

Graduate Program Student Learning Outcomes Assessment Plan For Accredited and Non-Accredited Programs

The Graduate School requests that each program have clearly articulated program goals (Section I) and student learning outcomes statements linked to curriculum and course experiences/requirements (Section II). This assessment plan will help programs determine the extent to which these outcomes are successfully being met through courses and other program requirements. As part of the plan, each program will also create an assessment timeline (Section III) indicating when and how learning outcomes assessment will take place.^{i ii}

Program Information:

Program:	Chemistry
Degree(s):	Ph. D. and M.S. (both thesis and non-thesis)
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I. Program Goals: Broad, general statements of what it means to be an effective program in terms of student learning outcomes; what the program wants students to know and be able to do upon completion of the program. Goals should relate to the mission of the department, college, and university in which the program resides. Success in achieving Goals is evaluated directly or indirectly by measuring specific outcomes (Section II) related to the goal

#1	Students attain broad and integrated knowledge spanning the field of chemistry with specific competency in a primary research focus.
#2	Students apply both their knowledge and critical thinking skills to advance the field of chemistry through original discovery.
#3	Students are prepared to function as responsible, professional scientists.

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II. Curriculum Mapping:

Across the top of the matrix, list courses and other requirements for the program. Order the requirements from left to right in rough chronological sequence, and append a standard description of your program requirements. Down the side, list programmatic student learning outcomes associated with goals. Using the map key below, indicate the degree to which an outcome will be taught and assessed in relevant courses and by other program requirements.

Map Key I = Outcome Introduced R = Outcome Reinforced E = Outcome Emphasized		CHM 500	CHM 505	CHM 506	CHM 507	Elective Courses*	CHM 642	CHM 643	CHM 644	Teaching Assistantship	Qualifying Exams	Comprehensive Exam	Thesis Proposal	Research Credits (CHM 599 and 699)	Dissertation or Thesis Defense
Goal #1	1.1 Demonstrate knowledge of scientific topics within and beyond one's primary research focus.		I	I	I	R	R	R	E	R	E	E			
	1.2 Find, comprehend and critique contemporary scientific literature.	I	I	I		R	R	R	E		E	E		E	E
	1.3 Write professional-quality works describing contemporary scientific topics, including one's own contributions to the field.		I	I		R		R				E	E	E	E
	1.4 Orally present and discuss contemporary scientific topics, including one's own contributions to the field.	I		I			R		E	I		E		R	E
Goal #2	2.1 Define an unsolved problem in a specific focus area of chemistry.		I			R							E	E	E
	2.2 Design and perform novel experiments.					I								R	E
	2.3 Disseminate research findings in scientific media (<i>e.g.</i> publications, presentations in professional settings, etc.).						I	I	R					E	E
Goal #3	3.1 Perform research in an ethical manner.	I								R				E	E
	3.2 Conduct chemical experiments in a safe manner.	I								R				E	

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	3.3 Manage both the projects and personnel in a modern chemical laboratory.	I								E				E	
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* Elective courses will meet some subset of the criteria. They are expected to reinforce the material in the core courses.

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III. Assessment Timeline: Indicates when and how student learning will be assessed based on clear statements of learning outcomes and expectations. Refer to the curriculum map to draft a student learning outcomes assessment timeline. Specify a 6-year plan for assessment (3 two-year periods) in which you will assess all of your program’s Goals with at least one student learning outcome representing each Goal.

Academic Years	Outcome(s)	Course(s) and Other Program Requirements	Assessment Evidence (direct/indirect)	Assessment Method
	WHICH outcome(s) will you examine in each period (by number, i.e. 1.1 etc.)?	WHERE will you look for evidence of student learning (i.e., what course(s)/program requirements)? Designate for each outcome.	WHAT student work or other evidence will you examine in order to generate conclusions and recommendations? Designate for each requirement.	HOW will you look at the evidence; what means will you use to quantify the evidence? Designate for each source of evidence.
Assessment Reporting Period 1	Outcomes 2.1, 2.2, 2.3	2.1 – Thesis proposal, Research (CHM 599 and 699) 2.2 – Research, comprehensive exam, dissertation or thesis defense 2.3 – Research, comprehensive exam, dissertation or thesis defense	Final version of thesis proposal submitted to the Graduate School, publications and presentations co-authored by graduate students, research awards received by graduate students. Annual evaluations by major professors.	The thesis proposal will be reviewed according to a rubric emphasizing learning outcomes 2.1-2.3. The number of student-authored publications, scholarly presentations and awards will also be compiled. A rubric for the annual review of each graduate student will be created. The student’s major professor will complete the form after an annual review meeting that addresses each student’s progress toward learning outcomes 2.1-2.3. All of these items will be compiled into a digital portfolio for each graduate student in the CHM program. Aggregate data will be compiled and categorized as exceeds

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				expectations, meets expectations or needs improvement.
Assessment Reporting Period 2	Outcome 3.1, 3.2, 3.3	3.1 – CHM 500, Research 3.2 – CHM 500, CHM 509, Research 3.3 – Research (CHM 599 and 699), Teaching assistantship	Responsible Conduct of Research (RCR) certification, written standard operating procedures (SOPs), written reports of unethical or unsafe practices	Digital student portfolios will be compiled containing RCR certifications for each student, the SOPs that they will write for their most common laboratory practices and any documented incidents of unethical or unsafe procedures that were reported by the chemistry faculty. Information about student's progress towards learning outcomes 3.1-3.3 will be included on the annual review rubric that will be completed by major professors for each graduate student in the CHM program. Teaching assistants will complete self-evaluations at the beginning and end of their first year of their teaching assistantship. Aggregate data will be compiled and categorized as exceeds expectations, meets expectations or needs improvement.
Assessment Reporting Period 3	Outcome 1.1, 1.2, 1.3, 1.4	1.1 – CHM 505, CHM 506, CHM 507, qualifying exams 1.2 – CHM 642, CHM 644, qualifying	Capstone projects in chemistry core courses (500-level), seminar courses (600-level), ability to pass	Capstone projects in CHM 505, 506 and 507 will be created that emphasize knowledge (outcome

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		<p>exams</p> <p>1.3 – CHM 643, Thesis proposal, comprehensive exam, dissertation or thesis defense</p> <p>1.4 – CHM 642, CHM 644, comprehensive exam, dissertation or thesis defense</p>	<p>the qualifying exams and both the written and oral portions of the comprehensive exam and the dissertation/thesis defense.</p>	<p>1.1) and use of the scientific literature (1.2). At least one of the capstone projects will have an oral presentation component (1.4), and at least one will have a significant written component (1.3). Rubrics will be created to evaluate student performance in seminar courses (CHM 642-644). Success rate for qualifying exams that are literature-based (1.2). Additionally, copies of publications and a listing of presentation abstracts and awards will be compiled in student digital portfolios. Aggregate data will be compiled and categorized as exceeds expectations, meets expectations or needs improvement.</p>
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ⁱ If you have questions or need assistance, please contact: Office of Student Learning, Outcome Assessment, and Accreditation 874-9517; 874-9379

ⁱⁱ Accredited programs can provide supplemental documents that indicate the answers to these questions as long as specific page references are provided in each cell of the tables in this form. When the answers are not accessible in that way, cutting and pasting will be required.