Progress Report to the
Middle states Commission on Higher Education
From
SUNY-ESF
Syracuse, NY 13210

Quentin D. Wheeler, President

10/1/2016

Subject of the Progress Report:

"To request a progress report, due October 1, 2016, documenting further development and implementation of a cohesive, organized and sustained assessment process that provides sufficient, convincing evidence that students are achieving key institutional and program learning outcomes, in all programs including general education, and that assessment information is used to improve teaching and learning (Standards 12 and 14)."

Table of Contents

Tables and Figures

Introduction

This progress report has been prepared at the request of the Middle States Commission on Higher Education (MSCHE) in response to a Monitoring Report submitted in March, 2015. The specific request is for a progress report:

> … documenting further development and implementation of a comprehensive, organized and sustained assessment process that provides sufficient, convincing evidence that students are achieving key institutional and program learning outcomes, in all programs including general education, and that assessment information is used to improve teaching and learning (Standards 12 and 14).

This report addresses the requested information by examining the progress and current status of assessment efforts for General Education (Standard 12) and program student learning outcomes (Standard 14) separately. First, this report establishes context for the organization, sustainability, results, and actions of our comprehensive assessment process. Discussion of how assessment, information is analyzed and used to improve teaching and learning for both Standard 12 and Standard 14 follows the Institutional Context. Both Standard 12 and Standard 14 begin with a summary of how we have organized the assessment process at ESF, followed by evidence of how that process has been sustained through faculty engagement with the assessment process, and finally each standard concludes with examples of results of the most recent assessment process and the actions faculty are taking to refine our assessment practices as well as to improve student achievement of institutional and program learning objectives. Following the discussion of Assessment of Student Learning (Standard 14) we offer a connection between our program review process and our student learning assessment process at the program level. Concluding remarks are at the end to reinforce the comprehensive and sustained nature of our institutional assessment of student learning.

Institutional Context

The State University of New York College of Environmental Science (ESF or the College) is one of the 64 institutions in the State University of New York (SUNY) system. It was created by an act of the New York State legislature in 1911 as the New York State College of Forestry at Syracuse University. In 1972 the name was changed to its current title.

ESF has made a commitment to further development and implementation of an organized and sustained process for the assessment of student learning, including the hire of a Senior Staff Assistant for Assessment and Institutional Research. This doctoral level professional staff member is responsible for supporting all assessment efforts at ESF, including faculty assessment efforts, coordinating assessment of student learning at an institutional level, and assisting academic departments with the ongoing improvement of their assessment processes as requested. As an administrative team member, this individual serves as a point of contact within the

institution to ensure that the data available for review of academic assessment at the institutional level is available, organized, and robust.

The Senior Staff Assistant works with faculty to shape and organize assessment processes with both departmental needs and institutional needs in mind. Improvement of how we assess student learning is ongoing. Faculty at ESF continue to make sustained improvements to both their assessment methods as well as “closing the loop” by making changes to courses for the improvement of teaching and learning based on feedback gleaned from assessments at the course and department levels.

ESF is a Carnegie R3: Doctoral Universities – Moderate Research Activity. Other Carnegie descriptors include STEM dominant, high undergraduate, primarily residential, and higher transfer-in.

Progress to Date and Current Status

Standard 12: General Education

The MSCHE Request for Information on General Education Assessment

MSCHE requests that ESF document… *further development and implementation of a comprehensive, organized, and sustained assessment process that provides sufficient, convincing evidence that students are achieving key institutional and program learning outcomes, including… general education, and that assessment information is used to improve teaching and learning.*

Organization of Procedure

The General Education Task Force was formed in Fall 2015 to examine and refine the structure and assessment process of the General Education process at ESF. As indicated in the introduction, conversations among faculty, the Associate Provost for Instruction and Dean of the Graduate School, and the Senior Staff Assistant for Assessment and Institutional Research acknowledged assumptions associated with the phrase "General Education," so we made the decision to organize our assessment of general education outcomes as the "College-wide Student Learning Outcomes & Assessment Committee" (CwSLOAC). The Senior Staff Assistant for Assessment and Institutional Research has also worked with this committee to organize and document the ongoing assessment of college-wide student learning outcomes, and to provide some additional tools to shape the comprehensive nature of student learning outcomes assessment.

For this analysis cycle, the Associate Provost for Instruction and Dean of the Graduate School forwarded a request for data in May 2016, in order for the CwSLOAC to assess student achievement of the College-wide Student Learning Outcomes. This request for data was sent to department chairs and assessment coordinators in each department. The College-wide SLOs we were reviewed for the 2015-16 academic year included Scientific Reasoning (SLO 1) and Quantitative Reasoning (SLO 2) as part of the regular assessment schedule. Additionally, two years of data for Critical Thinking (SLO 6) were assessed this year, as the assessment had not been completed in the 2014-15 academic year as scheduled.

Sampling was organized such that instructors were asked to select a representative or random sample of final work products from courses identified as data sources for the CwSLOs being assessed this year. If final enrollment in the course generated fewer than twenty projects (through individual or group work) the instructor was asked to submit all final work products for the class. As our assessment of institutional learning outcomes is still being refined, the data collection for Scientific Reasoning (SLO 1) did not return sufficient data for analysis. This is being addressed through both the committee's work to improving the organization of the request for data (see

Table 1) as well as an institutional commitment to supporting a comprehensive assessment of these learning outcomes.

Table 1: Timeline for Future Assessment	
March, April, May, & September of each academic year	Requests for student work will be made to faculty. A request for AY 2015-16 is in progress.
October 1	Data from previous academic year is due annually
November	Rubrics are applied and data collected from submitted student work samples
January	Draft report written and submitted to faculty for review and comment
March	Report is finalized by the committee and released to faculty
May	Report is endorsed by Academic Governance

For long range planning of assessment activities, both to ensure that efforts are organized and sustained, the committee developed an assessment cycle that ensures all six outcomes are reviewed regularly (Table 2). We were intentional about structuring this schedule in a manner that allows enough flexibility to refine the CwSLO assessment process.

Table 2: College-wide Student Learning Outcome Assessment Schedule			
2015-16	Outcomes 1, 2, 6[1]	Progress Report Only – No synthesis expected	Assessing 2014-15 Data
2016-17	Outcomes 3,4,5,1[2]	Synthesis Report – Comprehensive look at all 6 CwSLOs with 2 years of data and any previous synthesis reports.	Assessing 2015-16 Data
2017-18	Outcomes 1, 2, 6	Progress Report Only – No synthesis expected	Assessing 2016-17 Data
2018-19	Outcomes 3, 4, 5	Synthesis Report – Comprehensive look at all 6 CwSLOs with 2 years of data and analyzing changes triggered by previous synthesis report.	Assessing 2017-18 Data

[1]- We conducted 2 years of assessment on SLO 6 (Critical Thinking) because it had not been effectively assessed previously.

[2] – There was insufficient student work to review that addressed this outcome in the previous year; therefore, it will be assessed this year under the revised data collection protocol.

By necessity, the CwSLOAC has worked hard to establish an organized and comprehensive assessment procedure for reviewing College-wide Student Learning Outcomes. We recognize that without a high level of organization, the assessment of these important outcomes cannot be comprehensive or sustainable. As Table 1 and Table 2 show, we have invested a great deal of effort into establishing a schedule and procedure for conducting these assessments, which will promote the sustainability of our ongoing assessment of College-wide Student Learning Outcomes. In furtherance of this goal, the college has formed a College-wide Student Learning

Outcomes Assessment Committee (CwSLOAC), which is charged with overseeing the continuation of the assessment plan developed in 2014. In addition, this committee has also distributed a brief questionnaire to all academic departments that provided an opportunity for faculty to engage with the CwSLOs in a meaningful way, and reflect upon opportunities to refine the delivery and assessment of these learning outcomes for their individual departments.

Sustainability of CwSLO Assessment Process

Going forward from this inaugural cycle of College-wide Student Learning Outcomes assessment, coordination with academic departments will improve the sustainability of the assessment process. This will improve data collection procedures as well as the representativeness of the data. The process will also be sustained through the collaborative development of appropriate metrics to assess institutional learning outcomes. Departments will also participate in identifying additional opportunities to collect data relevant to the College-wide Student Learning Outcomes for each assessment cycle. The CwSLOAC will continue to meet regularly to coordinate the sustained assessment of student achievement of institutional learning outcomes. The Committee will continue to encourage departments to embrace how these overarching institutional learning outcomes clarify the competencies common to all academic programs at the College. To support this collaboration with academic departments, the Committee drafted a survey that was discussed at department meetings in September 2016 to solicit feedback from faculty about any changes they made to their curriculum based on the 2014-15 General Education report, and to invite them to offer suggestions for improving the data collection associated with CwSLO assessment.

Results and Actions Related to CwSLO Assessment

For Quantitative Reasoning (SLO 2), the committee was able to generate sufficient data for analysis, but also realized a need to refine the process and organization of data collection for this outcome as well, due to challenges regarding diversity of data sources, departmental representation, and variety of student experiences to demonstrate mastery of this outcome. Figure 1 represents the entire dataset, including data collected for introductory mathematics courses on campus. However, the committee believes Figure 2 is a more accurate representation of students' Quantitative Reasoning competencies upon graduation as it represents only data collected from a senior engineering student capstone assignment. The CwSLOAC will move to a model where SLOs are assessed at different levels, to improve the understanding of how and to what degree students are achieving competency in these skills.

Figure 1: Student Learning Outcome #2: Quantitative Reasoning

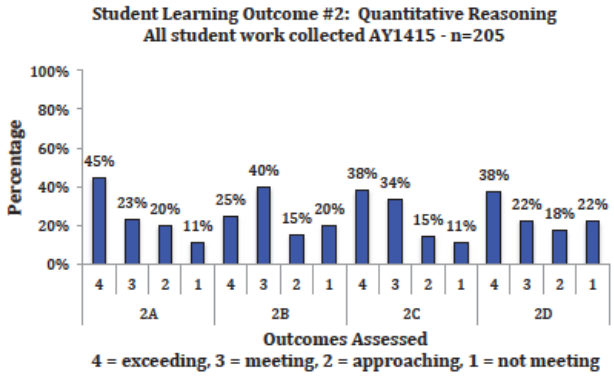
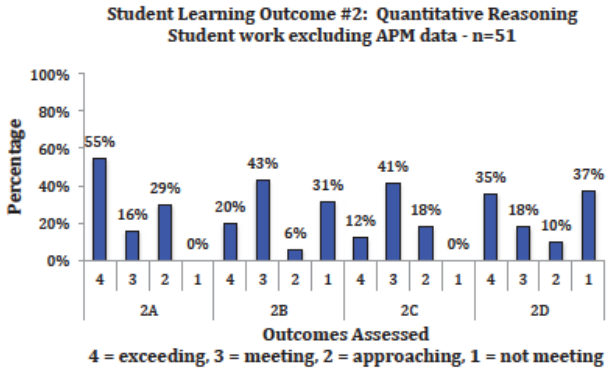
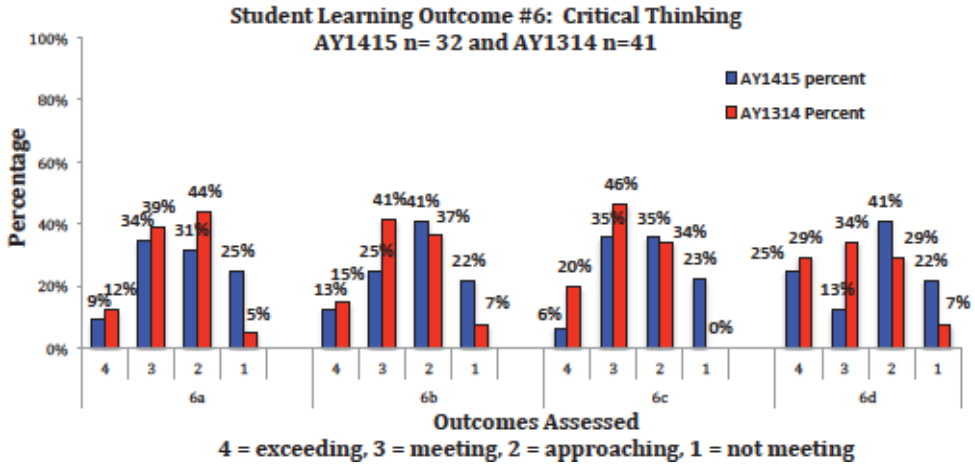


Figure 2: Student Learning Outcome #2: Quantitative Reasoning



Critical Thinking (SLO 6) provided two years of data for analysis. Similar to the analysis of SLO 2, the committee identified concerns over representativeness in SLO 6 as well. Two years of data were collected primarily from first year writing courses. As with the other CwSLOs, the committee determined that it will be valuable to identify additional data sources to assess this outcome. Figure 3 depicts the degree to which first-year students have achieved critical thinking skills, as they were defined for Academic Years 2014-15 and 2015-16.

Figure 3: Student Learning Outcome #6: Critical Thinking



Critical thinking skills were divided into four subcategories (6a – 6d) and analyzed for degree of attainment on a scale of 1 = not meeting to 4 = exceeding. Through this data analysis process, the Committee developed a table that establishes the competency level that should be identifiable in various courses at the College for the three SLOs that were under review for the 2015-16 Academic Year (Table 3).

Table 3: Refinement of data to be collected to address SLO competency levels		
Scientific Reasoning (SLO 1)		
Objective	*Examples of Student Work*	*Competency*
1a	General Chemistry & General Biology Exam Questions	Introductory
1b	General Chemistry & General Biology Lab Reports	Introductory
1c	General Chemistry I embedded final exam question, Capstone	Emphasis
1d	General Chemistry II media analysis project, Capstone	Emphasis
1e	Capstone Projects	Emphasis
Quantitative Reasoning (SLO 2)		
2a	APM Courses	Introductory
2b	APM Courses	Introductory
2c	APM Courses	Introductory
2d	Capstone	Emphasis
Critical Thinking (SLO 6)		
6a	Capstone	Emphasis
6b	Capstone	Emphasis
6c	Capstone	Emphasis
6d	Capstone	Emphasis

By separating each SLO into competency levels, the Committee is able to collect and analyze data from a greater variety of courses and show a broader representation of student achievement of these competencies. The action of establishing "Introductory" and "Emphasis" levels of achievement for the College-wide Student Learning Outcomes also increases the types and number of courses that may be data sources for future CwSLO assessment cycles. For example, the scientific method is likely most evident at the introductory level, thus evidence of a higher scientific reasoning competency will be expected in more advanced coursework. The competency levels the CwSLOAC developed can be reviewed in Appendix A, "College-wide Student Learning Outcomes Assessment: Academic Year 2015/2016," which is being presented to the faculty for acceptance at the Academic Governance meeting on October 18, 2016.

