

NTID
Laboratory Science Technology Program Outcomes Assessment
Plan and Report for AY 2010-2011

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
<p>1. General Skills and Professional Competence (Technical)</p> <p>[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>	<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>	<p>Portfolio review. To occur at the end of Laboratory Applications VI course (0879-206).</p>	<p>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.</p>	<p>AY 2004-2005</p>	<p>Annually in the Laboratory Applications VI (0879-206) or Senior Seminar (0879-250) courses.</p>	<p>13 students in the Laboratory Applications VI/Senior Seminar courses were evaluated in academic year 2010-2011.</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. 100% 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>	<p>The program again met (and exceeded) the benchmark for all items in the General Skills and Professional Competence section. In general, (for this section and the others we assessed) students scored very well-improving in almost every category. We believe that this is in response to our new system of capturing information/documentation in student portfolios. We have a new electronic system for submitting and reporting student work examples to satisfy each Outcome that we assess in the LST program. As such, we believe that the current data is likely a truer measure of student competence- as in past years' assessments, we believe that individual students who did not meet the benchmark on certain Outcomes likely had acquired the appropriate skills/knowledge, but did not properly report it in their portfolio systems. This year's improvement in the mechanism of using the electronic portfolio may be responsible for the improved accuracy of data (and thus, student scores).</p>

<p>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>	<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 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>Portfolio review. To occur at the end of Laboratory Applications VI course (0879-206).</p>	<p>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.</p>	<p>AY 2004-2005</p>	<p>Annually in the Laboratory Applications VI (0879-206) or Senior Seminar (0879-250) courses.</p>	<p>13 students in the Laboratory Applications VI/Senior Seminar courses were evaluated in academic year 2010-2011</p> <p>a. 100% of students performed at or above the benchmark for Probe/Meter-related skills in the Instrumental Analysis section.</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>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 thrilled that students appear to be performing so well in the field of instrumental analysis; as the setting-up, running, and maintaining of analytical instrumentation is one of the primary expectations of the workplace.</p> <p>It is good to see that this section has remained a strength of the program. We have now had a variety of instructors for the Instrumental Analysis series of courses (in the past there were consistent instructors teaching the courses quarterly and annually). The fact that the students still scored very well in this category is a testament to the faculty teaching the course and the strong shared curriculum.</p> <p>Annually, the program’s advisory board highlights this category (along with Volumetric Analysis) as a top priority, and we are pleased that we are performing well to give students these crucial skills. From co-op supervisor evaluations, it is also clear that students are strong in these categories- something that is certainly appreciated by the supervisors.</p>
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<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>13 students in the Laboratory Applications VI/Senior Seminar courses were evaluated in academic year 2010-2011</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 Volumetric/Gravimetric Analysis section.</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.</p> <p>In past years, we reported that we felt students were actually stronger in this section than data from the analysis of portfolios showed, but felt that the mechanism of capturing appropriate information in regard to Outcomes in this section might have contributed to some students missing the benchmark. As mentioned above, our new electronic portfolio system has changed. We believe that improvements in this section this year are likely due to the new system, as opposed to actual improvement by the students (in essence, we believe students have consistently been strong in this category over several years now).</p> <p>Annually, the program's advisory board highlights this category (along with Instrumental Analysis) as a top priority, and we are pleased that we are performing well to give students these crucial skills. From co-op supervisor evaluations, it is also clear that students are strong in these categories- something that is certainly appreciated by the supervisors.</p>
<p>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/</p>	<p>a. Students can identify/classify/evaluate microorganisms. b. Students can prepare media using sterile technique.</p>	<p>Portfolio review. To occur at the end of Laboratory Applications VI course (0879-206).</p>	<p>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.</p>	<p>AY 2004-2005</p>	<p>Annually in the Laboratory Applications VI (0879-206) or Senior Seminar (0879-250) courses.</p>	<p>13 students in the Laboratory Applications VI/Senior Seminar courses were evaluated in academic year 2010-2011</p>	<p>This category has posed some concerns for the program in the past. We have made several programmatic changes to remedy weaknesses. And though this category again yielded some of the lowest relative scores related to student skill acquisition,</p>

evaluation of microorganisms.						<p>a. 85% of students performed at or above the benchmark for Sterile Technique-related skills in the Biological Techniques section.</p> <p>b. 77% of students performed at or above the benchmark for Identifying Microorganisms-related skills in the Biological Techniques section.</p>	<p>we do report some improvements.</p> <p>This is the second group of students who have been through the program with the Molecular Biology course substituted for the former second Microbiology course. We feel that we are seeing the beginning of a trend in overall improvement in this category due to this programmatic change. As mentioned in the prior report, our current Outcomes Assessment plan does not specifically target skills within the field of Molecular Biology (rather it has an emphasis on “classical” Microbiology). We will need to consider modifying our Outcomes Assessment plans to measure skills that should be acquired in Molecular Biology.</p> <p>As mentioned above, students improved scores in this category may also be partially attributed to our new portfolio collection/reporting system. Still, the program views this section as an area of focus for improvement.</p>
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 Co-op performance.	AY 2004-2005	Quarterly	For students in the LST program the mean rating by co-op supervisors who completed the evaluation online was 4.18 (N=11) during the four quarters 20094-20103.	<p>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 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. And though our mean rating by supervisors of our program’s co-op students is down slightly this year, we believe that the score sis still very good. One potential reason for the dip in score</p>

							this past year may be due to a high number of students conducting co-ops in academic research labs (as opposed to industrial labs). Though students perform well in either setting, the program is more geared toward supporting students who enter industrial positions.
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 2008-2009 no one from the Laboratory Science Technology program was seeking employment. 8 were continuing in school, 1 was not looking and the status of 1 was unknown.	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.
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 <i>Strongly Agree</i> or <i>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.	AY 2004-2005	Annually	<p>12 students in the Laboratory Applications VI/Senior Seminar courses completed surveys in academic year 2010-2011 related to student satisfaction.</p> <p>92% indicated overall satisfaction with the program.</p> <p>42% responded “Agree Strongly” with question “I would recommend the Laboratory Science Technology Program to other students.” 50% responded that they “More Agree than Disagree” to the same question.</p> <p>83% indicated overall satisfaction with the courses in their major.</p> <p>33% responded “Agree Strongly” to the question “I was satisfied with what I learned in the Laboratory Science Technology program.” 50% responded that</p>	<p>In general, student satisfaction ratings improved from a slight (and unforeseen) dip last year. The program met the benchmark for student satisfaction this year.</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. This year, the Chemical Technology course joined this group of courses registering above average from the survey.</p> <p>Fundamentals of Biology, Biotechnology and Laboratory Math all received average marks, but took a small step backwards in student perceived satisfaction this year. Lab Math had been experiencing improved scores over the past few years. We will continue to monitor these classes to</p>

						<p>they “More Agree than Disagree” to the same question.</p>	<p>make sure they do not decline any further.</p> <p>The Laboratory Applications series of courses also received overall ratings of average. In fact, the ratings in this series of courses rebounded after a couple years of slipping. We are pleased with the improvement, but will continue to monitor these courses and try to improve them.</p> <p>The Microbiology and Molecular Biology courses received overall ratings below average, but did improve slightly from the past two years. Again, we have made these courses a focus of the program’s efforts to improve-something that we will continue to do.</p>
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