Data will be compared to previous years at an annual assessment meeting to determine if changes from previous years had an effect, what the effect was, and if the effect was as intended.

Additional Questions

1. On what schedule/cycle will program faculty assess each of the program's student learning outcomes? (Please note: It is not recommended to try to assess every outcome every year.)
   Outcomes will be assessed and reviewed every 3 years in alignment with our ongoing professional assessment processes required by ABET.
2. Describe how, and the extent to which, program faculty contributed to the development of this plan.
   The plan presented here is derived from our ABET processes, and faculty participate in review of the plan once each year. The current assessment plan was developed prior to most of the BME faculty joining the program, however, each faculty participates in an ongoing basis and has the opportunity to contribute to changes in our processes each year.

IMPORTANT: Please remember to submit any rubrics or other assessment tools along with this plan.

Current ABET Learning Outcomes & BME Specific Criteria

ABET Student Learning Outcomes
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 judgements, 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

ABET BME Specific Criteria
A. Applying principles of engineering, biology, human physiology, chemistry, calculus-based physics, mathematics (through differential equations) and statistics
B. Solving bio/biomedical engineering problems, including those associated with the interaction between living and non-living systems
C. Analyzing, modeling, designing, and realizing bio/biomedical engineering devices, systems, components, or processes
D. Making measurements on and interpreting data from living systems

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

	Unsatisfactory	Developing	Satisfactory	Exemplary
Formulate the problem and identify key issues / variables	- Missing problem formulation - Missing most key issues/variable - Missing most criteria - Missing most constraints - Missing most assumptions	- Weak problem formulation - Some issues/variables identified, but many missing - Many criteria missing - Many constraints missing - Many assumptions missing	- Adequate problem formulation - Most key issues/variables are identified - Almost all criteria presented for ranking alternatives - Almost all constraints identified - Almost all assumptions identified	- Complete and succinct problem formulation - Key issues/variables identified - All relevant criteria presented for ranking alternatives - All relevant constraints identified - All relevant assumptions identified
Recognize the need or potential for multiples solutions	- Alternative solutions are not presented	- Alternative solutions are not significantly different or only involve a minor parameter change	- Alternative solutions adequately cover design space - Variety of tradeoffs are presented in alternative solutions	- Alternative solutions cover design space in several significant dimensions - All significant tradeoffs are presented in alternative solutions
Analyze alternative solutions to an engineering problem	- Little analysis - Severely flawed analysis - Criteria not evaluated - Constraints ignored	- Limited analysis of alternatives - Only some criteria evaluated - Only some constraints considered	- Appropriate analysis approach - Mostly correct analysis results - Criteria evaluated with minor errors - Constraints considered with minor errors	- Well thought out or clever analysis approach - Complete and correct analysis results - Complete evaluation of design criteria - Complete consideration of constraints
Justify a solution to an engineering problem	- Little discussion of analysis results - Missing documentation of design-making process - Arbitrary choice for final solution	- Weak discussion of analysis results - Missing significant steps in decision-making process - Weak justification for final solution	- Adequate discussion of analysis results - Document decision-making process - Final solution justified based upon design criteria	- Detailed discussion of analysis results - Detailed documentation of decision-making process - Clear justification for final solution based upon design criteria

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

	Unsatisfactory	Developing	Satisfactory	Exemplary
Formulate the problem, identify the need, and analyze constraints	- Unable to formulate the problem at all - Does not understand the concept of constraints	- Partial formulation, but missing some key constraints - Understands the concept of constraints but is unable to formulate the problem	- Formulates the problem and uses constraints in formulation - Unable to use the most efficient formulation	- Formulates the problem and analyzes all relevant constraints - Finds the best formulation
Establish criteria for evaluating potential solutions and tradeoffs	- Unable to establish fitness criteria - Does not understand the concept of tradeoffs	- Somewhat able to establish fitness criteria and tradeoffs with major weaknesses - Misses several critical tradeoffs	- Establishes fitness criteria and tradeoffs with minor weaknesses	- Establishes complete fitness criteria - Analyzes tradeoffs thoroughly
Generate alternative solutions	- Unable to derive any meaningful solutions	- Derives a meaningful solution - Unable to derive alternative solutions	- Derives multiple solutions - Has some weaknesses in evaluation of alternative solutions	- Derives alternative solutions - Performs proper evaluation of alternative solutions
Develop a prototype (theoretical OR physical) and analyze performance	- Unable to build a proper prototype	- Builds a prototype with some help - Shows major weaknesses in analyzing performance	- Builds an adequate prototype - Somewhat able to analyze performance	- Builds a well-developed prototype - Fully analyzes the performance
Improves upon prototype (i.e. reiterate, painstorm, identify weaknesses, etc.)	- Unable to identify weaknesses in prototype	- Identifies some weaknesses in prototype, but still missing some important items - Unable to make any improvement to the prototype	- Identifies key weaknesses in prototype - Makes some improvements to eliminate major weaknesses, but minor weaknesses not addressed	- Identifies any weakness in prototypes - Remedies any weakness in prototype - Determines the best prototype