The committee has acknowledged persistent concerns about representativeness of data and identified a variety of data sources in order to generate a more robust dataset for future analysis of the College-wide Student Learning Outcomes. The committee plans to create a five year assessment plan to further organize assessment efforts, and to effectively communicate the role and importance of the college-wide student learning outcomes to the campus. The Senior Staff Assistant for Assessment has drafted a course-to-outcomes matrix (Appendix B) which will allow the committee and faculty members to identify opportunities for data collection to sustain the assessment of CwSLOs. By identifying the courses where these competencies are introduced and emphasized, academic departments will have a clearer understanding of their role in providing direct instruction in one or more of the institutional learning outcome areas. Additional actions include:

- Working through all six of the outcomes to look for redundancy, and understanding and refining where we are getting the data
- Collaborately design how to map and keep the levels (introductory to mastery) organized
- Curriculum map of SLOs with courses using both catalog descriptions and syllabus mapping to make data collection easier
- Host a college-wide workshop on CwSLOs to make this an institutional priority, thus creating institutional memory around SLO assessment and data collection
- Create a better understanding across campus about what it means to graduate from ESF, and what the basic set of competencies every ESF student should have, are
- Using materials outside of program requirements, such as co-curricular activities (community service, international experiences, etc.)
- Utilize the program-specific assessment that is already being performed to be more efficient in CwSLO assessment

Engaging in these activities throughout the 2016-17 academic year will serve to address concerns the Committee has identified throughout the past two years of assessing college-wide competencies. Through these recommendations it will be possible to refine the process of assessment, as well as improve student achievement of these important competencies.

Standard 14: Assessment of Student Learning

The MSCHE Request for Information on Student Learning Assessment

MSCHE requests that ESF document … *further development and implementation of a comprehensive, organized, and sustained assessment process that provides sufficient, convincing evidence that students are achieving key institutional & program learning outcomes … and that assessment information is used to improve teaching and learning.*

Organization of Procedure for Assessment of Student Learning

All BS programs at ESF have current assessment plans and are on a schedule for a cyclical analysis of assessment data in the future. By December 2015, all BS level programs at the College had completed at least one cycle of assessment and the subsequent analysis of those results have steered programmatic and/or assessment procedure changes. Table 4 provides a summary of programs, most recent assessment result date, most recent action date, and next scheduled analysis in the assessment cycle.

Table 4: Summary of Program Assessment Cycle

Program	Most Recent Result Date	Most Recent Action Date	External Accreditor?	Next Scheduled Analysis Year
Chemistry	09/15/2016	19/15/2016	No	2019
Aquatics & Fisheries	09/09/2016	09/09/2016	No	2019
Biotechnology	09/09/2016	09/12/2016	No	2019
Conservation Biology	09/12/2016	09/12/2016	No	2019
Environmental Biology	09/12/2016	09/12/2016	No	2019
Forest Health	09/13/2016	09/13/2016	No	2019
Natural History & Interpretation	09/13/2016	09/13/2016	No	2019
Wildlife Science	09/13/2016	09/13/2016	No	2019
Environmental Science	02/26/2015	02/26/2015	No	2019
Environmental Health	New Program		Yes	2019
Environmental Resources Engineering	07/01/216	07/01/2016	Yes	2019
Environmental Studies	06/20/2016	06/20/2016	No	2019
Forest Ecosystem Science	02/05/2015	02/05/2015	Yes	2025

Program	Most Recent Result Date	Most Recent Action Date	External Accreditor?	Next Scheduled Assessment Analysis Year
Forest Resources Management	02/05/2015	02/05/2015	Yes	2025
Natural Resources Management	02/05/2015	02/05/2015	Yes	2024
Sustainable Energy Management	New Program		No	2025
Landscape Architecture	06/01/2015	06/01/2015	Yes	2017
Bioprocess Engineering	09/02/2016	09/02/2016	Yes	2018
Paper Engineering	05/08/2014	11/21/2012	Yes	2017
Paper Science	02/13/2015	11/26/2012	No	2018
Construction Management	05/30/2015	02/11/2015	No	2018

The following figures (Figure 5 – Figure 9) illustrate examples of how academic programs are engaging with the assessment process through capturing information through the institutional TracDat portal. The Senior Staff Assistant for Assessment has coordinated with faculty to add the results and actions related to their assessment cycles (ending in 2012 and/or 2015) to the TracDat system so they can be viewed, understood, and discussed uniformly at various levels of the institution. However, there has also been effort on the part of the Senior Staff Assistant for Assessment to respect how assessment procedures are organized within individual departments, so faculty engage with their departmental assessment process in a meaningful, sustainable, and comprehensive manner. Actions are not required when established targets are met. However, some programs have chosen to identify actions that will improve their assessment procedures, even if targets were met using their selected measures for that assessment cycle.

Sustainability of Assessment Process

ESF has sustained an established schedule for assessment, and academic programs have continued to improve their assessment methods within the framework of institutional policies and procedures. Some academic programs are accredited by an outside agency (ABET, SAF, and LAAB) and have established assessment cycles that have been in place in accordance with the discipline specific accrediting bodies and are therefore well organized and sustained. Those programs without discipline-specific accreditation, however, are also fully engaged with the work of assessment and have been using the results and actions from prior review years to inform teaching and learning for the subsequent assessment cycles.

Results and Actions Related to Assessment of Student Learning

Overall, an important result of the student learning assessment process at ESF is the evolution and refinement of the assessment methods academic departments are using to improve teaching and learning. Most programs have continued to use the process of documenting and analyzing assessment data to identify appropriate data sources, and many have been able to make important improvements to support student achievement of identified learning outcomes. Figure 5 is an example of how the assessment plan for Environmental Biology evolved over the course of the assessment cycle.

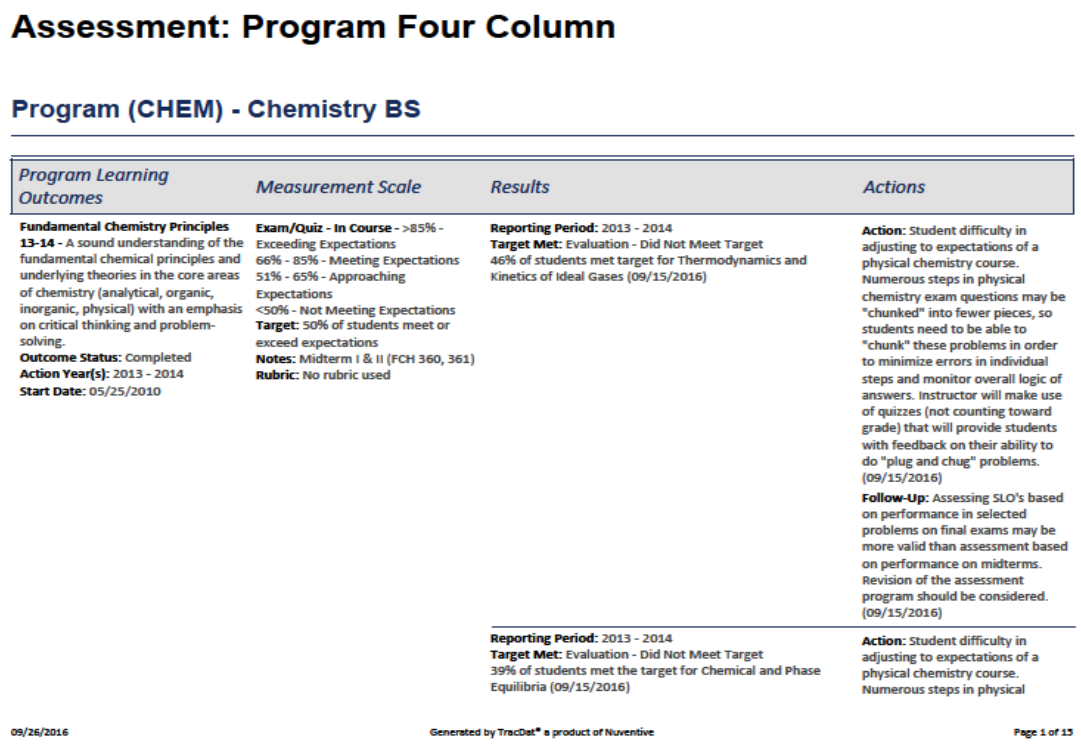
Figure 5: Assessment: Program Four Column: Program (EFB) – Environmental Biology BS

Program Learning Outcomes	*Measurement Scale*	*Results*	*Actions*
	Target: 80% of students will meet or exceed expectations (>=73) **Notes:** Averaged overall performance of ENB students in two chemistry laboratory courses, FCH151, FCH153, as measured by final grade distribution. **Rubric:** Rubric attached in Related Docs	**Target Met:** Evaluation - Met Target Exceeds Standard: 41% Meets Standard: 45% Approaches Standard: 7% Does Not Meet Standard: 7% (01/31/2013)	(03/05/2014) **Follow-Up:** Identify upper-division courses within the ENB curriculum where principles are chemistry are applied in order to measure this outcome. Will incorporate into future assessment the exam scores from the required Cell Biology (EFB 325) course to measure student understanding of biochemistry. (09/12/2016)
Knowledge of Biology 09-12 - Demonstrate basic knowledge of biology at molecular, cellular, and organismal levels and apply it to interpreting issues in their profession and in daily life. **Outcome Status:** Completed **Action Year(s):** 2009-2010, 2010-2011, 2011 - 2012	**Final Evaluation of PLO**	**Reporting Period:** 2014 - 2015 **Target Met:** No Evaluation - Data Point Exam and quiz grades from EFB 101-104, EFB 307, and EFB 320 will be used rather than final grades in order to isolate student command of biological content from other student learning objectives of these courses. We will also utilize exam and quiz grades from the Form/Function directed elective courses, which focus on organismal, cellular, and molecular biology. (09/12/2016)	
	Course Grade - 0-100 **Target:** 80% of students will meet or exceed expectations (>=73). **Notes:** Average grades in General Biology courses. **Rubric:** Rubric attached in Related Docs	**Reporting Period:** 2011 - 2012 **Target Met:** Evaluation - Did Not Meet Target Exceeds Standard: 24% Meets Standard: 46% Approaches Standard: 27% Does Not Meet Standard: 3% (03/04/2013)	**Action:** Shift to assessing this outcome using General Biology lecture and laboratory examination grades (instead of final grades, which include other components), to track student performance. (09/12/2016) **Follow-Up:** Assessment of this outcome through lecture/laboratory exam grades will provide a baseline for any future capstone/synthesis course for the Environmental Biology major. (09/12/2016)
	Course Grade - 0-100 **Target:** 80% of students will meet or exceed expectations (>=73). **Notes:** Average grades for Genetics	**Reporting Period:** 2011 - 2012 **Target Met:** Evaluation - Met Target Exceeds Standard: 43% Meets Standard: 43%	**Action:** No actions needed. (03/20/2014) **Follow-Up:** The final grades for

09/12/2016 Generated by TracDat® a product of Nuventive Page 4 of 7

Figure 6 demonstrates evidence of using the assessment process to analyze how material is presented to students and in what ways classroom instructors could adjust their teaching approach to facilitate student achievement of program learning outcomes.

Figure 6: Assessment: Program Four Column: Program (CHEM) – Chemistry BS



Assessment: Program Four Column

Program (CHEM) - Chemistry BS

Program Learning Outcomes	*Measurement Scale*	*Results*	*Actions*
Fundamental Chemistry Principles 13-14 - A sound understanding of the fundamental chemical principles and underlying theories in the core areas of chemistry (analytical, organic, inorganic, physical) with an emphasis on critical thinking and problem-solving. **Outcome Status:** Completed **Action Year(s):** 2013 - 2014 **Start Date:** 05/25/2010	**Exam/Quiz - In Course -** >85% - Exceeding Expectations 66% - 85% - Meeting Expectations 51% - 65% - Approaching Expectations <50% - Not Meeting Expectations **Target:** 50% of students meet or exceed expectations **Notes:** Midterm I & II (FCH 360, 361) **Rubric:** No rubric used	**Reporting Period:** 2013 - 2014 **Target Met:** Evaluation - Did Not Meet Target 46% of students met target for Thermodynamics and Kinetics of Ideal Gases (09/15/2016)	**Action:** Student difficulty in adjusting to expectations of a physical chemistry course. Numerous steps in physical chemistry exam questions may be "chunked" into fewer pieces, so students need to be able to "chunk" these problems in order to minimize errors in individual steps and monitor overall logic of answers. Instructor will make use of quizzes (not counting toward grade) that will provide students with feedback on their ability to do "plug and chug" problems. (09/15/2016) **Follow-Up:** Assessing SLO's based on performance in selected problems on final exams may be more valid than assessment based on performance on midterms. Revision of the assessment program should be considered. (09/15/2016)
		Reporting Period: 2013 - 2014 **Target Met:** Evaluation - Did Not Meet Target 39% of students met the target for Chemical and Phase Equilibria (09/15/2016)	**Action:** Student difficulty in adjusting to expectations of a physical chemistry course. Numerous steps in physical

09/26/2016 Generated by TracDat® a product of Nuventive Page 1 of 15

Program Learning Outcomes	*Measurement Scale*	*Results*	*Actions*
			chemistry exam questions may be "chunked" into fewer pieces, so students need to be able to "chunk" these problems in order to minimize errors in individual steps and monitor overall logic of answers. Instructor will make use of quizzes (not counting toward grade) that will provide students with feedback on their ability to do "plug and chug" problems. (09/15/2016) **Follow-Up:** Assessing SLO's based on performance in selected problems on final exams may be more valid than assessment based on performance on midterms. Revision of the assessment program should be considered. (09/15/2016)
		Reporting Period: 2013 - 2014 **Target Met:** Evaluation - Met Target 72% of students met target for Kinetics (09/15/2016)	
		Reporting Period: 2013 - 2014 **Target Met:** Evaluation - Met Target 50% of students met Target for Fundamentals of Quantum Mechanics (09/15/2016)	
	Lab Project - >85% - Exceeding Expectations 75% - 85% - Meeting Expectations 61% - 74% - Approaching Expectations <60% - Not Meeting Expectations **Target:** 70% of students will meet or exceed expectations. **Notes:** Acid/Base/Other Titrations **Rubric:** No rubric used	**Reporting Period:** 2013 - 2014 **Target Met:** Evaluation - Did Not Meet Target 45% of students met target for Acid/Base/Other Titrations (09/15/2016)	
	Lab Project - >85% - Exceeding	**Reporting Period:** 2013 - 2014	

09/26/2016 Generated by TracDat® a product of Nuventive Page 2 of 15

Figure 7 illustrates how the Bioprocess Engineering program refines their assessment plan from year to year, in response to student achievement of learning outcomes, in order to assess their targets most effectively. This reporting tool allows programs to examine and refine their assessment plans, and to track changes to their assessment methods.

Figure 7: Bioprocess Engineering Assessment Planning Report

Bioprocess Engineering Assessment Planning Report

MSCHE Assessment Plan Format

Program Learning Outcome Name	Program Learning Outcome	Outcome Year(s)	Assessment Method	Measurement Scale	Target
ABET - a. Knowledge 11-12	An ability to apply knowledge of mathematics, science, and engineering	2011 - 2012	Exam/Quiz - In Course	An exam is given at the first day of class in PSE 370 (Mass and energy balances) that covers general chemistry, physics, and calculus for the PSE 370 course. The exam should help students identify their deficiencies and prepare them for the upcoming assignments in the course.	We expect that 80% of the students will score 75% or above on the exam. We expect all students to score 60% or above.
		2011 - 2012	Final Project	4 - Exceptional 3 - Acceptable 2 - Marginal 1 - Unaaceptable	80% of the stduents are at least at acceptable level (3).
		2011 - 2012	Lab Project	4 - Exemplary 3 - Proficient 2 - Apprentice 1 - Novice	At least 85% of the student work is at least at Proficient level (or 3).
		2011 - 2012	Presentation/Performance	4 - Exemplary 3 - Proficient 2 - Apprentice 1 - Novice	At least 85% of the student work is at least at Proficient level (or 3).
		2011 - 2012	Survey of Students	5 - Exceptionally satisfied 4 - Satisfied 3 - Minimally meet 2 - Approaching to the outcome 1 - Did not meet	at least 80% of the students rated at least 4 or satisfied with the outcome requirements.
ABET - a. Knowledge 12-14	An ability to apply knowledge of mathematics, science, and engineering	2012 - 2013	Final Project	4 - Exceptional 3 - Acceptable 2 - Marginal 1 - Unaaceptable	80% of the stduents are at least at acceptable level (3).
		2012 - 2013	Lab Project	4 - Exemplary 3 - Proficient 2 - Apprentice 1 - Novice	At least 85% of the student work is at least at Proficient level (or 3).
		2012 - 2013	Presentation/Performance	4 - Exemplary 3 - Proficient 2 - Apprentice 1 - Novice	At least 85% of the student work is at least at Proficient level (or 3).
		2012 - 2013	Survey of Students	5 - Exceptionally satisfied 4 - Satisfied 3 - Minimally meet	at least 80% of the students rated at least 4 or satisfied with the outcome requirements.

