

NTID
Laboratory Science Technology Program Outcomes Assessment
Plan and Report for AY 2011-2012

Program Goal: To provide graduates with laboratory analytical testing knowledge and skills, for entry level positions, with scientific organizations.

Critical Outcomes for all Students		Assessment of Outcomes		Timeline		Results	
Domain/Task/Capability	Performance Criteria/Benchmarks	Instrument/Opportunity	Assessment of Performance	Develop	Collect	Summarization of Results	Use of Results
1. General Skills and Professional Competence (Technical) [Eighty percent (80 %)] of all students will understand, use, and document appropriate laboratory skills related to safety, quality control, technical communication, and professional readiness.	<p>a. Students will understand and apply safety regulations and protocols and correctly utilize safety equipment.</p> <p>b. Students will appropriately follow quality control procedures.</p> <p>c. Students will demonstrate effective technical communication of results.</p> <p>d. Students will develop a resume that is accurate, complete, and professional.</p>	Portfolio review. To occur at the end of Laboratory Applications VI course (0879-206).	a.-d. Score of at least "2" ("acceptable/meets entry level professional standards") on all related items on the Laboratory Science Technology portfolio rating sheet.	AY 2004-2005	Annually in the Laboratory Applications VI (0879-206) or Senior Seminar (0879-250) courses.	<p>11 students in the Laboratory Applications VI/Senior Seminar courses were evaluated in academic year 2011-2012.</p> <p>a. 100% of students performed at or above the benchmark for Safety-related skills in the General Skills and Professional Competence sections.</p> <p>b. 91% of students performed at or above the benchmark for Quality Control-related skills in the General Skills and Professional Competence sections.</p> <p>c. 100% of students performed at or above the benchmark for Technical Communication-related skills in the General Skills and Professional Competence sections.</p> <p>d. 100% of students performed at or above the benchmark for the Development of a Professional resume skill in the General Skills and Professional Competence sections.</p>	The program again met (and exceeded) the benchmark for all items in the General Skills and Professional Competence section. Last year, 100% of the students satisfied the benchmark in each of the four categories in this section. We attributed that success in part to the new electronic system that we implemented for capturing documentation in student portfolios (yielding a more accurate measure of student competencies). We still believe that this system is beneficial in encouraging students to record their competency at the point in the program when it is acquired. The one category (Quality Control) where a single student (n=1) did not satisfy the benchmark was likely still a case of the student not being aware that their activities at the time represented the broad category of Quality Control (and likely just did not think to record the evidence).
2. Instrumentation (Technical) [Eighty percent (80 %)] of all students will produce laboratory reports that demonstrate an understanding of the use of analytical instrumentation including: electroanalytical, spectroscopy, and chromatography instruments.	<p>a. Students will demonstrate an understanding of how to set-up, run, and maintain selected electroanalytical probes/meters.</p> <p>b. Students will demonstrate an understanding of how to set-up, run, and maintain selected molecular spectrophotometers.</p> <p>c. Students will demonstrate an</p>	Portfolio review. To occur at the end of Laboratory Applications VI course (0879-206).	a.-e. Score of at least "2" ("acceptable/meets entry level professional standards") on all related items on the Laboratory Science Technology portfolio rating sheet.	AY 2004-2005	Annually in the Laboratory Applications VI (0879-206) or Senior Seminar (0879-250) courses.	<p>11 students in the Laboratory Applications VI/Senior Seminar courses were evaluated in academic year 2011-2012.</p> <p>a. 100% of students performed at or above the benchmark for Probe/Meter-related skills in the Instrumental Analysis section.</p>	Since the program's inception, students have performed very well in skills related to Instrumental Analysis. We believe that this is a strength of the program and are pleased that students appear to be performing so well in the field of instrumental analysis; as the setting-up, running, and maintaining of

