

## Department of Chemistry Assessment Plan for the M.S. in Chemistry

The M.S. in Chemistry is a degree that provides technical training in the field that goes beyond that of the B.S. degree. It represents advanced study, and while it provides enhanced preparation for Ph.D. work, it is not traditionally a steppingstone for Ph.D. study. Hence, as an enhancement of the B.S. training in the discipline, the program goals are very much in line with those for the B.S. degree.

The Assessment Plan for the M.S. in Chemistry follows four Program Goals. For each Program Goal, there are one or more Outcome Measures.

**PROGRAM GOAL 1:** Students will have a strong understanding of the fundamental basis of the science of chemistry through mastering key concepts in at least four of the specific areas of physical chemistry, organic chemistry, inorganic chemistry, analytical chemistry, and biochemistry, and with advanced work in one of the areas through independent investigation (research). One of the areas may be chemical education.

Outcome Measures	Data Needed	Group	Assessment: Method	Reporting	Assessment Benchmarks
Understanding of key concepts in: <ul style="list-style-type: none"><li>• Physical chemistry</li><li>• Organic chemistry</li><li>• Inorganic chemistry</li><li>• Analytical chemistry</li><li>• Biochemistry</li><li>• Chemical education</li></ul>	Demonstration of working knowledge	Students who completed a graduate course in each of the four of the five areas	1-Overall course GPA in graduate courses 2-Completion of CHE 492 (graduate seminar) 3-Oral defense of thesis	Course GPA; percent of students; completing CHE 492 on time; thesis committee report submitted to the Chair	1-Maintain hist. course GPA's 2-At least 70% of graduate students complete CHE 492 by their fourth semester

**PROGRAM GOAL 2:** Students will develop information and communication skills (oral, written, and computer skills) needed to be a professional chemist, to continue to Ph.D. study in chemistry, or to enter a program leading to a degree in medicine or related fields.

Outcome Measures	Data Needed	Group	Assessment: Method	Reporting	Assessment Benchmarks
Effective at orally communicating their knowledge of chemistry	Seminars presented on a literature topic and a research topic	<i>Students in:</i> CHE 492	Faculty evaluation of oral presentation	Instructor reports completion	Achieve 70% of students successfully presenting required talks
Effective at communicating chemical ideas in writing	M.S. theses	CHE 490	Committee evaluation of thesis	Committee reports outcome of thesis evaluation to Chair	Achieve 40% of theses as suitable for nomination for Fisher Thesis Award
Ability to use computer based tools for data analysis, interpretation, and communication	Assignments that demonstrate student abilities with different kinds of computer based tools (e.g., Excel, chem. structure, graphs, simulations)	400-level courses	Homework and laboratory assignments needing specific software tools	Instructor reports cases of inability to use essential software tools	Less than 10% of enrolled students show a lack of ability

**PROGRAM GOAL 3:** Students will develop problem-formulating and problem-solving skills relevant to the field of chemistry

<b>Outcome Measures</b>	<b>Data Needed</b>	<b>Group</b>	<b>Assessment: Method</b>	<b>Reporting</b>	<b>Assessment Benchmarks</b>
Ability to formulate questions in specific areas of chemistry and apply problem-solving skills to answer questions/problems	M.S. thesis	All graduate students	Laboratory-based thesis research	Thesis committee report to Chair	Achieve 70% of entering graduate students successfully defending M.S. thesis and receiving M.S. degree

**PROGRAM GOAL 4:** Students will develop safe and effective laboratory skills, including those for chemical handling and use of chemical instrumentation.

Outcome Measures	Data Needed	Group	Assessment: Method	Reporting	Assessment Benchmarks
Laboratory work that shows safe handling and use of instrumentation and chemicals	Safety training program	All graduate students	Complete safety training	Safety Officer reports to Chair on students completing training	Achieve 100% successful completion of safety training
Laboratory activities that show skill and ability in advanced laboratory procedures	Independent lab work/research	All graduate students	Development of new scientific understanding from lab work	Report by research director to thesis committee	Achieve 100% of those completing a thesis as being effective in their lab work

## FEEDBACK

Stakeholders and Others	Information Sought	Collection Method
Current students	Course and instructor satisfaction	End-of-semester course evaluations
Alumni	Program satisfaction; strengths; weaknesses	Annual Alumni Survey
Employers	Success of students placed from our program	Communication with Chair and the Department's corporate liaison
Graduate and professional schools	Success of students pursuing PhDs elsewhere	Tracking outcome through maintaining contact with students

## ANALYSIS AND RESPONSE

Each year, the Chair and the Executive Committee of the Department will review how well Assessment Benchmarks have been met or are approaching the intended performance level for each of the Outcome Measures. Feedback will be incorporated to provide a composite picture of the Department's effort on the four Program Goals. Where there is a substantial shortfall and lack of progress, the Executive Committee will formulate an action plan, which may involve review and change in courses, curricula, facilities, faculty effort, and so on. The action plan will be forwarded to an appropriate faculty committee in the Department (e.g., Courses and Curricula, Facilities, Graduate Programs) for further analysis and/or implementation. It is conceivable that some action plans will be directed to the faculty as a whole and will then be discussed at a faculty meeting. Changes made as a result of the analysis will be detailed in the Department's Annual Report. The following year, the Chair and Executive Committee will be charged with reporting to the faculty on the outcome of actions taken in relation to the Assessment Benchmarks for which there was a shortfall and lack of progress.