Outcome #3: An ability to communicate effectively with a range of audiences

	Unsatisfactory	Developing	Satisfactory	Exemplary
Organize the material to be communicated, with any accompanying slides designed to look both professional and graphically appealing.	- Little organization - Missing problem statement - Mission conclusion/summary - Missing other major sections - Missing references - Too much or small-font text - Missing /Low-quality graphics - Slides do not support speaker	- Confusing organization - Weak problem statement - Weak conclusion or summary - Other sections are weak - Weak list of references - Slides not graphically appealing (e.g. white space) - Verbiage not clear and concise	- Mostly logical and complete organization - Adequate problem statement - Adequate conclusion/summary - Adequate list of references - Slide content is clear - Images are relevant	- Excellent organization - Well-stated problem statement or purpose - Strong conclusion or summary - Thorough list of references - Images enhance the message - Text clear and concise - Very graphically appealing
Presents content in own words, demonstrating comprehension of material	- Lacking information or information is inaccurate or irrelevant - Significant text has been plagiarized - Presents little understanding of topic	- Some basic information, but some is inaccurate or irrelevant - Some text may be plagiarized - Presents basic understanding of some parts of the topic	- Adequate information with a few minor errors or omissions - Adequate research - Text is mostly the author's own, and appropriate citations provided - Presents general understanding of topic	- Exceptional information that is accurate and relevant - Careful and thorough research - All text is the author's own - Presents in-depth understanding and insight
Provide data to support claims or inform the audience	- Ideas not expressed clearly nor supported by details - No interpretation of data - No illustrations, or they do not support the intended message	- Ideas are not expressed clearly OR details are weak - Data analysis is weak - Illustrations are unrelated, confusing, or mislabeled	- Ideas are generally expressed clearly and details are adequate - Data analysis is adequate - Illustrations support ideas, but have some mislabeling or do not present data in the best way	- Ideas are well-developed, expressed clearly with appropriate details - Data analysis is thorough and clever - Illustrations clearly support core message, are properly labeled, and captioned
Demonstrate proper use of English	- Numerous errors in grammar, punctuation, and spelling - Many sentences have an awkward construction - Does not appear to have been proofread	- Several errors in grammar, punctuation, and spelling - Several sentences have an awkward construction - Proofreading appears to have been done hastily	- A few errors in grammar, punctuation, and spelling - Sentences are mostly well-crafted - Appears to have been proofread, but further revision could improve text	- Minor errors, if any, in grammar, punctuation, and spelling - Varied and creative sentence structures - Demonstrates thorough proofreading and revision
Deliver an oral presentation that is well-rehearsed and synchronized to any accompanying slides	- Control of speaking tone, clarity, and volume is poor - Speaker visibly nervous; does not convey interest in topic - Speaker fails to make eye contact with audience - Absent awareness of physical gestures and facial expression - Presentation not synchronized to slide content	- Clarity of speech is uneven, delivery is halting - Speaker is not completely sure of topic and appears nervous or disengaged - Limited or sporadic eye contact with audience - Limited or inappropriate use of gestures or facial expression - Speaker is reading the slides	- Good speaking voice; recovers easily from speaking errors - Speaker is in command of the topic but appears slightly nervous in delivery - Good eye contact with audience throughout most of presentation - Use of physical gestures and facial expression is good	- Strong, clear speaking tone easily understood by audience - Speaker conveys confidence in talking about the topic - Excellent eye contact with audience throughout presentation - Use of physical gestures and facial expressions conveys energy and enthusiasm