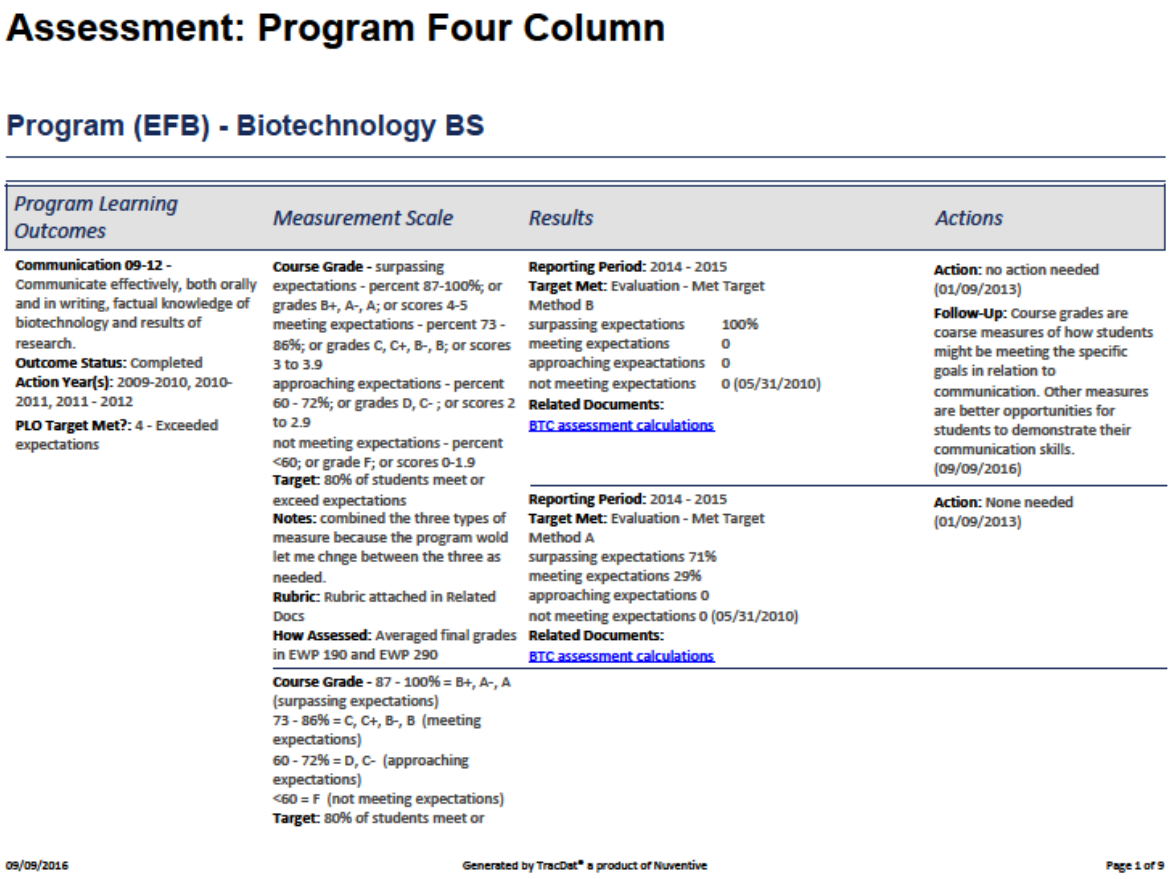
09/26/2016 1:10 Page 1 of

Program Learning Outcome Name	Program Learning Outcome	Outcome Year(s)	Assessment Method	Measurement Scale	Target
		2012 - 2013	Survey of Students	2 - Approaching to the outcome 1 - Did not meet	at least 80% of the students rated at least 4 or satisfied with the outcome requirements.
		2013 - 2014	Final Project	4 - Exceptional 3 - Acceptable 2 - Marginal 1 - Unaaceptable	80% of the stduents are at least at acceptable level (3).
		2013 - 2014	Lab Project	4 - Exemplary 3 - Proficient 2 - Apprentice 1 - Novice	At least 85% of the student work is at least at Proficient level (or 3).
		2013 - 2014	Presentation/Performance	4 - Exemplary 3 - Proficient 2 - Apprentice 1 - Novice	At least 85% of the student work is at least at Proficient level (or 3).
		2013 - 2014	Survey of Students	5 - Exceptionally satisfied 4 - Satisfied 3 - Minimally meet 2 - Approaching to the outcome 1 - Did not meet	at least 80% of the students rated at least 4 or satisfied with the outcome requirements.
ABET - a. Knowledge 14-15	An ability to apply knowledge of mathematics, science, and engineering	2014 - 2015	Final Project	4 - Exceptional 3 - Acceptable 2 - Marginal 1 - Unaaceptable	80% of the stduents are at least at acceptable level (3).
		2014 - 2015	Group Project	4 - Exemplary 3 - Proficient 2 - Apprentice 1 - Novice	3 - Proficient
		2014 - 2015	Lab Project	4 - Exemplary 3 - Proficient 2 - Apprentice 1 - Novice	3 - Proficient
		2014 - 2015	Lab Project	4 - Exemplary 3 - Proficient 2 - Apprentice 1 - Novice	At least 85% of the student work is at least at Proficient level (or 3).
		2014 - 2015	Presentation/Performance	4 - Exemplary 3 - Proficient 2 - Apprentice 1 - Novice	At least 85% of the student work is at least at Proficient level (or 3).
		2014 - 2015	Survey of Students	5 - Exceptionally satisfied 4 - Satisfied 3 - Minimally meet	at least 80% of the students rated at least 4 or satisfied with the outcome requirements.

09/26/2016 1:10 Page 2 of

Changes made by departmental faculty include selecting assessment measures, changes to instructional methods, and refining assessment procedures. This cyclical process has allowed faculty and departmental assessment coordinators to develop a deeper understanding of curricular needs and strategies for supporting student achievement of program learning outcomes. The four column report from the Conservation Biology program (Appendix C) provides a comprehensive example of how faculty addressed concerns relating to student attainment of program learning outcomes. In Figure 8 below, it is evident that despite having met the established target for student achievement, the Biotechnology department chose improve the process by working to select and identify other opportunities to measure this outcome that are more refined than course grades.

Figure 8: Assessment: Program Four Column: Program (EFB) – Biotechnology BS



Assessment: Program Four Column

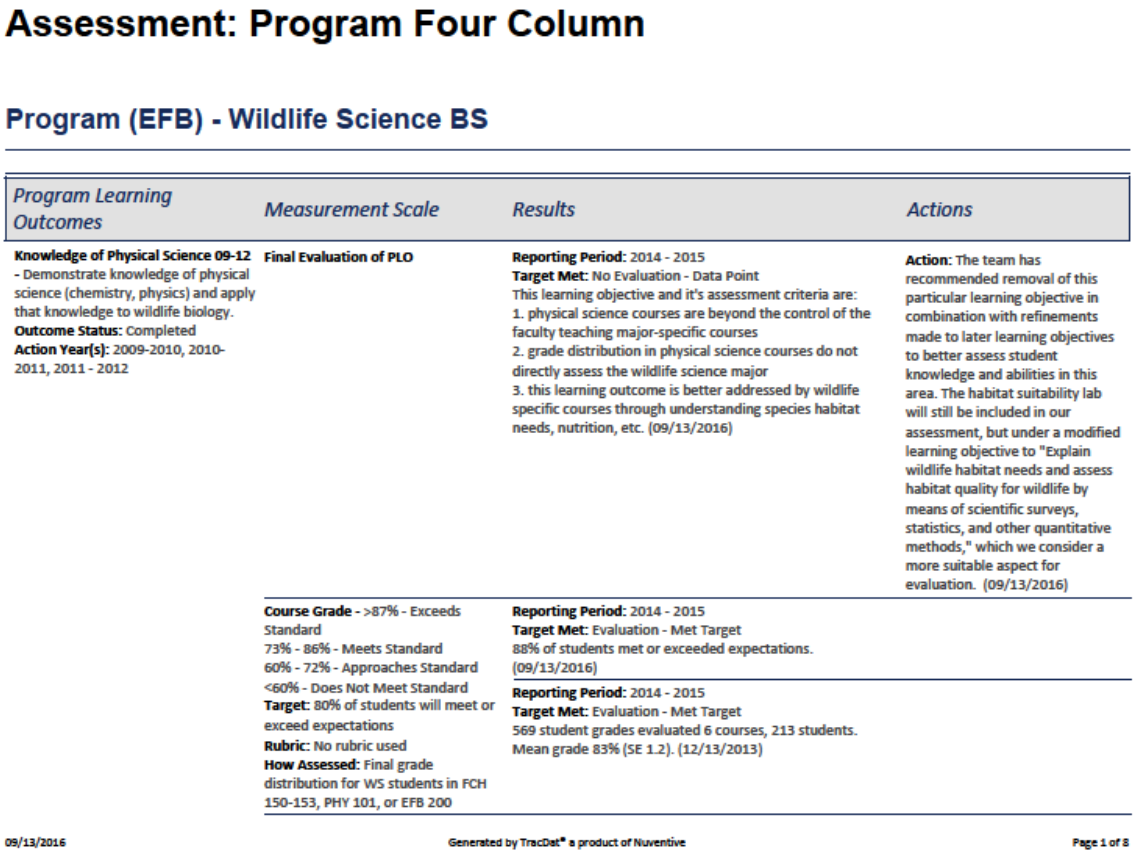
Program (EFB) - Biotechnology BS

Program Learning Outcomes	*Measurement Scale*	*Results*	*Actions*
Communication 09-12 - Communicate effectively, both orally and in writing, factual knowledge of biotechnology and results of research. **Outcome Status:** Completed **Action Year(s):** 2009-2010, 2010-2011, 2011 - 2012 **PLO Target Met?:** 4 - Exceeded expectations	**Course Grade** - surpassing expectations - percent 87-100%; or grades B+, A-, A; or scores 4-5 meeting expectations - percent 73 - 86%; or grades C, C+, B-, B; or scores 3 to 3.9 approaching expectations - percent 60 - 72%; or grades D, C- ; or scores 2 to 2.9 not meeting expectations - percent <60; or grade F; or scores 0-1.9 **Target:** 80% of students meet or exceed expectations **Notes:** combined the three types of measure because the program wold let me chnge between the three as needed. **Rubric:** Rubric attached in Related Docs **How Assessed:** Averaged final grades in EWP 190 and EWP 290	**Reporting Period:** 2014 - 2015 **Target Met:** Evaluation - Met Target Method B surpassing expectations 100% meeting expectations 0 approaching expeactations 0 not meeting expectations 0 (05/31/2010) **Related Documents:** BTC assessment calculations	**Action:** no action needed (01/09/2013) **Follow-Up:** Course grades are coarse measures of how students might be meeting the specific goals in relation to communication. Other measures are better opportunities for students to demonstrate their communication skills. (09/09/2016)
		Reporting Period: 2014 - 2015 **Target Met:** Evaluation - Met Target Method A surpassing expectations 71% meeting expectations 29% approaching expectations 0 not meeting expectations 0 (05/31/2010) **Related Documents:** BTC assessment calculations	**Action:** None needed (01/09/2013)
	Course Grade - 87 - 100% = B+, A-, A (surpassing expectations) 73 - 86% = C, C+, B-, B (meeting expectations) 60 - 72% = D, C- (approaching expectations) <60 = F (not meeting expectations) **Target:** 80% of students meet or		

09/09/2016 Generated by TracDat® a product of Nuventive Page 1 of 9

Additionally, some programs just completed their first assessment cycle in 2015, so the Wildlife Science program realized that they needed to adjust their program learning outcomes at a broader level (Figure 9).

Figure 9: Assessment: Program Four Column: Program (EFB) – Wildlife Science BS



Assessment: Program Four Column

Program (EFB) - Wildlife Science BS

Program Learning Outcomes	*Measurement Scale*	*Results*	*Actions*
Knowledge of Physical Science 09-12 - Demonstrate knowledge of physical science (chemistry, physics) and apply that knowledge to wildlife biology. **Outcome Status:** Completed **Action Year(s):** 2009-2010, 2010-2011, 2011 - 2012	**Final Evaluation of PLO**	**Reporting Period:** 2014 - 2015 **Target Met:** No Evaluation - Data Point This learning objective and it's assessment criteria are: 1. physical science courses are beyond the control of the faculty teaching major-specific courses 2. grade distribution in physical science courses do not directly assess the wildlife science major 3. this learning outcome is better addressed by wildlife specific courses through understanding species habitat needs, nutrition, etc. (09/13/2016)	**Action:** The team has recommended removal of this particular learning objective in combination with refinements made to later learning objectives to better assess student knowledge and abilities in this area. The habitat suitability lab will still be included in our assessment, but under a modified learning objective to "Explain wildlife habitat needs and assess habitat quality for wildlife by means of scientific surveys, statistics, and other quantitative methods," which we consider a more suitable aspect for evaluation. (09/13/2016)
	Course Grade - >87% - Exceeds Standard 73% - 86% - Meets Standard 60% - 72% - Approaches Standard <60% - Does Not Meet Standard **Target:** 80% of students will meet or exceed expectations **Rubric:** No rubric used **How Assessed:** Final grade distribution for WS students in FCH 150-153, PHY 101, or EFB 200	**Reporting Period:** 2014 - 2015 **Target Met:** Evaluation - Met Target 88% of students met or exceeded expectations. (09/13/2016)	
		Reporting Period: 2014 - 2015 **Target Met:** Evaluation - Met Target 569 student grades evaluated 6 courses, 213 students. Mean grade 83% (SE 1.2). (12/13/2013)	

09/13/2016 Generated by TracDat® a product of Nuventive Page 1 of 8

Taken together, these figures illustrate the documentation of an organized, comprehensive, sustained assessment process at the College. As departmental assessment coordinators gain experience with the assessment of student learning, the assessment plans have evolved to reflect needed changes. This effort has allowed the Senior Staff Assistant to provide support to academic departments for the ongoing refinement of assessment measures that are appropriate to the learning outcomes for the program. Coordination of these discussions has begun and collaboration will ensure that the assessment of student learning continues to be a comprehensive, organized, and sustainable process that informs curricular decisions at the program level.

Connection between Program Review and Assessment of Student Learning

ESF has a long-standing procedure for program review that operates on a six-year review cycle for programs that are not accredited by a discipline-specific accreditor. Those programs that do hold discipline-specific accreditation are reviewed on the same cycle as their reaffirmation of accreditation. For programs that are reviewed on the institutional six-year cycle, the final year is

devoted to analysis of the previous years of data collection. Table 5 shows a summary of when each program is expected to produce a program review report in the future.

