

NTID
Laboratory Science Technology Program Outcomes Assessment
Plan and Report for AY 2009-2010

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>14 students in the Laboratory Applications VI/Senior Seminar courses were evaluated in academic year 2009-2010.</p> <p>100% of students performed at or above the benchmark for Safety-related skills in the General Skills and Professional Competence sections.</p> <p>86% of students performed at or above the benchmark for Quality Control-related skills in the General Skills and Professional Competence sections.</p> <p>100% of students performed at or above the benchmark for Technical Communication-related skills in the General Skills and Professional Competence sections.</p> <p>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 the benchmark for all items in the General Skills and Professional Competence section. For the past several years, we have reported improvement in the all-important category of Laboratory Safety due to programmatic curricular changes. For the first time, the program achieved 100% of the students who satisfied the benchmark in this category! It appears that our efforts over the past few years to improve the safety components of the program have succeeded.</p> <p>Though students scored very well, for the students (n=2) who did not achieve the benchmark, we believe that the issue with the "Quality Control" metric is again a problem with student documentation in this category, as opposed to a skill deficiency. Since Quality Control is occurring in the "background" of all performed laboratory assignments, students can overlook the proper documentation of this skill. We will try to bring this issue to the forefront of the students' minds as they consider proper documentation.</p> <p>In the past, we reported a desire to improve on Technical Communication, and for the second straight year, we are pleased to report that 100% of the students satisfied (or exceeded) an acceptable rating in this category.</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>14 students in the Laboratory Applications VI/Senior Seminar courses were evaluated in academic year 2009-2010.</p> <p>100% of students performed at or above the benchmark for Probe/Meter-related skills in the Instrumental Analysis section.</p> <p>93% of students performed at or above the benchmark for Molecular Spectrophotometer-related skills in the Instrumental Analysis section.</p> <p>100% of students performed at or above the benchmark for Atomic Spectrophotometer-related skills in the Instrumental Analysis section.</p> <p>100% of students performed at or above the benchmark for Gas Chromatographer-related skills in the Instrumental Analysis section.</p> <p>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. However, some of the instructor assignments for the Instrumental Analysis courses are expected to change in the coming years. We will continue to monitor this important category with the hopes that the quality of instruction, and therefore student learning, remains high.</p> <p>The program’s advisory board has highlighted 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.</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>14 students in the Laboratory Applications VI/Senior Seminar courses were evaluated in academic year 2009-2010.</p> <p>100% of students performed at or above the benchmark for Sample Preparation-related skills in the Volumetric/Gravimetric Analysis section.</p> <p>100% of students performed at or above the benchmark for Acid/Base Titration-related skills in the Volumetric/Gravimetric Analysis section.</p> <p>93% of students performed at or above the benchmark for Gravimetric-related skills in the Volumetric/Gravimetric Analysis section.</p>	<p>For several years now, students have performed very well in skills related to Volumetric/Instrumental 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. For the second straight year, we report that no further action is required at this time.</p> <p>The program’s advisory board has highlighted 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.</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/evaluation of microorganisms.</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>14 students in the Laboratory Applications VI/Senior Seminar courses were evaluated in academic year 2009-2010.</p> <p>57% of students performed at or above the benchmark for Sterile Technique-related skills in the Biological Techniques section.</p>	<p>For the past several years, this category has yielded some of the lowest relative scores related to student skill acquisition. We are still in a several year programmatic transition with some of the courses in which these skills are taught.</p> <p>Last year to remedy some of the concerns that we were seeing in prior assessments, we offered a Special Topics course (Molecular Biology) as a substitute to one of the Microbiology series courses. The group of students assessed here were the first to go through this new course and we believe that we are already seeing positive results of this move. However, the current Outcomes Assessment plan</p>

						<p>50% of students performed at or above the benchmark for Identifying Microorganisms-related skills in the Biological Techniques section.</p> <p>does not specifically target skills within the field of Molecular Biology. We will work to slightly modify our Outcomes Assessment plans to measure skills that should be acquired in this new course.</p> <p>We continue to search for faculty to teach, and ultimately improve, the program's Biology strand of courses.</p> <p>The institute will be facing opportunities for major curricular changes in the upcoming years, and the Biology strand of courses will be central to the program's efforts toward 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	<p>For students in the LST program the mean rating by co-op supervisors who completed the evaluation online was 4.46 (N=13) during the four quarters 20084-20093.</p> <p>We believe 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>These strong scores have been consistent for the past 3 years (since the start of when results were tabulated), and are identical to last year. Though we always aim to improve, the margin for improvement in this category is small. Over the past few years we have tried to increase the number of supervisors who complete evaluations online. For the second straight year, our response rate is up (and at 100%). We will continue these efforts in the future.</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	<p>For AY 2007-2008 N=1; 100% of students who were seeking employed were working</p> <p>In every case where an individual is not looking for a job, the graduates of the LST program are continuing in baccalaureate programs as a result of a newly established transfer degree from the LST program. The number of students who continue their education past the LST program is a strong majority of graduates. Of the remaining students, we are pleased that 100% are finding permanent jobs.</p>
80 % of graduating	Graduating students will	Student	Students will	AY	Annually	<p>16 students in the Laboratory Applications</p> <p>Overall, though still satisfying our goal metric, student</p>

<p>students will indicate overall satisfaction with the program and the courses.</p>	<p>indicate overall satisfaction with program and courses.</p>	<p>Satisfaction Survey</p>	<p>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.</p>	<p>2004-2005</p>		<p>VI/Senior Seminar courses completed surveys in academic year 2009-2010 related to student satisfaction.</p> <p>82% indicated <u>overall satisfaction</u> with the program.</p> <p>•25% responded "Agree Strongly" with question "I would recommend the Laboratory Science Technology Program to other students." 57% responded that they "More Agree than Disagree" to the same question.</p> <p>82% indicated <u>overall satisfaction</u> with the courses in their major.</p> <p>•25% responded "Agree Strongly" to the question "I was satisfied with what I learned in the Laboratory Science Technology program." 57% responded that they "More Agree than Disagree" to the same question.</p>	<p>satisfaction of the program and its courses was down a bit from prior years. Although students indicated overall satisfaction with their courses, we examined the results from the assessment of individual courses and found the following information.</p> <p>•Of the 8 categories of courses, 3 received overall ratings above average in the extent to which the courses improved their skills. The Instrumentation series of courses, Principles of Chemistry series of courses, and Fundamentals of Chemistry series of courses all 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.</p> <p>Chemical/Biotechnology, Fundamentals of Biology, and Laboratory Math all received average marks. Chemical/Biotechnology took a step backwards from last year, but was still rated as "average" related to student satisfaction. Fundamentals of Biology and the Lab Math series of courses were consistent with last year's ratings (Lab Math being up from two years ago, and Fundamentals of Biology being down slightly from two years ago) in regard to student satisfaction.</p> <p>The Laboratory Applications series of courses received overall ratings of slightly below average for the second straight year, as did the Microbiology course. In that this is the second year of the lower ratings for the Laboratory Applications series of courses, they will be investigated during the current academic year. With an opportunity for institute-wide curriculum changes on the horizon, these courses will be thoroughly investigated. The Microbiology course is going through curricular and faculty changes. This course has been a weakness for a few years now. Two years ago, we replaced one of the Microbiology sequence courses with a Special Topics course (Molecular Biology). Though early to say definitively, we already believe that this has produced an improvement in both student skillsets and student satisfaction.</p>
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