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

	Unsatisfactory	Developing	Satisfactory	Exemplary
Identify the global, economic, environmental, and societal context of an engineering problem or scenario	- Unable to identify relevant context of the problem - Relevant contexts described in an extremely limited fashion	- One relevant context of the four listed context types identified - The one relevant context described in only a rudimentary fashion	- Relevant context among two or three of the four listed context types recognized - At least two contexts described substantively	- Relevant contexts among three or four of the four listed context types identified - At least three of the contexts described thoroughly
Describe ethical and professional responsibilities related to an engineering project	- Description of ethical and professional responsibilities absent or extremely limited	- Description of ethical and professional responsibilities is rudimentary	- Description of ethical and professional responsibilities is substantive	- Description of ethical and professional responsibilities is complete and thorough
Explain the impact of engineering decisions in a global, economic, environmental, and societal context	- Explanation of relevant impacts of engineering decisions is absent or extremely limited	- Explanation of engineering decisions impact touches on only one context - Explanation of relevant impacts of engineering decisions is rudimentary	- Explanation of relevant impacts of engineering decisions touches on two or three of the provided contexts - Explanation is substantive in the majority of contexts	- Explanation of relevant impacts of engineering decisions touches on three or four of the contexts - Explanation is at least substantive in all contexts and is thorough in the majority

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

	Unsatisfactory	Developing	Satisfactory	Exemplary
Establish a collaborative and inclusive team environment	- Does not provide encouragement or constructive criticism - Does not listen to other teammates or share knowledge - Does not help other teammates or demonstrate leadership	- Sometimes provides encouragement and constructive criticism - Sometimes listens to other teammates and shares knowledge - Sometimes helps other teammates and demonstrates leadership	- Frequently provides encouragement and constructive criticism - Frequently listens to others and shares knowledge - Frequently helps other teammates and demonstrates leadership	- Always provides encouragement and constructive criticism - Always listens to other teammates and shares knowledge - Always helps other teammates and demonstrates leadership
Fulfill individual responsibilities and contributes to the team's success	- Does not complete individual tasks timely - Does not contribute to the team efforts - Does not interact with the other team members	- Completes small number of individual tasks timely - Contributes little to the team efforts - Interacts little with other team members	- Completes most of the individual tasks timely - Contributes frequently to the team efforts - Interacts regularly with other team members	- Completes all individual tasks timely - Always contributes to the team efforts - Always interacts with other team members
Define team goals and deadlines, plan tasks, organize and facilitate effective team meetings	- Does not define any goals or deadlines - Does not plan shared or individual tasks - Does not organize nor facilitate any part of the team meetings	- Defines at least one goal with a deadline - Plans at least one shared and one individual task - Organizes and facilitates at least one part of one team meeting	- Defines a few necessary goals with deadlines - Plans a few necessary shared and individual tasks - Organizes and facilitates a few parts of a few team meetings	- Defines several necessary goals with deadlines - Plans several necessary shared and individual tasks - Organizes and facilitates several parts of several team meetings