Table 5: Summary of Program Review Schedules			
Dept.	*Program*	*Accrediting Body/Reviewer*	*Next Rev. Yr.*
CHEM	Chemistry BS	Selected Peer Group	2018
EFB	Aquatics and Fisheries Science BS	Selected Peer Group	2018
EFB	Biotechnology BS	Selected Peer Group	2018
EFB	Conservation Biology BS	Selected peer Group	2018
EFB	Environmental Biology BS	Selected Beer Group	2018
EFB	Forest Health BS	Selected Peer Group	2018
EFB	Environmental Education & Interpretation BS	Selected Peer Group	2018
EFB	Wildlife Science BS	Selected peer Group	2018
ENS	Environmental Science BS	Selected Peer Group	2016
ENS	Environmental Health BS	Selected Peer Group	2019
ERE	Environmental Resources Engineering BS	Accreditation Board for Engineering and Technology	2018
ES	Environmental Studies BS	Selected Peer Group	2017
FNRM	Forest Ecosystem Science BS	Society of American Foresters	2025
FNRM	Forest Resources Management BS	Society of American Foresters	2024
FNRM	Natural Resources Management BS	Society of American Foresters	2024
FNRM	Sustainable Energy Management BS	Selected Peer Group	2025
LA	Landscape Architecture BS	American Association of Landscape Architects	2017
PBE	Bioprocess Engineering BS	Accreditation Board for Engineering and Technology	2018
PBE	Paper Engineering BS	Accreditation Board for Engineering and Technology	2018

The institution uses TracDat software to maintain a database of assessment activities for each year of data collection, and subsequently report results, actions, and follow up activities during the final year. To support program review, as well as to develop an effective understanding of the assessment procedures academic departments are developing, the Senior Staff Assistant transfers assessment data from departmental reports to the TracDat system, in order to have a consistent and robust repository of assessment data to analyze at the institutional level.

Conclusions

General Education (Standard 12)

Through discussions across academic departments, SUNY ESF has established a set of six College-wide Learning Outcomes that reflect the basic competencies that each student should possess upon degree completion. For not only this reason, but also for the reason that SUNY has a specific set of system-wide General Education requirements that must be met within the first two-years of study, as part of the system's Seamless Transfer initiative, the College-wide Student Learning Outcomes & Assessment Committee chose to frame our institutional student learning outcomes in a more inclusive manner. By discussing these learning outcomes as "college-wide," it creates an opportunity for faculty, staff, and students to take ownership of these broad competencies, and assess them as an integral part of the SUNY ESF educational experience. Through this work, articulation and assessment of these outcomes has improved, and in future assessment cycles we hope to see greater faculty engagement with assessment of these general student learning outcomes than the College has enjoyed in the past.

The process of assessing SUNY ESF's College-wide Student Learning Outcomes has been the primary responsibility of the College-wide Student Learning Outcomes Assessment Committee. The Committee's engagement with a collaborative and cross-disciplinary assessment process has highlighted that in order to conduct meaningful assessment of these broad concepts, it is essential to understand where, and to what degree, they are introduced to students throughout their studies. For this reason, the Committee has distributed a course-to-outcome matrix (Appendix B) for the six SLOs we have identified as our institutional general education outcomes, and each department is to identify what outcomes are incorporated into which courses. Furthermore, the Committee has chosen to delineate whether the outcome is presented in an Introductory or Emphasis level, as the sub-outcomes in the College-wide Student Learning Outcomes & Assessment Committee annual report suggests (Appendix A). Through this cycle of engaging with the assessment work, analyzing the data generated for assessment, and making changes to the assessment process, SUNY ESF is on a clear and strong path to facilitating student achievement of our College-wide Student Learning Outcomes.

Student Learning Assessment (Standard 14)

Assessment of student learning at the programmatic level continues to develop and become more refined, but is not a new activity at ESF. The three-year cycle of assessment continues to go forward, but through the process of developing good assessment procedures within departments, has become staggered. We feel this is a good thing, as it demonstrates that departmental faculty are engaging with the work of assessment and taking the time to implement the curricular changes indicated by the analysis of assessment data. Each program has identified an assessment and review cycle that allows them to do their assessment work the most effectively, and to produce relevant and sustainable changes where necessary. With the addition of the Senior Staff Assistant for Assessment, data are being entered into TracDat in a consistent and robust manner, facilitating institutional analysis of program level assessment. Furthermore, this administrative

team member brings knowledge of assessment best practices, an understanding of the delicate balance between assessment method and assessment methodology, and a genuine desire to support student success through the development of proactive and meaningful assessment procedures to support the exceptional academic programs offered at ESF.

Appendix A: College-wide Student Learning Outcomes Assessment

State University of New York
College of Environmental Science and Forestry

Academic Year 2015/2016

College-wide Student Learning Outcomes Assessment Academic Year 2015-2016

Submitted for faculty endorsement on behalf of the committee by
Kelley Donaghy, Chair of CwSLO Committee

Members of the College-wide Student Learning Outcomes (CwSLO) Committee

Chair: Kelley J. Donaghy, Associate Professor of Chemistry
Nasri Abdel-Aziz, Instructor of Mathematics
Shannon Farrell, Assistant Professor of Biology
Sophie Gublo-Jantzen, Assessment and Institutional Research Associate
Lindi Quackenbush, Associate Professor of Engineering
Scott Shannon, Associate Provost of Instruction
Kurt Stavenhagen, Writing Instructor, Interim Director of the Writing Program
Mary Thompson, Instructor of Mathematics
Sarah L. Vonhof, Instructor of Forest Resources Policy

Table of Contents

College-wide Student Learning Outcomes Assessment Academic Year 2015-2016

Overview and Process

A General Education Committee was formed in the fall of 2015 to focus on the assessment of the General Education Student Learning Outcomes. One of the first recommendations adopted by this committee was to assess the general education learning outcomes as College-wide Student Learning Outcomes due to our heavy reliance on neighboring Syracuse University, advanced placement and transfer courses for general education courses which could not be easily assessed. For clarity, we changed the name of the committee to College-wide Student Learning Outcomes Committee (CwSLO) and from this point forward all Student Learning Outcomes (SLOs) are referring to Middles States student learning outcomes.

This report builds upon the Academic Year 2014/2015 report (Appendix I) and follows the protocol established in that report for review cycles. The SLO's and their accompanying rubrics used for the review of Academic Year 2013-2014 (AY1314) were applied to student work collected for Academic Year 2014-2015 (AY1415) for quantitative reasoning and scientific reasoning per last year's timeline of review cycles. Further, the critical thinking SLO was developed and an accompanying rubric generated (Appendix II). These outcomes and rubric were applied to student work collected for AY1314 and AY1415. The faculty on the committee as well as additional faculty were contracted to review the submitted student work and then the committee met to review and make recommendations based on the data, and ultimately generate a draft report. This draft report was presented to department chairs and subsequently to each department's faculty at a department meeting for review and feedback. Recommendations and Actions Taken were added after department review and the report finalized in September of 2016. It will be presented to Academic Governance for review, feedback and endorsement at the October 18th 2016, College-wide Academic Governance Meeting.

Student Learning Outcomes Reviewed This Year

The timeline suggested from the 2014-2015 review for assessment required review of two SLOs each year, using one year of current data and student work each year. However, because the committee did not complete the critical thinking SLO assessment last year, they studied two years of data for this report.

Scientific Reasoning (SLO #1)

Students will be able to demonstrate understanding of modern science and the implications of scientific discoveries, apply the scientific method and use science to address contemporary problems.

Quantitative Reasoning (SLO #2)

Students will be able to describe, interpret, apply and evaluate quantitative information.

Critical Thinking (SLO #6)

Students will be able to interpret, analyze and integrate data with theory and evidence and to synthesize and apply knowledge to identify problems, propose solutions and make decisions.

Summary of Assessment of Student Work

Scientific Reasoning (SLO #1)

The work provided by the campus community was not sufficient for meaningful assessment of this SLO this cycle. There were several reasons the committee found it impossible to make meaningful assessment this cycle. First the materials collected lacked a specific call to use scientific method by design of the assignment, then there was an overall lack of responses to direct request for materials campus-wide resulting in a less than diverse sampling, finally, a dedicated committee charged with these tasks until late in the fall semester. Based on these identified problems, the committee has suggested several refinements to the assessment process both as to the kinds of materials for assessment to be collected based on learning outcomes as well as the timeline of the assessment process. For example: demonstrating understanding of the scientific method is really best addressed at the introductory course level. It becomes less obvious (and perhaps by design absent) in capstone documents and consequently more difficult for external reviewers to identify, therefore general chemistry and general biology will be targeted for this introductory type of learning outcome. Other sub-outcomes, such as making informed decisions on contemporary issues and the relationships between science and society, are better addressed by capstone projects. A similar process will be used in quantitative reasoning where introductory learning outcomes will be assessed in the math courses and advanced learning outcomes assessed using capstone assignments. These refinements are discussed further below in Assessment Process Refinements. This SLO will be re-assessed next year with Student Learning Outcomes #3, 4, and 5 using more targeted data.

Quantitative Reasoning (SLO #2)

SUNY ESF is primarily a science based school, and we would expect that our students would be generally proficient in Quantitative Reasoning, so we hope to set high standards and continue to

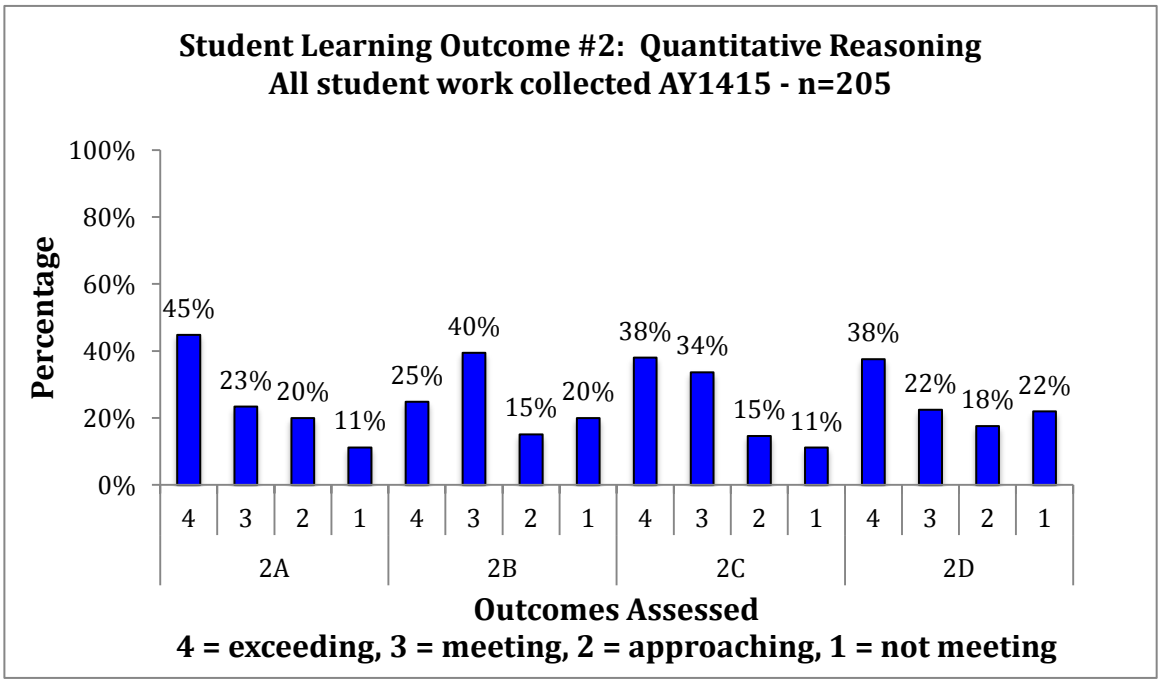
strive towards improvements. **Table 1** shows the measured proficiency in the objectives of Quantitative Reasoning along with the expected proficiency:

Table 1. Percentage of student meeting or exceeding for each SLO for Quantitative Reasoning

Objective	Target threshold for meeting or exceeding	Measured to be meeting or exceeding
2a- Identify and describe quantitative information	80%	70%
2b- Interpret quantitative information and draw inferences	75%	65%
2c- Apply and analyze problems with acquired quantitative reasoning and skills	70%	70%
2d- Synthesize and evaluate problems within a specific discipline using quantitative reasoning	60%	60%

Overall, this may appear to be a satisfactory indicator that we are somewhat reaching our goals for proficiency in Quantitative reasoning. However, the reality behind the numbers is that three-quarters of the data came from exams from the APM math classes, and the other one-quarter came from senior capstones and papers from engineering students. If you take that into consideration, then the results are not so surprising or exciting. We lacked a diverse sample of quantitative work from the rest of the college such as Environmental Studies, Landscape Architecture, and Environmental Forest Biology to truly assess the general quantitative reasoning proficiency for our students. Although most of these students are represented by the APM math courses, the goal is to assess their quantitative reasoning within their field. This is the essence of objective 2d. The results for 2d, in fact should be looked at exclusively with a student's culminating experience within their program of study. Figure 1, shown below summarizes the SLO evaluation for all documents reviewed.

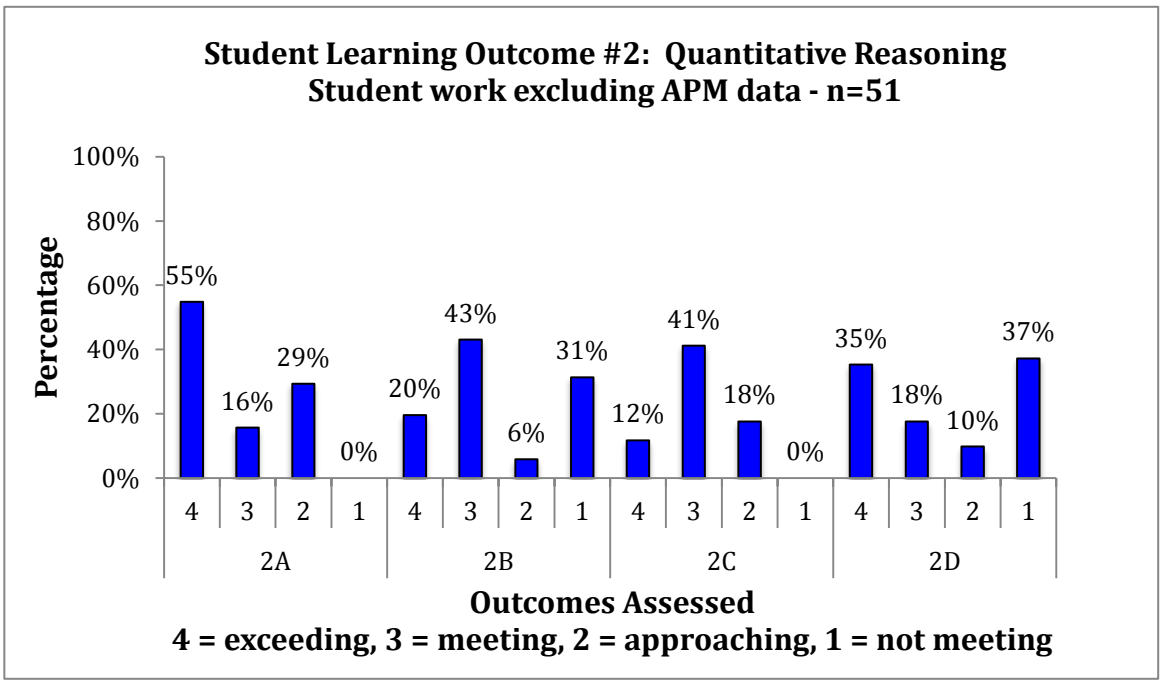
Figure 1. All assessment Data for Quantitative Reasoning Student Learning Outcomes



.

