

# NTID

## Laboratory Science Technology Program Outcomes Assessment

### Plan and Report for AY 2012-2013

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

Critical Outcomes for all Students		Performance Criteria/Benchmarks		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 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 2012-2013.</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. 82% 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. In the past few years, students have been exceeding the benchmark and higher rates- and we attribute 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). Like last year, the one category (Quality Control) where students student (n=2) 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). We are confident that these two students satisfied the requirement, but did not properly document it. Still we exceeded the benchmark and will continue to use and improve the electronic portfolio system.
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	<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</p>	Portfolio review. To occur at the end of Laboratory Applications VI course (0879-206).	a.-e. Score of at least "2" ("acceptable/meets professional standards") on all related items on the Laboratory Science Technology portfolio rating	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. 91% of students performed at or above the benchmark for Probe/Meter-related</p>	Students have always 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

<p>chromatography instruments.</p>	<p>maintain selected molecular spectrophotometers.  c. Students will demonstrate an understanding of how to set-up, run, and maintain selected atomic spectrophotometers.  d. Students will demonstrate an understanding of how to set-up, run, and maintain High Performance Liquid Chromatographers.  e. Students will demonstrate an understanding of how to set-up, run, and maintain Gas Chromatographers/Gas Chromatographer – Mass Spectrometers.</p>		<p>sheet.</p>			<p>skills in the Instrumental Analysis section.  b. 100% of students performed at or above the benchmark for Molecular Spectrophotometer-related skills in the Instrumental Analysis section.  c. 100% of students performed at or above the benchmark for Atomic Spectrophotometer-related skills in the Instrumental Analysis section.  d. 100% of students performed at or above the benchmark for Gas Chromatographer-related skills in the Instrumental Analysis section.  e. 100% of students performed at or above the benchmark for HPLC-related skills in the Instrumental Analysis section.</p>	<p>instrumental analysis; as the setting-up, running, and maintaining of analytical instrumentation is one of the primary expectations of the workplace.  Though the program exceeded the benchmarks in all skills in this category, this year, a single student (n=1) did not meet the benchmark for Probe/Meter-related skills. Again, we believe this was a case of the student not properly documenting the attained skill in the electronic portfolio.  The Instrumental Analysis courses will continue to be 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)  [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.  b. Students can perform gravimetric procedures and the corresponding calculations.  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 2012-2013.  a. 100% of students performed at or above the benchmark for Sample Preparation-related skills in the Volumetric/Gravimetric Analysis section.  b. 100% of students performed at or above the benchmark for Acid/Base Titration-related skills in the Volumetric/Gravimetric Analysis section.  c. 91% of students performed at or above the benchmark for Gravimetric-related skills in the Volumetric/Gravimetric Analysis section.</p>	<p>The program exceeded the benchmark, but again, a single student (n=1) had an issue with documenting evidence in the Gravimetric-related skills category. Again, we feel that our new electronic portfolio capturing system is in part responsible for strong marks- as we have felt that students have typically performed very well in this category (even if past Outcomes Assessment marks were a bit lower).  Like the Instrumental Analysis section, students continue to perform very well in skills related to Volumetric/Gravimetric Analysis. Skills in this category are also 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. With the move to semesters, we were able to expand the LST Analytical Chemistry course, so students will get even more practice with these crucial skills. Prior co-op supervisor evaluations have</p>

							indicated the importance of the skills in this category.
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 2012-2013.  a. 91% of students performed at or above the benchmark for Sterile Technique-related skills in the Biological Techniques section.  b. 64% of students performed at or above the benchmark for Identifying Microorganisms-related skills in the Biological Techniques section.	As stated in prior Outcomes reports, this category has historically posed some concerns for the program. Again, this was the lone place where a single benchmark for a skill was not satisfied. Though we continue to work toward improving this category (and discussion of the program's modifications on the academic semester system are outlined below), in fairness, the one skill where the benchmark was not obtained (Identifying Microorganisms-related skills) is somewhat outdated for the program (which no longer has a Microbiology course). This skill will have to be modified/updated for future Outcomes metrics.  We feel strongly that the modifications to the program under the new semester-based system will remedy some of the concerns that we have had in this category. These modification under the semester program mask was initiated due largely to our program's Outcomes Assessment efforts over the past few years. We have reorganized the Microbiology, Molecular Biology, and Biotechnology competencies into a two part Biotechnology sequence. Perhaps the most significant modification on the semester system's 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.
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 4.0 (N=7) during the four quarters 20114-20123.	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 that our students are very well trained in practical

			Co-op performance.				<p>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. After improvement last year, we are happy that we received 100% of co-op supervisor satisfaction evaluations. 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.</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 2010-2011 only 1 student from the Laboratory Science Technology program was seeking employment and that student was employed. 10 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 graduation, but are continuing their education. We are comfortable with this change, even though it makes this Outcome more challenging to assess. Again this year, the vast majority of students (n=10) continued their education beyond the LST program- while only one (n=1) student sought (and secured) a job. As always, we are proud of the job placement rate of student alums from the LST program.
80 % of graduating students will indicate overall satisfaction with the program and the courses.	Graduating students will indicate overall satisfaction with program and courses.	Student Satisfaction Survey	Students will indicate they Strongly Agree or More Agree than Disagree (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.	AY 2004-2005	Annually	<p>11 students in the Laboratory Applications VI/Senior Seminar courses completed surveys in academic year 2012-2013 related to student satisfaction.</p> <p>100% indicated overall satisfaction with the program.</p> <p>82% responded "Agree Strongly" with question "I would recommend the Laboratory Science</p>	<p>For the third 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 (Analytical and</p>

					<p>Technology Program to other students." 9% responded that they "More Agree than Disagree" to the same question.</p> <p>100% indicated overall satisfaction 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>Organic) series of courses, and the Fundamentals of Chemistry series of courses again received overall ratings above average. These courses represent "flagships" of the program, as well as program strengths. All of these courses have either been maintained or expanded in the academic semester system (not only because students show satisfaction in these courses, but also because we believe that they are the core courses that help students on co-ops and permanent jobs).</p> <p>Fundamentals of Biology, Biotechnology, and Laboratory Applications all received average marks. Despite improvements in the past, Laboratory Math and Microbiology/Molecular Biology took a step backwards and were rated just below average. Fortunately, all of the courses in this category have undergone significant modifications in the semester system. The Laboratory Math course has been reworked and the Biology-related course were discussed above. In addition, 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 to their core coursework.</p>
<b>Comments:</b>						