	<p>understanding of how to set-up, run, and maintain selected atomic spectrophotometers.</p> <p>d. Students will demonstrate an understanding of how to set-up, run, and maintain High Performance Liquid Chromatographers.</p> <p>e. Students will demonstrate an understanding of how to set-up, run, and maintain Gas Chromatographers/Gas Chromatographer – Mass Spectrometers.</p>					<p>b. 100% of students performed at or above the benchmark for Molecular Spectrophotometer-related skills in the Instrumental Analysis section.</p> <p>c. 100% of students performed at or above the benchmark for Atomic Spectrophotometer-related skills in the Instrumental Analysis section.</p> <p>d. 100% of students performed at or above the benchmark for Gas Chromatographer-related skills in the Instrumental Analysis section.</p> <p>e. 100% of students performed at or above the benchmark for HPLC-related skills in the Instrumental Analysis section.</p>	<p>analytical instrumentation is one of the primary expectations of the workplace.</p> <p>The Instrumental Analysis courses will continue to a strength and core of the program under the impending semester system. Competencies/skills have been reorganized for semesters, but none have been lost in the proposed semester-based curriculum.</p>
<p>3. Volumetric and Gravimetric Analysis (Technical)</p> <p>[Eighty percent (80 %)] of all students will produce laboratory reports that demonstrate an understanding of the processes involved in volumetric and gravimetric analyses including: sample preparation, titrations, and gravimetric techniques.</p>	<p>a. Students can perform sample preparation procedures and the corresponding calculations.</p> <p>b. Students can perform gravimetric procedures and the corresponding calculations.</p> <p>c. Students can perform acid/base titrations and the corresponding calculations.</p>	<p>Portfolio review. To occur at the end of Laboratory Applications VI course (0879-206).</p>	<p>a.-c. Score of at least “2” (“acceptable/meets entry level professional standards”) on all related items on the Laboratory Science Technology portfolio rating sheet.</p>	<p>AY 2004-2005</p>	<p>Annually in the Laboratory Applications VI (0879-206) or Senior Seminar (0879-250) courses.</p>	<p>11 students in the Laboratory Applications VI/Senior Seminar courses were evaluated in academic year 2011-2012.</p> <p>a. 100% of students performed at or above the benchmark for Sample Preparation-related skills in the Volumetric/Gravimetric Analysis section.</p> <p>b. 100% of students performed at or above the benchmark for Acid/Base Titration-related skills in the Volumetric/Gravimetric Analysis section.</p> <p>c. 100% of students performed at or above the benchmark for Gravimetric-related skills in the</p>	<p>Students continue to perform very well in skills related to Volumetric/Gravimetric Analysis. Skills in this category are among the most crucial for individuals working in the field. We will continue to emphasize these skills in coursework so that we maintain this high level of student competence. Volumetric/Gravimetric Analysis has joined the Instrumental Analysis category as a flagship and strength of the program.</p> <p>This is the second year in a row that 100% of the students satisfied the benchmark. Again, we feel that our new electronic portfolio capturing system is in part responsible for strong marks- as we have felt that students</p>

						Volumetric/Gravimetric Analysis section.	have typically performed very well in this category (even if past Outcomes Assessment marks were a bit lower).
4. Biological and Microbiological Techniques (Technical) [Eighty percent (80 %)] of all students will produce laboratory reports that demonstrate an understanding of biological and microbiological techniques including: tasks involving sterile technique and the identification/classification/evaluation of microorganisms.	a. Students can identify/classify/evaluate microorganisms. b. Students can prepare media using sterile technique.	Portfolio review. To occur at the end of Laboratory Applications VI course (0879-206).	a.-b. Score of at least "2" ("acceptable/meets entry level professional standards") on all related items on the Laboratory Science Technology portfolio rating sheet.	AY 2004-2005	Annually in the Laboratory Applications VI (0879-206) or Senior Seminar (0879-250) courses.	11 students in the Laboratory Applications VI/Senior Seminar courses were evaluated in academic year 2011-2012. a. 82% of students performed at or above the benchmark for Sterile Technique-related skills in the Biological Techniques section. b. 91% of students performed at or above the benchmark for Identifying Microorganisms-related skills in the Biological Techniques section.	This category has posed some concerns for the program in the past. We have made several programmatic changes to remedy weaknesses. And whereas we are very pleased the met the required benchmark for each competency this year, this represents the category where we will continue to place the most effort toward improving. We feel strongly that the modifications to the program under the proposed semester-based system will stimulate further improvement in this area. We have reorganized the Microbiology, Molecular Biology, and Biotechnology competencies. Perhaps the largest change under the propose semester system program mask is the addition of a second course of Fundamentals of Biology. It is anticipated that adding this course of foundation biology content in the first year of the LST program will improve student performance in the more advanced coursework. This modification to the proposed semester program mask was initiated due to our program's Outcomes Assessment efforts over the past few years.
Co-op Work experience	Having completed a job search process, a student will complete at 10-week co-op work experience.	Assessment will occur prior to graduation by a Co-op supervisor.	80% of the students will successfully complete a 10-week program-related work experience and receive a score of 3 or above (5 point scale) on overall	AY 2004-2005	Quarterly	For students in the LST program the mean overall job performance rating by co-op supervisors was 4.42 (N=12) during the four quarters 20104-20113.	We have always felt that co-op supervisor satisfaction is one of the best metrics for evaluating the efficacy if a program's curriculum, and have always felt