If we were to exclude the APM data, then we would get more of a clearer picture as to whether Objective 2d is being fulfilled. **Figure 2** looks at only the culminating experiences of students, and the results are rather surprising and revealing. The students seem to either know how to quantitatively synthesize a problem or they do not. The middle area of approaching and meeting shrinks significantly.

Figure 2. Capstone Assessment Data for Quantitative Reasoning Student Learning Outcomes



.

Finally, we have to consider how the metrics were defined and applied. In capstones and other culminating experience, a 1 (Not Meeting) was assigned to students that either provided a graph without proper analysis or seemed to avoid opportunities to give quantitative analysis.

Critical Thinking (SLO #6)

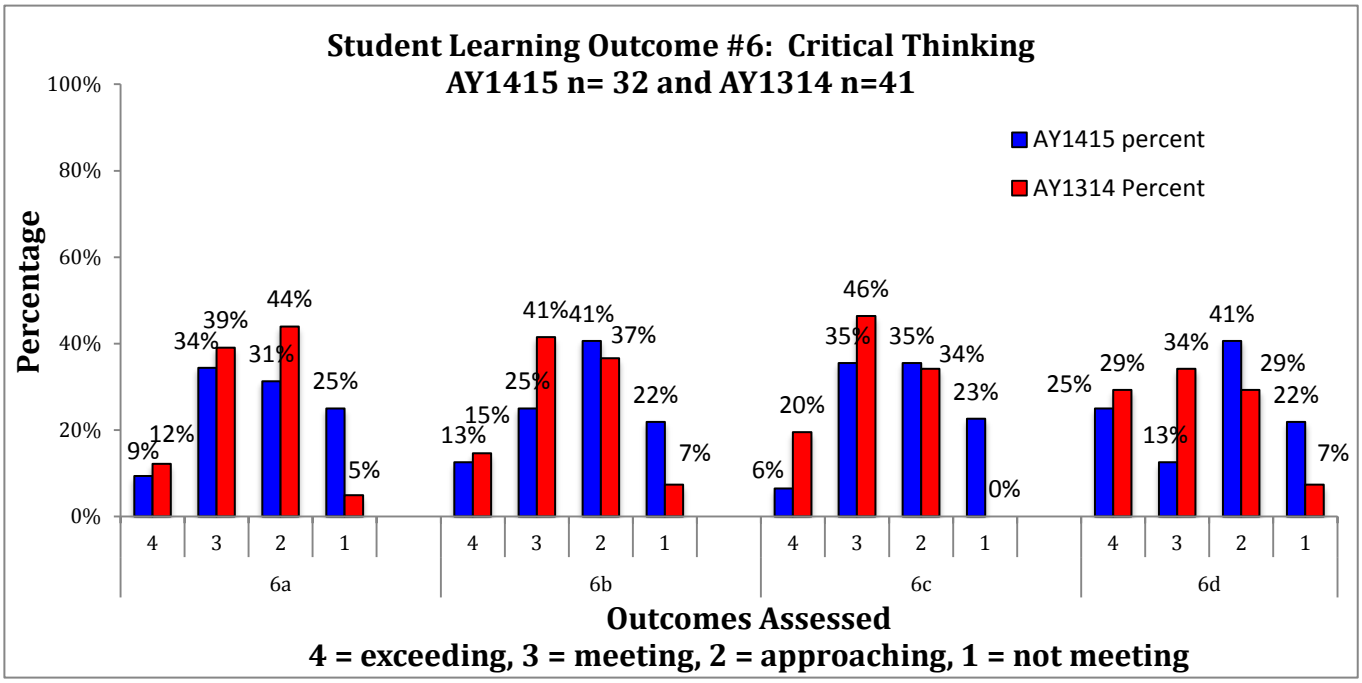
Critical Thinking is a key attribute of higher education and is valued highly among STEM majors. Therefore we would expect that SUNY ESF students would be meeting or exceeding at the 70% range for this SLO. **Table 2** shows the number of students meeting and exceeding by year.

Table 2. Percentage of student meeting or exceeding for each SLO for Critical Thinking

Objective	Expected to be meeting or exceeding		Measured to be meeting or exceeding	
	AY1314	AY1415	AY1314	AY1415
6.a Locate, select, and interpret data or information using quantitative and qualitative analytical skills.	70%	70%	51%	43%
6.b Carefully analyze and integrate theory, data and evidence appropriate to discipline.	70%	70%	56%	38%
6.c Synthesize and apply knowledge to identify problems, propose solutions and make decisions.	70%	70%	66%	41%
6.d Communicate clearly with a target audience.	70%	70%	63%	38%

Similar to the assessment of our goals for Quantitative Reasoning the work samples that were used lacked diversity and in some cases did not seem like good samples to use for this outcome. Much of the student samples reviewed came primarily from first year writing courses and the committee felt these are SLO's that continue to develop and get stronger as students progress throughout the SUNY ESF curriculum. Collection of student work is a primary focus going forward to ensure diversity, with a goal to collect capstone or synthesis projects from all programs and to focus review of the work on assignments that are intended to clearly have a critical thinking component. See the refinements to the data collection below in Assessment Process Refinement.

Figure 3: Assessment Data for Critical Thinking Student Learning Outcomes.



A rubric (Appendix II) was used to assess four areas of critical thinking: (a) locate, select, and interpret data or information using quantitative and qualitative analytical skills; (b) carefully analyze and integrate theory, data and evidence appropriate to discipline; (c) synthesize and apply knowledge to identify problems, propose solutions and make decisions; and (d) communicate clearly with a target audience.

Taken together, 43% of the projects assessed from the academic year (AY) 2014/2015 met or exceeded outcomes for the first area of critical thinking—locating, selecting and interpreting data or information using quantitative and qualitative analytical skills. This result was down from 51% for the same measurement for AY 2013/2014. This shows that in 57% of documents, students either failed to cite references or adequately discuss them; in 25% of the cases they did not cite sources, use authoritative references or adequately analyze them.

For the second area of critical thinking (carefully analyze and integrate theory, data and evidence appropriate to discipline), 38% of projects surveyed from AY 2014/2015 met or exceeded

the outcomes. Like the first area, the percentage that met or exceeded the standard again was down from 56% in AY 2013/2014. The rubric was scaled as the "careful analysis and integration of theory, data and evidence" (rated at 4) to no "integration or evaluation of information" (rated 1). In a majority of documents, students did not integrate and analyze source material to a full extent.

The third area of critical thinking (synthesize and apply knowledge to identify problems, propose solutions and make decisions) shows the most marked drop between AY 2013/2014 and AY 2014/2015: from 66% to 41%. Here an even split (35% each) occurred between students who are able to identify problems, at least one solution and justification for that solution adequately (35%) and those who either did not identify or understand a problem nor provide enough solutions and justification (35%).

The fourth area of critical thinking (communicate clearly with a target audience) also showed a disparity among those that met or exceeded the standard: down from 63% in AY 2013/2014 to 38% in AY 2014/2015. Here a clear strong thesis and lack of clear lines of reasoning were deemed generally substandard. For most (41%) arguments put forth, we found a lack of clarity and precision in the argument was at fault.

Communication of Results

Committee Chair Donaghy communicated the results of the assessment to the Academic Department Chairs at the Provost's Academic Council Meeting in May. The Academic Department Chairs were asked to either facilitate a discussion with their faculty directly or to invite a member of the CWSLO Committee to a departmental meeting when the report would be discussed. Results of those discussions were recorded and a document was created to review and make adjustments to this report as well as to generate recommendations. This data was presented to the faculty at the September College-wide meeting of Academic Governance, the final report was presented for endorsement at the October College-wide meeting of Academic Governance.

Recommendations Based Upon Data Collected

Based upon the data collected this past year, there are two specific recommendations to the process that the committee is making:

1. Data collection must be targeted, general calls for work do not result in a sufficient sample size for meaningful analysis.
2. SLO's at the introductory level can be assessed in one course while those SLO's that rank higher on Bloom's taxonomy can be assessed in higher level courses

Actions Taken

In order to carry-out the first recommendation above, a survey was done of each academic department to help identify which courses in each program would be most suitable for the collection and assessment of student work for each of the SLO's. These surveys (5/7 departments reporting) show some changes in the coursework being required, the kinds of questions being asked on specific course assessments and a general acknowledgement that CwSLO's although formerly called general education are being embraced across the curriculums and used to refine our students basic set of competencies.

Further, to address point number two above, these surveys included questions about what courses in particular in each program would be best to target for student work collection for assessment at the introductory level as well as the advanced level. This will significantly increase the sample size as well as the ability to assess each outcome.

Assessment Process Refinements

The committee identified significant problems with data collection and data analysis. Trying to assess all of the SLO's using materials collected from either upper-division capstone courses or lower division entry level courses such as General Chemistry, caught either the higher level SLOs or the lower level SLOs but one type of course materials is insufficient to address all levels of the expected competencies. Therefore the committee suggests that the SLOs have specific competency levels such as introductory (basic competency) and emphasis (higher level competency). For example, the scientific reasoning SLO has as its most basic level of competency, the introduction of the scientific method (1a. Demonstrate knowledge of the scientific method) which is very low on Bloom's Taxonomy and is best assessed within the entry-level general education courses. Conversely higher level competencies such as assess credibility and analyze and discuss are best assessed at the capstone level. Therefore Table 3 is an attempt at developing guidelines for specific student work for each of the objectives within the SLO's of scientific reasoning, quantitative analysis and critical thinking. This is a refinement to the prior process suggested by the committee and reflects a movement toward more specific data collection.

Table 3. Refinement of data to be collected specifically to address SLO competency level expectations.

Scientific Reasoning (SLO#1)	
Objective	Examples of Student Work
1a	General Chemistry and General Biology Exam Questions
1b	General Chemistry and General Biology Laboratory Reports
1c	General Chemistry I embedded final exam question, Capstone projects
1d	General Chemistry II media analysis project, Capstone Projects
1e	Capstone projects

Quantitative Reasoning (SLO #2)	
Objective	Examples of Student Work
2a	APM Courses
2b	APM Courses
2c	APM Courses
2d	Capstone Project
Critical Thinking	
Objective	
6a	Capstone Project
6b	Capstone Project
6c	Capstone Project
6d	Capstone Project

Another process refinement is reflected in our new timeline for assessment. In our original schedule we were to assess two SLOs each year, so that each SLO would be analyzed every three years. In a ten year period, this schedule would provide three data points. The committee has now decided to assess three SLOs each year to better assess trends. Now in a ten year period, this schedule would be five data points. Every other year, the committee will compose a synthesis report. Further the timeline now reflects certain steps along the process and the expected timeline for that as well, including dates for data requests and application of rubrics to student work.

Program Refinements

The survey done this year has shown that several departments have refined either courses within their program or have created new courses to address deficiencies in either reaching program goals or specifically College-wide Student Learning Outcomes goals. The surveys are in the appendix, but summarized here in Table XX, by department are the reported changes to date.

Table 4. Program refinements based upon the 2014-2015 and the 2016-2017 report

Department	**Program or course changes since the CwSLOA 2014-2015 period**	**Program or course changes since the CwSLOA 2015-2016 period**
Chemistry	Introduction of specific questions into the exams in FCH 110/111, FCH 150/151 and FCH 152/153 to better assess Outcomes 1a, 1b 1c and 1d which are student learning objectives in these courses.	Reiteration of the Scientific method throughout the curriculum all courses will reinforce this topic and it will be assessed in FCH 495 and FCH 498 through the proposal and final research paper.

	We now require FCH 232 Career skills for Chemists – a new course designed to emphasize ethics and to assess 1D, and 1E in a position paper which also covers basic communications.	Investigate opportunities to work toward better knowledge and skills retention.
	Switched timing for ESF200 – effects information literacy – occurs earlier in the sequence in the student's career so it will be reinforced as student's progress through the major more effectively.	
	Introduced INFO LIT in FCH 132 and are now requiring presentations, ethics day on plagiarism in addition to Student Affairs (would like to do this in place so we don't waste a day).	

Table 4. Continued.

Department	**Program or course changes since the CwSLOA 2014-2015 period**	**Program or course changes since the CwSLOA 2015-2016 period**
Environmental and Forestry Biology	Did not report	Did not report
Environmental Resources Engineeering	No major changes to courses or curriculum.	The program-specific assessment done over the last several years did not suggest revisions to the curriculum were needed to meet the expectations of quantitative reasoning (a and e) or critical thinking (a, b, c, e).
	Change made to materials collected for Assessment in that a description of the expectations of the final reports in ERE 489 is now transmitted with the reports.	
	Increased incorporation of ethics topics in ERE 488.	
Environmental Science	Did not report	Did not report

Environmental Studies	We have developed a senior reflection paper to be added to graduation requirements. We plan to submit our proposal to the committee on curriculum this year. Students will not graded on this paper; it will serve the purpose of helping our faculty determine whether and how we are meeting our overall learning objectives. We ask that students reflect honestly and thoughtfully about their educational experience at ESF, illustrating how students' coursework and synthesis projects have or have not achieved the program learning objectives. These papers, while focused on our departmental learning outcomes, will be useful in providing data to compliment other assessment measures.	We believe that our program is already very strong in developing and assessing critical thinking skills.

Table 4. Continued.

Department	**Program or course changes since the CwSLOA 2014-2015 period**	**Program or course changes since the CwSLOA 2015-2016 period**
	We eliminated a pre and post program survey that was criticized in the Middle States report.	We address quantitative reasoning mostly through biophysical requirements outside of our department and we are expanding our efforts to collaborate with other departments to improve our students meeting expectation in this arena.
	We have added an environmental studies undergraduate research methods class, EST 255 that focuses on scientific and quantitative reasoning and, critical thinking.	In addition, there is a new faculty member in our department who works predominantly with quantitative reasoning. Her ENS classes are often populated by EST students.
Forest and Natural Resources Management	CM: No curricular changes have been made. This programs was just added to the department in 2015-16 and has not yet been reviewed or assessed. Departmental student	CM: To be determined.

	learning outcomes are still in development.	
	SEM: Two new capstones course, SRE 450 and SRE 491, were created and will be used for departmental assessment.	SEM: We revised the SEM curriculum to add four new courses, all of which address quantitative reasoning and critical thinking.
	SEM: Four other courses were developed to meet department learning outcomes: SRE 225 Physics of Energy, SRE 417 Energy Resource Assessment, SRE 419 Energy Policy Assessment Methodologies, SRE 479 Life Cycle Assessment	
	FRN, NRM, FES: No curricular changes have been made. Programs are reviewed on a four to five year cycle.	FRN,NRM, FES: No
Landscape Architecture	Did not report	Did not report
Paper & Bioprocess Engineering	None.	None.

Recommendations for Future Assessment

Many of the recommendations for future assessment have revolved around streamlining and creating a more efficient process. While the committee agrees that what has been created is sustainable, we also feel that there are redundancies that need to be removed and that generally the SLO's need to be refined. In some cases we are learning for example, that it is best to have specific SLO's assessed by departmental faculty and in others, we see significant overlaps between SLO's and even more significantly that within an SLO, we have levels of where they can be addressed. The committee agrees with moving to a model where introductory SLO's are assessed in some courses while SLO's that would indicate emphasis/reinforcement/mastery are assessed in higher level courses.