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

	Unsatisfactory	Developing	Satisfactory	Exemplary
Design and / or evaluate an experimental plan	- Missing experimental plan / evaluation - Missing driving or key questions - Missing the identification of critical variables - Missing data collection procedures	- Flawed experimental plan / evaluation - Weak driving questions - Majority of key variables are not identified - Data collection procedure is formulated poorly	- Adequate experiment plan / evaluation - Driving questions are presented, although it may have minor flaws - Almost all variables have been identified - Data collection procedure is formulated adequately, but does not account for all externalities	- Well thought out experimental plan / evaluation - Driving question is appropriately narrow and focused - All relevant variables and externalities have been identified - Data collection procedure is detailed without being unnecessarily complicated
Acquire data on appropriate variables	- Data acquisition appears to have significant errors or unrealistic accuracy - Data collected for variables that are not part of experiment plan OR key variables are not sampled - Missing large portions of data	- Data acquisition does not include any detail on instrument precision or accuracy performance - Acquired data is not accompanied by a data acquisition illustration or diagram - Input data range is significantly limited or obviously meaningless for some variables	- Data acquisition includes most instrument capabilities - Data acquisition setup is illustrated/explained, but a few minor details are missing - Input data covers most of the range of interest for the key variables	- Data acquisition includes all relevant sensitivity and calibration information - Data acquisition setup is carefully and thoroughly explained - Input data covers entire range of interest
Interpret experimental data and results with respect to appropriate theoretical models or anticipated outcomes	- No comparison made, or comparison made to irrelevant models / outcomes	- Weak comparison of data to an appropriate model / outcome - Comparison of data made to model that doesn't include some important relationships among key variables	- Adequate comparison made to appropriate model / outcome - Model includes important relationships among key variables, though some minor details are missing	- Thorough comparison conducted between sufficiently varied data set and a detailed model / outcome - Theoretical model is sufficiently detailed to provide insight to answering driving question
Explain observed differences between model and experiment and draw conclusions	- Differences are not identified or are incorrectly explained - Neither the possibility of using the wrong model nor of collecting erroneous data has been identified - Conclusions are not justified	- Most differences are correctly identified, but many are poorly explained - Explanation of differences does not consider use of wrong model or possible erroneous data - Conclusions are weakly justified	- All major differences are identified; only a few minor differences have been ignored - Both model and data have been explored as possible sources of error - Conclusions are partially justified by analysis	- All relevant differences have been identified - Potential weaknesses in both model and data collection have been identified, and both are well done - Conclusions are fully justified by rigorous analysis

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

	Unsatisfactory	Developing	Satisfactory	Exemplary
Identify necessary techniques, skills, and tools / resources for advancing research or technology	- Identifies a small subset of necessary techniques, skills, and tools / resources - Identifies unrelated techniques, skills, and tools / resources	- Identifies some techniques, skills, and tools / resources, but missing some important items - Includes some unrelated techniques, skills, and tools / resources	- Identifies almost all of the relevant techniques, skills, and tools / resources - Missing some minor techniques, skills, and tools / resources	- Identifies all relevant techniques, skills, and tools / resources
Explain the use of the new techniques, skills, and tools / resources	- Provides little explanation of how the techniques, skills, and tools / resources should be used - Provides incorrect explanation of how to use the techniques, skills, and tools / resources	- Explains how some techniques, skills, and tools / resources should be used, but missing some important items - Provides some incorrect explanations of how to use the techniques, skills, and tools / resources	- Explains how almost all of the techniques, skills, and tools / resources should be used - Shows adequate understanding of techniques, skills, and tools / resources - Missing the explanation of some minor techniques, skills, and tools / resources	- Explains how all relevant techniques, skills, and tools / resources should be used - Shows in-depth understanding of techniques, skills, and tools / resources - Does not explain unrelated aspects of techniques, skills, and tools / resources
Apply the new techniques, skills, and tools / resources to a given engineering situation	- Applies a small subset of the necessary techniques, skills, and tools / resources - Incorrectly applies the techniques, skills, and tools / resources	- Correctly applies some of the techniques, skills, and tools / resources, but missing some important items - Incorrectly applies some techniques, skills, and tools / resources	- Correctly applies almost all of the techniques, skills, and tools / resources - Demonstrates adequate use of techniques, skills, and tools / resources - Incorrectly applies some minor techniques, skills, and tools / resources	- Correctly applies all relevant techniques, skills, and tools / resources - Demonstrates mastery of techniques, skills, and tools / resources - Does not apply unnecessary techniques, skills, and tools / resources

Course Number:
Course Title:
Semester:

Instructor:
Date Completed:
Programmatic Review Date:

Course Grade Distribution

Grade	F	D	C-	C	C+	B-	B	B+	A-	A
Number of Students										

Phase-1 (Direct) Assessment of Student Outcomes

For each student outcome indicate the *Phase-I* assessment methods used (see appendix). For each method listed please provide a more specific description of the assessment method, rank the achievement level, and provide quantitative evidence to support the achievement level.

Table F3.5-1: Summary of Phase-1 Assessment

Summarize the phase-1 measures, and based on that data, determine the overall level of achievement.