			Co-op performance.				<p>that our students are very well trained in practical applications of Laboratory Science and prepared to contribute to the host lab with minimal training while on co-op.</p> <p>In the past we have reported a desire to increase the return rate of supervisors who respond to surveys. We are happy to report that we have continued to experience improvement in this regard. The program greatly values co-op supervisor satisfaction responses- as the program prides itself on being “industrially driven”, preparing students to enter a co-op or permanent job laboratory and begin to contribute to the laboratory’s daily operations with minimal on the site training. Though we again scored very high, because of the value that we place in it, we would like to see the supervisor satisfaction scores even higher. After reading through supervisor reports, we believe that our changes to the biology-related content in the program should yield even higher scores from co-op supervisors.</p>
Job Placement	Students will gain entry-level employment in the LST field	NCE Data	90% of graduates will be employed in the field.	Ongoing	Annually	For the reporting year AY 2009-2010 only 1 student from the Laboratory Science Technology program was seeking employment and that student was employed. 20 graduates were continuing in school.	The LST program has experienced a shift since its inception- where most students from the program are not directly taking jobs after graduate, but are continuing their education. We are comfortable with this change, even though it makes this Outcome more challenging to assess. This year really models the shift- as 20 students continued their education, while only one student sought employment.
80 % of graduating students will indicate	Graduating students will indicate overall	Student Satisfaction	Students will indicate they	AY 2004-	Annually	11 students in the Laboratory	

<p>overall satisfaction with the program and the courses.</p>	<p>satisfaction with program and courses.</p>	<p>Survey</p>	<p><i>Strongly Agree or More Agree than Disagree</i> (4-point scale) when asked to give an overall rating on two global items, one related to the program in general and the other related to the courses in the major.</p>	<p>2005</p>	<p>Applications VI/Senior Seminar courses completed surveys in academic year 2011-2012 related to student satisfaction.</p> <p>100% indicated <u>overall satisfaction</u> with the program.</p> <p>91% responded “Agree Strongly” with question “I would recommend the Laboratory Science Technology Program to other students.” 9% responded that they “More Agree than Disagree” to the same question.</p> <p>100% indicated <u>overall satisfaction</u> with the courses in their major.</p> <p>82% responded “Agree Strongly” to the question “I was satisfied with what I learned in the Laboratory Science Technology program.” 18% responded that they “More Agree than Disagree” to the same question.</p>	<p>For the second straight year, student satisfaction with the program improved. 100% of students showed overall satisfaction with the program (and the vast majority of students further indicated “strong” satisfaction with the program.</p> <p>The Instrumental Analysis series of courses, the Principles of Chemistry series of courses, and the Fundamentals of Chemistry series of courses again received overall ratings above average. These series of courses also received high scores in years prior, and it appears that we are doing well to satisfy student in these courses. These courses represent “flagships” of the program, as well as program strengths. For the second straight year, the Chemical Technology course joined this elite group of courses registering above average from the survey.</p> <p>Fundamentals of Biology and Biotechnology both received average marks, and Microbiology/Molecular Biology did show some improvement this year. Lab Math took a small step backwards but still performed average in respect to student satisfaction.</p> <p>The Laboratory Applications series of courses received overall ratings that were average, but the lowest in the program. Under the proposed semester-based curriculum, the skills from the Laboratory Applications courses will be distributed throughout the technical courses. It is believed that this reorganization will help students to see how the intended material relates</p>
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