For 2016/2017 the committee plans to create a five year assessment plan to organize their assessment efforts, to broadly communicate to the campus more about college-wide student

learning outcomes and to create a more cohesive map of the curriculum with respect to the basic competencies we expect for each of our students. To do this some of the ideas being considered include:

- Working through all six of the outcomes to look for redundancy, and understanding and refining where we are getting the data
- Collaboratively design how to map and keep the levels (introductory to mastery) organized
- Curriculum map of SLO's with courses using both catalog descriptions and syllabus mapping to make data collection easier
- Host a college-wide workshop on CwSLO's to make this an institutional tract and to create institutional memory around SLO's assessment and data collection
- Create a better understanding across campus about what it means to graduate from ESF, and what the basic set of competencies that every ESF students should have, are.
- Using materials outside of program requirements such as co-curricular activities, such as community service, international experiences in particular for SLO#4: Values, ethics and diverse perspecties
- Utilize the program-specific assessment that is already being performed to be more efficient in CwSLO assessment

Timeline for Future Assessment

Committee Timeline

March, April, May and September – requests for student work will be made to faculty, a request is in progress for AY1516.

October 1 – data from previous academic year is due – annually

November – rubrics are applied and data collected for the student work collected

January – draft report written and submitted to faculty for review and comment

March – report is finalized by the committee and released to faculty

May – report is endorsed by Academic Governance

Student Learning Outcome Schedule

AY 2015/2016 – Outcomes 1, 2, and 6*

- Progress report - less synthesis unless an issue can be easily identified
- Assessing data from AY 2014/2015

* we did two years of work on SLO #6 because it was not assessed previously

AY 2016/2017 – Outcomes 3, 4, 5 and 1*

- Synthesis Report - comprehensive look at all six outcomes with two years of data and all previous synthesis report
- Assessing data from AY 2015/2016
  * there was insufficient student work to review that addressed this outcome in the previous year, therefore it will be assessed this year under the revised data collection protocol

AY 2017/2018 – Outcomes 1, 2, and 6

- Progress report - less synthesis unless an issue can be easily identified
- Assessing data from AY 2016/2017

AY 2018/2019 - Outcomes 3, 4, and 5

- Synthesis Report - comprehensive look at all six outcomes with two years of data and all previous synthesis report
- Assessing data from AY 2017-2018

Appendix

APPENDIX I - General Education Report from Academic Year 2014-2015

APPENDIX II - Student Learning Outcomes and Rubrics for Critical Thinking

Critical Thinking (SLO #6)

Students will be able to interpret, analyze and integrate data with theory and evidence and to synthesize and apply knowledge to identify problems, propose solutions and make decisions.

6.a Locate, select, and interpret data or information using quantitative and qualitative analytical skills. [this is 1c/4c]

6.b Carefully analyze and integrate theory, data and evidence appropriate to discipline.

6.c Synthesize and apply knowledge to identify problems, propose solutions and make decisions.

6.d Communicate clearly with a target audience.

Rubric for assessing student work

Student Learning Outcome	Exceeding Expectation	Meeting Expectations	Approaching Expectations	Not-Meeting Expectations
6.a Locate, select, and interpret data or information using quantitative and qualitative analytical skills.	References are present and discussed critically in the text. A variety of references are used and integrated.	References are present and may be discussed critically in the text. Less variety of reference materials used.	Very few references are present and inadequately discussed critically. References are inappropriate and citation style	Fails to give references, or uses limited or questionable sources, no analysis of references.
6.b Carefully analyze and integrate theory, data and evidence appropriate to discipline.	Critically evaluates and analyzes information consistently and thoughtfully.	Evaluates and analyzes information from a sufficient number of sources.	Uses incomplete information, fails to adequately evaluate information consistently.	Does not evaluate and integrate sufficient, relevant information. Fails to evaluate information thoughtfully.
6.c Synthesize and apply knowledge to identify problems, propose solutions and make decisions.	Students are able to clearly identify problems, propose and defend well-supported, relevant solutions and make decisions providing clear justification and reasoning.	Students are able to identify problems adequately, propose at least one adequate solution to problem, and provide adequate justification or reasoning using information. Determine whether solutions meet constraints. Finds all relevant information that affects	Student insufficiently identifies or understands problem, provides few solutions and provides insufficient justification or reasoning using available information.	Student is unable to identify or understand problem. Student fails to propose and justify relevant solutions. Student fails to connect evidence to provide reasoning for solutions or decisions based on available information.

		solution		
Student Learning Outcome	Exceeding Expectation	Meeting Expectations	Approaching Expectations	Not-Meeting Expectations
6.d Communicate clearly with a target audience.	Clearly articulated thesis or purpose; well developed and clear explanation; coherent and cohesive argument; audience appropriate language (e.g., jargon, terminology)	Clearly articulated thesis or purpose; partially developed explanation; argument lacks organization and clarity; some language choices are inconsistent and require clarification	Unclear or poorly articulated thesis or purpose; lacks clear explanation; argument somewhat lacking organization and clarity and cohesion; many language choices are inappropriate	Lacks an articulated thesis or purpose; disorganized, obscure or garbled explanation; disjointed argument; inappropriate language

APPENDIX III - Faculty comments and feedback from report draft and review

Appendix B: Courses to Outcomes Matrix

Prefix	Course Number	Course Name	SLO 1: Scientific Reasoning	SLO 2: Quantitative Reasoning	SLO 3: Communication	SLO 4: Tech & Info Literacy	SLO 5: Values, Ethics, Diverse Perspectives	SLO 6: Critical Thinking
APM	101	Fundamentals of College Algebra		X				
APM	103	Applied College Algebra & Trig		X				
APM	104	College Algebra & PreCalc		X				
APM	105	Surveyof Calc & its Applications I		X				
APM	106	Survey of Calc & its Applications II		X				
APM	115	Essential Calc		X				
APM	205	Calc I for Science & Engineering		X				
APM	206	Calc II for Science & Engineering		X				
APM	255	Computing Applications		X		X		
APM	307	Multivariable Calc						
APM	360	Intro to Computer Programming				X		X
APM	391	Intro to Probability & Stats		X				
APM	395	Probability & Stats for Engineers		x				
APM	485	Differential Equations for Engineers & Scientists		X				
BPE	132	Intro to Process Engineering I	X					
BPE	133	Intro to Process Engineering II	X					
BPE	230	The China Experience					X	X
BPE	296	Special Topics in Engineering						
BPE	300	Intro to Industrial Bioprocessing	X					
BPE	304	Summer Internship in Bioprocess Engineering						
BPE	305	Co-op Experience in Bioprocess Engineering						
BPE	310	Colloid and Interface Science	X					
BPE	335	Transport Phenomena	X					
BPE	336	Transport Phenomena Lab	X					
BPE	420	Bioseparations	X					
BPE	421	Bioprocess Kinetics & Systems Engineering	X					
BPE	430	Process Operations Laboratory	X					
BPE	435	Unit Process Operations	X					
BPE	438	Intro to Biorefinery Processes	X					
BPE	440	Bioprocess & Systems Laboratory	X					
BPE	441	Biomass Energy					X	X
BPE	481	Bioprocess Engineering Design	X					X
BPE	496	Special Topics						
BPE	498	Research Problem in Bioprocess Engineering	X	X	X	X	X	X
BTC	132	Orientation Seminar						
BTC	298	Research Apprenticeship in Biotechnology						
BTC	401	Molecular Biology Techniques	X					
BTC	425	Plant Biotechnology	X					
BTC	426	Plant Tissue Culture Methods	X					
BTC	497	Research Design & Professional Development	X				X	X
BTC	498	Research Problems in Biotechnology	X	X	X	X	X	X
BTC	499	Senior Project Synthesis	X	X	X	X	X	X
CME	132	Orientation Seminar: Sustainable Construction Management & Engineering						
CME	151	Introduction to Financial Accounting		X				
CME	202	Introduction to Professional Communications			X			
CME	215	Sustainable Construction					X	
CME	226	Statics and Mechanics of Materials	X					
CME	252	Introduction to Managerial Accounting		X				
CME	255	Plan Interpretation and Quantity Takeoff	X					X
CME	303	Sustainable Construction Management & Engineering Internship						
CME	304	Environmental Performance Measures fo Buildings	X					X
CME	305	Sustainable Energy Systems for Buildings					X	
CME	306	Engineering Materials for Sustainable Construction						X
CME	322	Mechanical Processing	X					
CME	326	Fluid Treatment of Wood	X					
CME	327	Site Investigation & Solutions	X					
CME	330	Building Code of New York State						X
CME	331	Construction Safety					X	X
CME	332	Mechanical & Electrical Equipment				X		X
CME	335	Cost Engineering		X				
CME	342	Light Construction	X					
CME	343	Construction Estimating		X				
CME	350	Construction Methods & Equipment	X			X		X
CME	376	Decay of Wood Products	X					
CME	387	Renewable Materials for Sustainable Construction	X					
CME	388	Wood and Fiber Identification Laboratory	X					
CME	389	Wood Identification Laboratory	X					
CME	390	Fiber Identification Laboratory	X					
CME	400	Introduction to Forest Products	X					
CME	404	Applied Structures	X					
CME	405	ilding Information Modeling for Construction Management	X					
CME	410	Computer-Aided Design & Drafting				X		
CME	422	Composite Materials for Sustainable Construction	X					
CME	444	Materials Marketing			X			
CME	453	Construction Planning & Scheduling	X					X
CME	454	Construction Project Management		X				X
CME	455	Construction Contracts & Specifications						X
CME	480	Fundamentals of Microscopy	X					
CME	487	Wood Chemistry & Physics	X					
CME	488	Professional Construction Project Mgt. Presentation Seminar			X			X

Courses to Outcomes Matrix

Prefix	Course Number	Course Name	SLO 1: Scientific Reasoning	SLO 2: Quantitative Reasoning	SLO 3: Communication	SLO 4: Tech & Info Literacy	SLO 5: Values, Ethics, Diverse Perspectives	SLO 6: Critical Thinking
CME	495	Undergraduate Experience in College Teaching						
CME	497	Senior Ethics Seminar					X	
CME	498	Research or Design Problem	X	X	X	X	X	X
CMN	220	Public Presentation Skills			X			
CMN	420	Advanced Public Presentation Skills			X			
CMN	440	Environmental Visualization			X			
CMN	493	Environmental Communication Workshop			X			
EFB	101	General Biology I/EFB 102: Lab	X					
EFB	103	General Biolog II/ EFB 104: Lab	X					
EFB	120	The Global Environment & the Evolution of Human Society	X				X	
EFB	132	Orientation Seminar: Environmental & Forest Biology						
EFB	200	The Physics of Life	X					
EFB	202	Ecological Monitoring & Biodiversity Assessment	X		X		X	X
EFB	211	Diversity of Life II	X					
EFB	217	Peoples, Plagues, & Pests					X	
EFB	220	Urban Ecology	X				X	X
EFB	296	Special Topics in Environmental & Forest Biology						
EFB	298	Research Apprenticeship in Environmental Biology						
EFB	303	Introductory Environmental Microbology	X					
EFB	305	Indigenous Issues & the Environment					X	
EFB	307	Principles of Genetics/ EFB 308: Lab	X					
EFB	311	Principles of Evolotion	X					
EFB	312	Introduction to Personal Environmental Interpretation Methods	X		X			X
EFB	320	General Ecology	X				X	X
EFB	325	Cell Biology	X					
EFB	327	Adirondack Flora	X					
EFB	335	Dendrology	X					
EFB	336	Dendrology	X					
EFB	337	Field Ethnobotany	X				X	
EFB	340	Forest & Shade Tree Pathology	X					
EFB	342	Fungal Diversity & Ecology	X					
EFB	345	Forest Health	X					
EFB	351	Forest Entomology	X					
EFB	352	Entomology	X					
EFB	352	Invertabrate Zoology	X					
EFB	360	Epidemiology	X	X				X
EFB	381	Vertebrate Museum Techniques	X					
EFB	384	Field Herpetology	X					
EFB	385	Comparative Vertebrate Anatomy	X					
EFB	388	Ecology of Adirondack Fishes	X					
EFB	390	Wildlife Ecology & Management	X				X	X
EFB	400	Toxic Health Hazards	X				X	X
EFB	404	Natural History Museums & Modern Science			X	X	X	X
EFB	405	Literature of Natural History			X			X
EFB	406	Great Naturalist Seminar			X			
EFB	411	Research Methods: Understanding the Adirondack Ecosystem	X			X	X	X
EFB	412	Introduction to Chemical Ecology	X					
EFB	413	Introduction to Conservation Biology	X		X	X	X	X
EFB	414	Senior Synthesis in Conservation Biology	X	X	X	X	X	X
EFB	415	Ecological Biogeochemistry	X					
EFB	417	Non-personal Environmental Interpretive Methods	X		X	X		X
EFB	418	Interpretation of Field Biology	X		X	X		X
EFB	419	Problem Solving in Conservation Biology						X
EFB	420	Internship in Environmental & Forest Biology						
EFB	423	Marine Ecology	X					
EFB	424	Limnology: Study of Inland Waters	X					
EFB	427	Plant Anatomy & Development	X					
EFB	428	Mycorrhizal Ecology	X					
EFB	434	Ecosystem Restoration Design						
EFB	435	Flowering Plants: Diversity, Evolution, & Systematics	X					
EFB	437	Plant Propagation	X					
EFB	439	Forest Health Monitoring	X		X			X
EFB	440	Mycology	X					
EFB	444	Biodiversity and Geography of Nature	X				X	X
EFB	445	Plant Ecology & Global Change	X				X	X
EFB	446	Ecology of Mosses	X					
EFB	453	Parasitology	X					
EFB	462	Animal Physiology - Environmental & Ecological	X					
EFB	480	Principles of Animal Behavior	X					
EFB	482	Ornithology	X					
EFB	483	Mammal Diversity	X					
EFB	484	Mammalian Winter Ecology	X					
EFB	485	Herpetology	X					
EFB	486	Ichthyology	X					
EFB	487	Fisheries Science & Management	X					
EFB	488	Fisheries Science Practicum	X					
EFB	491	Applied Wildlife Science	X				X	X
EFB	492	Senior Synthesis in Aquatic & Fisheries Science	X	X	X	X	X	X
EFB	493	Wildlife Habitats and Populations	X	X			X	X
EFB	494	Senior Synthesis in Forest Health	X	X	X	X	X	X
EFB	495	Undergraduate Experience in College Teaching						