Outcome	Phase-1 Assessment Level
1	
2	
3	
4	
5	
6	
7	
A	
B	
C	
D	

Phase-2 (Indirect) Faculty Assessment: *Discuss the basis for the indirect faculty assessment here. Please also provide your overall class assessment and, if necessary, an action plan to address concerns.*

Outcome	Unsatisfactory	Developing	Satisfactory	Exemplary	Overall Level
1					
2					
3					
4					
5					
6					
7					

Outcome	Unsatisfactory	Developing	Satisfactory	Exemplary	Overall Level
A					
B					
C					
D					

Table F3.5-2: Summary of Phase-1 and Phase-2 Assessments

Summarize the phase-1 and phase-2 measures and, based on that data, determine the overall level of achievement.

Outcome	Phase-1 Assessment Level	Phase-2 Assessment Level	Overall Assessment Level
1			
2			
3			
4			
5			
6			
7			
A			
B			
C			
D			

Appendix

Student Outcome Assessment Methods

The assessment of student outcomes is a coordinated process involving the program constituents and designed to meet the institutional mission. The following sections describe the methods used, results, and analysis.

Phase-1 (Direct) Assessment Methods: These methods range from homework and exams to oral presentations and large-scale projects. There are seven general types categorized below. Achievement levels are obtained through graded measurements and/or rubric measurements.

1. *homework, quizzes, exams:* This method is based on assignment or problem grades that are focused on specific program outcomes.

2. *computer assignments and projects:* This method is based on assignment or project grades that are based on computer programming or simulations related to program outcomes.

3. *laboratory experiments and projects:* This method is based on grades from laboratory experiments or course projects.

4. *oral reports and exams:* This method is based on grades and assessment rubrics from oral reports or exams.

5. *written reports and essays:* This method is based on grades and assessment rubrics from written reports or essays.

6. *Portfolios, surveys, reflections, and critical reviews:* This method is based on grades and assessment rubrics from portfolios, student surveys, reflections, peer assessments, or critiques of papers.

7. *team and class participation:* This method is based on grades and assessment rubrics based on team or class participation.

Table 1 Assessment Outcome Achievement Level for Graded Measurements

Level-A	Greater than 80% of students received a passing grade (>70%). Strong indication that outcome is sufficiently addressed.
Level-B	Greater than 60% of students received a passing grade (>70%). Outcome is addressed but faculty should monitor closely during next cycle.
Level-C	Less than 60% of students received a passing grade (>70%). Marginal indication that outcome is addressed. Faculty should review before next cycle.

Table 2 Assessment Outcome Achievement Level for Rubric Measurements

Level-A	Greater than 80% of students marked at "Satisfactory" or "Exemplary." Strong indication that outcome is sufficiently addressed.
Level-B	Greater than 60% of students marked at "Satisfactory" or "Exemplary." Outcome is addressed but faculty should monitor closely during next cycle.
Level-C	Less than 60% of students marked at "Satisfactory" or "Exemplary." Marginal

	indication that outcome is addressed. Faculty should review before next cycle.

Table 3 Assessment Outcome Achievement Level for Surveys

Level-A	Greater than 80% of responses were "Strongly Agree" or "Agree." Strong indication that outcome is sufficiently addressed.
Level-B	Between 60% and 80% of responses were "Strongly Agree" or "Agree." Outcome is addressed but faculty should monitor closely during next cycle.
Level-C	Less than 60% of responses were "Strongly Agree" or "Agree." The student outcome requires review by the faculty before next cycle.

Phase-2 (Indirect) Assessment Methods: These methods apply to all student outcomes.

- *student course evaluations:* This method is based on student course evaluations and archived with faculty course evaluations.
- *student advisory board and town hall meetings: S*tudent feedback on the overall curriculum and specific courses is provided through the student advisory board and town hall meetings. Minutes are kept and action items may be initiated based on these discussions.
- *faculty course evaluations:* This method is based on individual faculty assessment of their courses with periodic review by the department of all courses.
- *senior exit survey/interviews and alumni surveys:* The senior exit surveys/interviews are completed at the time of graduation and include the written form and a meeting with the Department Chair or designee. The alumni survey is available on a continuous basis but a recent call for responses resulted in roughly 20% of the alumni submitting their views on the program.