Courses to Outcomes Matrix

Prefix	Course Number	Course Name	SLO 1: Scientific Reasoning	SLO 2: Quantitative Reasoning	SLO 3: Communication	SLO 4: Tech & Info Literacy	SLO 5: Values, Ethics, Diverse Perspectives	SLO 6: Critical Thinking
EFB	496	Special Topics in Environmental and Forest Biology						
EFB	497	Seminar						
EFB	498	Research Problems in Environmental & Forest Biology	X	X	X	X	X	X
EHS	250	Foundations of Environmental Health	X					
EHS	320	Disease Prevention	X		X		X	X
EHS	350	Environmental Health Management	X		X		X	X
EHS	420	Professional Internship in Environmental Health						
EHS	440	Occupational Health & Safety						
EHS	480	Hazardous Waste Management	X		X		X	X
ENS	132	Orientation Seminar: Environmental Science						
ENS	200	Climate Change Science & Sustainability	X			X	X	X
ENS	250	Foundations of Environmental Health	X				X	X
ENS	260	Environmental Sampling Methods	X					
ENS	296	Special Topics in Environmental Science						
ENS	325	Energy Systems	X	X		X		X
ENS	335	Renewable Energy	X				X	X
ENS	350	Environmental Health Management	X		X		X	X
ENS	422	Energy Markets & Regulation		X		X	X	X
ENS	441	Biomass Energy	X				X	X
ENS	450	Reneweable Energy Capstone Planning	X	X	X	X	X	X
ENS	460	Renewable Energy Capstone	X	X	X	X	X	X
ENS	470	Environmental Risk Assessment	X	X	X	X	X	X
ENS	480	Hazardous Materials Management			X		X	X
ENS	494	Environmental Science Capstone	X	X	X	X	X	X
ENS	498	Research Problems in Environmental Science	X	X	X	X	X	X
ERE	132	Introduction to Environmental Resources Engineering						
ERE	133	Introduction to Engineering Design	X					
ERE	275	Ecological Engineering	X					
ERE	311	Ecological Engineering in the Tropics	X				X	
ERE	335	Numerical & Computing Methods		X				
ERE	339	Fluid Mechanics	X	X				
ERE	340	Engineering Hydrology & Hydraulics	X				X	
ERE	351	Basic Engineering Thermodynamics	X					X
ERE	365	Principles of Remote Sensing		X		X		
ERE	371	Surveying for Engineers		X				
ERE	380	Energy Systems Engineering		X			X	X
ERE	385	Mechanical Design	X					
ERE	405	Sustainable Engineering					X	X
ERE	412	River Form & Process	X				X	X
ERE	425	Ecosystem Restroation & Design	X				X	X
ERE	430	Engineering Decision Analysis	X	X				X
ERE	440	Water and Wastewater Treatment	X				X	
ERE	444	Hydro-Meteorology	X	X		X	X	X
ERE	445	Hydrologic Modeling	X	X		X		
ERE	448	Open Channel Hydraulics	X					
ERE	450	Environmental Hydraulics	X					
ERE	465	Environmental Systems Engineering	X	X				
ERE	468	Solid & HazardousWaste Engineering					X	
ERE	475	Ecological Engineering for Water Quality	X				X	X
ERE	480	Fate & Transport of Contaminants in Environmental Systems	X				X	
ERE	488	Engineering Project Management	X		X			X
ERE	489	Environmental Resources Engineering Planning & Design	X	X	X	X	X	X
ERE	496	Special Topics						
ERE	498	search Problem in Environmental Resources Engineering	X	X	X	X	X	X
ESC	132	Orientation Seminar						
ESC	296	Special Topics in Environmental Science						
ESC	325	Energy Systems	X	X				X
ESC	422	Energy Markets & Regulation		X			X	X
ESC	450	Renewable Energy Capstone Planning	X	X	X	X	X	X
ESF	109	Honors Seminar in Environmental Science & Forestry						
ESF	122	The Ecology of the Economic Process	X					
ESF	200	Information Literacy				X		
ESF	209	Honors Seminar in Environmental Science & Forestry						
ESF	300	Introduction to Geospatial Information Technologies				X		
EST	132	Introduction to Environmental Studies					X	
EST	140	Introduction to Native Peoples, Land, & Culture					X	
EST	200	Cultural Ecology					X	X
EST	201	US History Reconstruction to the Present					X	X
EST	202	American History: From Discovery to Civil War					X	X
EST	220	Urban Ecology					X	X
EST	221	Introduction to American Government					X	X
EST	230	The China Experience					X	X
EST	231	Environmental Geology				X	X	X
EST	245	Foundations of Environmental Communication			X			
EST	255	Research Methods for Environmental Studies	X	X				
EST	296	Special Topics in Environmental Studies						
EST	301	Leadership through Mentoring						
EST	321	Government & the Environment					X	X
EST	353	Environmental Psychology	X					X
EST	361	History of the American Environmental Movement					X	
EST	366	Attitudes, Values, and the Environment					X	

Courses to Outcomes Matrix

Prefix	Course Number	Course Name	SLO 1: Scientific Reasoning	SLO 2: Quantitative Reasoning	SLO 3: Communication	SLO 4: Tech & Info Literacy	SLO 5: Values, Ethics, Diverse Perspectives	SLO 6: Critical Thinking
EST	388	Psychological Principles of Risk Communication			X		X	X
EST	390	Social Processes & the Environment					X	
EST	393	Environmental Discourse & Communication			X			
EST	395	Public Communication of Science & Technology			X	X	X	X
EST	400	Senior Paper	X	X	X	X	X	X
EST	401	Environmental Ethics & Culture: Perspectives on the Adirondack Park					X	
EST	402	Diverse Perspective on a Common Landscape: Experiencing Adirondack Park					X	X
EST	403	Sustainable Development: An Adirondack Park Case Study			X		X	X
EST	404	Using Past Ex. To Inform Future Mgt.: Synthesizing the Adirondack Park					X	X
EST	412	Advanced Leadership Through Mentoring			X		X	X
EST	423	Rhetorical Practices in Rhetorical Communication			X			
EST	426	Community Planning & Sustainability			X		X	
EST	427	Environmental & Energy Auditing						X
EST	450	Sustainable Enterprise			X		X	X
est	460	Land Use Law						
EST	493	Environmental Communication Workshop			X			
EST	494	Senior Seminar in Environmental Studies	X	X	X	X	X	X
EST	496	Special Topics in Environmental Studies						
EST	498	Introductory Research Problems	X	X	X	X	X	X
EST	499	Environmental Studies Internship						
EWP	190	Writing & the Environment			X			X
EWP	220	Public Presentation Skills			X			X
EWP	222	Presentation Skills for Managers			X			X
EWP	290	Research Writing & Humanities			X			X
EWP	291	Research Writing & Humanities (Honors)			X			X
EWP	296	Special Topics in Writing, Literature, & Pubic Presentation Skills			X			X
EWP	300	Survey of Environmental Writing			X			X
EWP	311	Urban Environmental Literature			X			
EWP	350	Eco-Cinema: Perspectives & Practices (Honors)			X		X	X
EWP	390	Literature of Nature						X
EWP	401	Capstone Experience	X	X	X	X	X	X
EWP	405	Writing for Science Professionals			X			
EWP	407	Writing for Environmental & Science Professionals			X			
EWP	410	Writing for Environmental Professionals			X			
EWP	420	Public Presentation Skills			X			
EWP	444	Professional Writing/Paper & Bioprocess Engineering			X			
EWP	490	Contemporary Literature of Nature						X
EWP	494	Creative Non-fiction in the Sciences						X
EWP	495	Environmental Journalism			X		X	X
EWP	496	Special Topics in Writing, Literature, & Public Presentation Skills			X			
EWP	498	Independent Study in Writing, Literature, & Public Presentation Skills			X			
FCH	110	Survey of Chemical Principles/ FCH 111 Lab						
FCH	132	Orientation Seminar: Chemistry						
FCH	150	General Chemistry I/ FCH151 Lab	X					
FCH	152	General Chemistry II/FCH 153 Lab	X					
FCH	210	Elements of Organic Chemistry	X					
FCH	221	Organic Chemistry I / FCH 222 Lab	X					
FCH	223	Organic Chemistry II / FCH 224 Lab	X					
FCH	232	Career Skills for Chemists	X		X	X	X	X
FCH	290	Chemistry Teaching Assistant Experience for Undergraduates						
FCH	296	Special Topics in Chemistry						
FCH	325	Organic Chemistry III	X					
FCH	360	Physical Chemistry I	X					
FCH	361	Physical Chemistry II	X					
FCH	380	Analytical Chemistry I: Fravimetric, Titrimetric, and Potentiometric Analysis	X					
FCH	381	Analytical Chemistry II: Spectroscopic, Chromatographic, & Electroanalytical Instrumental Technique						
FCH	384	Spectrometric Identification of Organic Compounds	X					
FCH	390	Drugs from the Wild	X				X	
FCH	399	Introduction to Atmospheric Sciences	X					
FCH	410	Inorganic Chemistry	X					
FCH	430	Biochemistry I/ FCH 431 Lab						
FCH	432	Biochemistry II						
FCH	440	Introduction to Chemical Ecology	X					
FCH	495	Introduction to Professional Chemistry	X					
FCH	496	Special Problems in Chemistry	X		X	X		X
FCH	497	Undergraduate Seminar						
FCH	498	Introduction to Research	X		X	X		X
FOR	106	Introduction to Green Entrepreneurship						
FOR	132	Orientation Seminar: F&NRM						
FOR	201	Introduction to Watershed Hydrology	X					
FOR	202	Introduction to Sociology	X				X	
FOR	203	Western Civilization & the Environment					X	X
FOR	204	Natural Resources in American History					X	X
FOR	205	Principles of Accounting		X				
FOR	207	Introduction to Economics	X					
FOR	208	Introduction to Sustainable Energy Resources	X				X	X
FOR	232	Natural Resources Ecology	X					
FOR	296	Special Topics in Resource Management/Forestry						
FOR	298	Research Internship in Forest & Natural Resources Management						
FOR	304	Adirondack Field Studies	X					
FOR	312	Sociology of Natural Resources					X	X
FOR	321	Forest Ecology & Silviculture	X					
FOR	322	Natural Resources Measurements & Sampling	X	X				
FOR	323	Forest Biometrics	X					
FOR	330	Studies in Silviculture	X					
FOR	332	Forest Ecology	X					

Courses to Outcomes Matrix

Prefix	Course Number	Course Name	SLO 1: Scientific Reasoning	SLO 2: Quantitative Reasoning	SLO 3: Communication	SLO 4: Tech & Info Literacy	SLO 5: Values, Ethics, Diverse Perspectives	SLO 6: Critical Thinking
FOR	333	Natural Resources Managerial Economics	X					
FOR	334	Silviculture	X					
FOR	338	Meteorology	X					
FOR	340	Watershed Hydrology	X					
FOR	345	Introduction to Soils	X					
FOR	360	Principles of Management		X	X		X	X
FOR	370	Forest Management Decision Making & Planning	X					X
FOR	372	Fundamentals of Outdoor Recreation			X		X	X
FOR	373	Forest Operations	X					
FOR	402	Professional Forestry Mentoring Program			X			
FOR	403	Humans & the Environment: New Zealand	X		X		X	X
FOR	404	Ecotrouism Abroad						
FOR	411	Analytical & Technical Writing for Resource Managers			X			
FOR	416	Sustainable Energy Policy	X		X		X	X
FOR	433	Silviculture Workshop	X					
FOR	442	Watershed Ecology & Management	X		X			X
FOR	454	Renewable Energy Finance & Analysis	X	X				
FOR	458	Advanced Topics in GIS						
FOR	465	Natural Resources Policy						X
FOR	475	Recreation Behavior & Management			X			X
FOR	476	Ecotourism & Nature Tourism					X	
FOR	478	Wilderness & Wildlands Management			X		X	X
FOR	480	Urban Forestry	X					
FOR	481	Introduction to Arboriculture	X					
FOR	485	Business & Managerial Law						X
FOR	487	Environmental Law & Policy						X
FOR	489	Natural Resournces Law & Policy						X
FOR	490	Integrated Resources Management					X	X
FOR	491	Sustainable Energy Management Capstone	X	X	X	X	X	X
FOR	495	Undergraduate Teaching Assistance						
FOR	496	Special Topics in Resource Management/Forestry						
FOR	498	Independent Study in Forest Resources Management						
FOR	499	Internship in Forest & Natural Resources Management						
FTC	101	Trigonometry for Natural Resoruce Technicians		X				
FTC	105	Tree & Forest Biology	X					
FTC	200	Dendrology	X					
FTC	202	Introduction to Surveying	X					X
FTC	204	Introduction to Natural Resource Measurements	X	X				
FTC	205	Computer Aided Drafting & Design I				X		
FTC	206	Forest Ecology	X					
FTC	207	Communications & Safety			X			
FTC	208	Remote Sensing & GIS Technology				X		
FTC	209	Timber Harvesting	X					
FTC	210	Wildlife Techniques	X					
FTC	211	Silviculture	X					
FTC	212	Adirondack Cultural Ecology	X					
FTC	213	Forest Inventory Practicum	X					
FTC	214	Leadership & Organizational Performance			X			X
FTC	217	Wildland Firefighting & Ecology	X					
FTC	219	Introduction to Forest Recreation			X		X	X
FTC	221	Natural Resources Management			X		X	X
FTC	224	Field Applications					X	X
FTC	225	Timber Transportation & Utilization						X
FTC	234	Wildlife Conservation	X				X	X
FTC	236	Interpretive Techniques in Forest Recreation			X			X
FTC	237	Introduction to Water & Soil Resources	X					X
FTC	239	GIS Applications				X		
FTC	251	Advanced Surveying Measurements & Computations		X		X		X
FTC	253	Survey Law						X
FTC	255	Boundary Surveying	X			X		X
FTC	256	Subdivision Surveys	X			X		X
FTC	257	Construction & Topographic Surveys	X			X		X
FTC	259	Computer Aided Drafting & Design II				X		
FTC	298	Independent Study in Forest Technology						
GNE	160	Computing Methods for Engineers & Scientists				X		
GNE	171	Engineering Mechanic Dynamics						
GNE	172	Statics & Dynamics						
GNE	271	Statics						
GNE	273	Mechanics of Materials						
GNE	330	Professional Engineering Skills Seminar						
GNE	410	Structures						
GNE	461	Air Pollution Engineering						
HES	440	Occupational Health & Safety	X				X	X
LSA	132	Orientation Seminar: Landscape Architecture						
LSA	182	Drwaing Studio			X			X
LSA	190	Clasing Perspectives in the Built Environment			X		X	X
LSA	205	Art, Culture, & Landscape I			X		X	X
LSA	206	Art, Culture, & Landscape II			X		X	X
LSA	220	Introduction to Landscape Architecture					X	X
LSA	226	Foundation Design Studio I			X	X		
LSA	227	Foundation Design Studio II			X	X		
LSA	300	Digital Methods & Graphics I			X	X		

Courses to Outcomes Matrix

Prefix	Course Number	Course Name	SLO 1: Scientific Reasoning	SLO 2: Quantitative Reasoning	SLO 3: Communication	SLO 4: Tech & Info Literacy	SLO 5: Values, Ethics, Diverse Perspectives	SLO 6: Critical Thinking
LSA	301	Digital Methods & Graphics II			X	X		
LSA	305	History of Landscape Architecture I					X	X
LSA	306	History of Landscape Architecture II					X	X
LSA	311	Natural Processes in Design & Planning	X					
LSA	312	Place/Culture/Design	X				X	X
LSA	321	Ecological Applications in Planning & Design						
LSA	326	Landscape Architectural Design Studio I			X			X
LSA	327	Landscape Architectural Design Studio II			X			X
LSA	333	Plants Materials	X					
LSA	342	Landscape Architectural Construction Technology	X	X				
LSA	343	Landscape Materials & Structure	X					
LSA	422	Landscape Architectural Design Studio III	X		X			X
LSA	423	Landscape Architectural Design Studio IV	X		X			X
LSA	424	Preparation of Off-Campus Design Thesis Studio	X					
LSA	425	Orientation for Off-Campus Design Thesis Studio	X					
LSA	433	Planting Design & Practice	X					
LSA	451	Comprehensive Land Planning	X					
LSA	455	Professional Practice in Landscape Architecture	X		X			X
LSA	458	Off-Campus Design Thesis Studio: Faculty Advisor Visit, Weekly Reports & Field Studies	X	X	X	X	X	X
LSA	459	Off Campus Design Thesis Studio: Design Journal & Project Notebook	X	X	X	X	X	X
LSA	460	Off-Campus Design Thesis Studio: Thesis Project	X	X	X	X	X	X
LSA	461	Off-Campus Final Presentation Seminar	X	X	X	X	X	X
LSA	470	Thematic Landscape Design Studio						
LSA	480	Seminar in Urban Design	X		X		X	X
LSA	481	Cultural Landscape Preservation	X		X		X	X
LSA	495	Undergraduate Experience in College Teaching						
LSA	496	Special Topics in Landscape Architecture						
LSA	498	Introductory Research Problem	X	X	X	X	X	X
LSA	499	Undergraduate Landscape Architecture Internship						
MCR	480	Fundamentals of Microscopy	X					
MCR	484	Scanning Electron Microscopy	X					
MCR	485	Transmission Electron Microscopy	X					
PSE	132	Introduction to Process Engineering I	X					
PSE	133	Introduction to Process Engineering II	X					
PSE	200	Introduction to Papermaking	X					
PSE	201	The Art & Early History of Papermaking	X				X	X
PSE	202	Pulp & Paper Laboratory Skills	X					
PSE	223	Introduction to Lingocellulosics	X					
PSE	296	Special Topics in Engineering						
PSE	304	Professional Experience/Synthesis	X	X	X	X	X	X
PSE	305	Co-op Experience			X			X
PSE	350	Fiber Processing	X					
PSE	351	Pulping & Bleaching Laboratory Skills	X					
PSE	361	Engineering Thermodynamics	X					
PSE	370	Principles of Mass & Energy Balance	X					
PSE	371	Fluid Mechanics	X					
PSE	436	Pulp & Paper Unit Operations	X					
PSE	437	Equipment Troubleshooting & Maintenance	X		X			X
PSE	438	Biorenewable Fibrous & Non-fibrous Products	X					
PSE	450	Pulping & Bleaching Processes	X					
PSE	456	Management in Industry			X		X	X
PSE	465	Fiber & Paper Properties	X					
PSE	466	Paper Pigment & Barrier Coating	X					
PSE	467	Papermakign Wet End Chemistry	X					
PSE	468	Papermaking Processes	X					
PSE	469	Functional & Nano Additives	X					
PSE	477	Process Control	X					
PSE	480	Engineering Design Economics	X					
PSE	481	Engineering Design	X					
PSE	492	Research Practice						
PSE	496	Special Topics						
PSE	498	Research Problem	X	X	X	X	X	X
RMS	200	Renewable Materials & Composites from Lignocellulosics						
RMS	465	Renewable Materials Surfaces						
SRE	225	Physics of Energy						
SRE	325	Energy Systems						
SRE	335	Renewable Energy						
SRE	416	Sustainable Energy Policy						
SRE	417	Energy Resource Assessment						
SRE	419	Energy Policy Assessment Methodologies						
SRE	422	Energy Markets & Regulation						
SRE	441	Biomass Energy						
SRE	450	Renewable Energy Capstone Planning						
SRE	454	Renewable Energy Finance & Analysis						
SRE	479	Life Cycle Assessment						
SRE	491	Sustainable Energy Management Capstone	X	X	X	X	X	X

Appendix C: Assessment: Program Four Column

Program (EFB) - Conservation Biology BS

Program Learning Outcomes	*Measurement Scale*	*Results*	*Actions*
Goals of Conservation Biology 09-12 - Articulate the goals of conservation biology, that is, to maintain biological diversity in all its expressions. **Outcome Status:** Active **Action Year(s):** 2009-2010, 2010-2011, 2011 - 2012	**Exam/Quiz - In Course -** >3.3 - Exceeds Standard 1.8 - 3.3 - Meets Standard 0.5 - 1.8 - Approaches Standard <0.5 - Does Not Meet Standard **Target:** 80% of students will meet or exceed expectations (>0.8) **Rubric:** No rubric used **How Assessed:** Distribution of student grades on embedded exam questions in EFB 413 (Intro. Conservation Biology).	**Reporting Period:** 2014 - 2015 **Target Met:** Evaluation - Did Not Meet Target 60% of students meet or exceed expectations (09/09/2016)	**Action:** Renewed focus within coursework of Introduction to Conservation Biology to emphasize the goals and objectives of the discipline of conservation biology. (09/09/2016) **Follow-Up:** Coordinate content and courses with other faculty engaged in teaching courses typically taken by undergrads in the major to improve student command of conservation biology principles. (09/12/2016)
	Course Assignment - >3.3 - Exceeds Standard 1.8 - 3.3 - Meets Standard 0.5 - 1.8 - Approaches Standard <0.5 - Does Not Meet Standard **Target:** 80% of students meet or exceed expectation s(>1.8) **Rubric:** No rubric used **How Assessed:** Distribution of student grades on relevant exercise modules in EFB 419.	**Reporting Period:** 2014 - 2015 **Target Met:** Evaluation - Did Not Meet Target 56% of students meet or exceed expectations. (09/09/2016)	**Action:** Renewed focus within the coursework of Introduction to Conservation Biology to emphasize the goals and objectives of the discipline of conservation biology. (09/09/2016) **Follow-Up:** Increased communication between faculty delivering lower division courses and faculty delivering upper division/electives so that higher level courses function to reinforce concepts from introductory/lower

Program Learning Outcomes	Measurement Scale	Results	Actions
			division coursework. (09/12/2016) **Follow-Up:** Content overlap between courses needs to be addressed so that repetition is minimized. Better faculty coordination will allow more synergy between the core courses and related electives. (09/12/2016)
Concepts of Biodiversity 09-12 - Describe the concept of biodiversity and its key component concepts of taxonomy, ecology, genetics, geography, and evolution. **Outcome Status:** Active **Action Year(s):** 2009-2010, 2010-2011, 2011 - 2012	**Exam/Quiz - In Course -** >3.3 - Exceeds Standard 1.8 - 3.3 - Meets Standard 0.5 - 1.8 - Approaches Standard <0.5 - Does Not Meet Standard **Target:** 80% of students meet or exceed expectations **Rubric:** No rubric used **How Assessed:** Distribution of student grades on embedded EFB 413 exam questions.	**Reporting Period:** 2014 - 2015 **Target Met:** Evaluation - Did Not Meet Target 61% of students met standard (09/12/2016)	**Action:** Greater emphasis on defining biodiversity in EFB 413, particularly its genetic and evolutionary basis (09/12/2016) **Follow-Up:** Develop an introductory seminar in conservation biology for freshmen to provide an early introduction to some of the core learning objectives in the major, allowing for more reiteration and expansion of the ideas as the student progresses through the program. (09/12/2016)
	Course Grade - >3.3 - Exceeds Standard 1.8 - 3.3 - Meets Standard 0.5 - 1.8 - Approaches Standard <0.5 - Does Not Meet Standard **Target:** 80% of students will meet or exceed expectations. **Rubric:** No rubric used **How Assessed:** Average grade distribution of Conservation Biology students on Organismal Diversity electives.	**Reporting Period:** 2014 - 2015 **Target Met:** Evaluation - Did Not Meet Target 61% of students met standard (09/12/2016)	**Action:** Greater emphasis on defining biodiversity in EFB 419, particularly its genetic and evolutionary basis. Recognition that the utility of averaging conservation biology grades across a disparate set of directed electives is an imprecise instrument for gauging student learning and that overall course grades mask knowledge of key taxonomic groups. (09/12/2016) **Follow-Up:** Development of a

Program Learning Outcomes	Measurement Scale	Results	Actions
			"field test" to be administered to incoming freshmen and departing seniors that will enable measuring learning gains as students progress through the major, monitoring changes in student achievement over time, and identifying more clearly areas of adequacy and deficiency for targeting improvements in teaching and mentoring. (09/12/2016)
Importance of Biological Diversity 09-12 - Explain why biological diversity is important, that is, nature?s intrinsic and instrumental **Outcome Status:** Active **Action Year(s):** 2009-2010, 2010-2011, 2011 - 2012	**Exam/Quiz - In Course -** >3.3 - Exceeds Standard 1.8 - 3.3 - Meets Standard 0.5 - 1.8 - Approaches Standard <0.5 - Does Not Meet Standard **Target:** 80% of students will meet or exceed expectations (>1.8 on 0-4 scale) **Rubric:** No rubric used **How Assessed:** Distribution of student grades on embedded EFB 413 exam questions.	**Reporting Period:** 2014 - 2015 **Target Met:** Evaluation - Did Not Meet Target 60% of student met the standard. (09/12/2016)	**Action:** Increasing emphasis on the definition of the diverse values of biodiversity in EFB 413. Component will receive greater emphasis in all core and elective diversity courses so that the core conservation courses are reinforcing and expanding the idea instead of introducing the concept. (09/12/2016)
	Course Assignment - >3.3 - Exceeds Standard 1.8 - 3.3 - Meets Standard 0.5 - 1.8 - Approaches Standard <0.5 - Does Not Meet Standard **Target:** 80% of students will meet or exceed expectations (>1.8 on 0-4 scale) **Rubric:** No rubric used **How Assessed:** Distribution of student grades on relevant EFB 419 exercise modules.	**Reporting Period:** 2014 - 2015 **Target Met:** Evaluation - Did Not Meet Target 61% of students met standard (09/12/2016)	**Action:** To address deficits in student learning there will be increased emphasis on the definition of the diverse values of biodiversity on EFB 419 and design of more accurate/precise metrics for deployment in field tests for incoming freshman and departing seniors given concerns that analysis of final grades does not adequately reflect the state of student learning. We will incorporate specific questions regarding this learning objective

Program Learning Outcomes	Measurement Scale	Results	Actions
			into an exit exam so that we have an additional tool for independently assessing student learning and retention. (09/12/2016)
Threats to Biological Diversity 09-12 - Describe the threats to biological diversity, that is, direct harvesting, habitat destruction, and introduction of non-native species, among others, and their interactions. **Outcome Status:** Active **Action Year(s):** 2009-2010, 2010-2011, 2011 - 2012	**Exam/Quiz - In Course -** >3.3 - Exceeds Standard 1.8 - 3.3 - Meets Standard 0.5 - 1.8 - Approaches Standard <0.5 - Does Not Meet Standard **Target:** 80% of students meet or exceed standard **Rubric:** No rubric used **How Assessed:** Distribution of student grads on embedded exam questions on EFB 413 final exam.	**Reporting Period:** 2014 - 2015 **Target Met:** Evaluation - Did Not Meet Target 56% of student meet or exceed standard. (09/12/2016)	**Action:** Covering threats to biodiversity in more detail in EFB 413. Awaiting insights from more accurate/precise metrics being developed for field tests to be administered to incoming freshmen and departing seniors. (09/12/2016)
	Course Assignment - >3.3 - Exceeds Standard 1.8 - 3.3 - Meets Standard 0.5 - 1.8 - Approaches Standard <0.5 - Does Not Meet Standard **Target:** 80% of students meet or exceed standard **Rubric:** No rubric used **How Assessed:** Distribution of student grades on relevant exercise modules in EFB 419.	**Reporting Period:** 2014 - 2015 **Target Met:** Evaluation - Did Not Meet Target 52% of students meet or exceed standard. (09/12/2016)	**Action:** Added a new module to EFB 419 that covers threats to biodiversity in more detail. Awaiting insights from more accurate/precise metrics being developed for field tests to be administered to incoming freshmen and departing seniors. (09/12/2016)
Competency of Tools 09-12 - Be effective as a conservation biology professional by having mastered basic competencies: natural history broadly speaking, field methods, quantitative assessment and data analysis, taxonomic expertise in at least one major group of organisms, written and oral communication in technical-, popular- and policy-specific genres,	**Course Assignment -** >3.3 - Exceeds Standard 1.8 - 3.3 - Meets Standard 0.5 - 1.8 - Approaches Standard <0.5 - Does Not Meet Standard **Target:** 80% of students meet or exceed standard **Rubric:** No rubric used **How Assessed:** Distribution of student grads in relevant EFB 419	**Reporting Period:** 2014 - 2015 **Target Met:** Evaluation - Did Not Meet Target 51% of students met or exceeded standard (09/12/2016)	**Action:** Increasing emphasis on context-appropriate management actions as well as awaiting insights from more accurate and precise metrics we are developing for field tests to be administered to incoming freshmen and departing seniors. (09/12/2016) **Follow-Up:** Build identity within the major and emphasize early

Program Learning Outcomes	Measurement Scale	Results	Actions
familiarity with relevant policy, law and government at local, regional, national and international levels, ability to critique of evidence/research products/proposals/work plans/budgets, and awareness of issues of professional conduct and ethics. Specify context appropriate actions needed to protect and restore biological diversity, that is, endangered species recovery, designating ecological reserves, ecosystem restoration, captive breeding, population management, invasive species management, interfacing with the policy-making process, educating others, and combinations thereof. **Outcome Status:** Active **Action Year(s):** 2009-2010, 2010-2011, 2011 - 2012	modules.		professional expectations and the mechanics and skills needed to successfully navigate through the major and ultimately secure a professional opportunity in the field. (09/12/2016)
Suggest appropriate actions to conserve biodiversity 09-12 - Be able to identify and implement conceptually actions that are appropriate to mitigate particular threats to biological diversity in a diverse set of contexts including social, political and biological ones as well as combinations of them. Be an effective conservation biology professional by having mastered basic competencies: natural history broadly speaking; field methods; quantitative assessment and data analysis; taxonomic expertise in at least one major group of organisms; written and oral communication in technical-,	**Final Project -** >3.3 - Exceeds Standard 1.8 - 3.3 - Meets Standard 0.5 - 1.8 - Approaches Standard <0.5 - Does Not Meet Standard **Target:** 80% of students meet or exceed standard **Rubric:** No rubric used **How Assessed:** Distribution of performance assessments for student internships/research.	**Reporting Period:** 2014 - 2015 **Target Met:** Evaluation - Did Not Meet Target 60% of students meet or exceed standard (09/12/2016)	**Action:** Added more role playing exercises to EFB 419 to create an opportunity for students to learn to excel at communication. EFB 414 also emphasizes this learning area to a greater degree. (09/12/2016) **Action:** Developing more useful metrics for the field tests to be administered to incoming freshmen and departing seniors that specifically measure natural history and taxonomic expertise, written and oral communication, legal, policy, and administrative aspects of conservation biology, and professional ethics and

Program Learning Outcomes	Measurement Scale	Results	Actions
popular-, and policy-specific genres; familiarity with relevant policy, law, and government at local, regional, national, and international levels; ability to critique evidence/research/products/proposals/work plans/budgets; and awareness of issues of professional conduct and ethics. **Outcome Status:** Active **Action Year(s):** 2009-2010, 2010-2011, 2011 - 2012			conduct. Field test outcomes will guide specifically which aspects most need to be addressed through curriculum revision. (09/12/2016) **Follow-Up:** Build identity within the major and emphasize early professional expectations and the mechanics and skills needed to successfully navigate through the major and ultimately secure a professional opportunity in the field. (09/12/2016)
	Capstone Assignment/Project - >3.3 - Exceeds Standard 1.8 - 3.3 - Meets Standard 0.5 - 1.8 - Approaches Standard <0.5 - Does Not Meet Standard **Target:** 80% of students meet or exceed standard **Rubric:** No rubric used **How Assessed:** Distribution of grades on EFB 414 Capstone project.	**Reporting Period:** 2014 - 2015 **Target Met:** Evaluation - Did Not Meet Target 60% of students met or exceeded standard (09/12/2016)	**Action:** Developing more useful metrics for the field tests to be administered to incoming freshmen and departing seniors that specifically measure natural history and taxonomic expertise, written and oral communication, legal, policy, and administrative aspects of conservation biology, and professional ethics and conduct. Field test outcomes will guide specifically which aspects most need to be addressed through curriculum revision. (09/12/2016)