

Annual Assessment Report

M.S. in Chemistry AY 20-21

Program Information:

Name of Program: M.S. in Chemistry

Degree Type: Graduate

Coordinating Faculty: Herman Nikolayevskiy (hnikolayevskiy@usfca.edu), Chemistry Graduate Program Director

Mission Statement: (No changes)

To deliver a broad-based, challenging research experience that will train students to participate effectively as PhD researchers, health professionals, government and industry professionals, or as teachers. The program will foster a culture that: values strong researcher-faculty-staff interactions and strives to help researchers become self-learners and to discover the excitement and creativity of chemical research. We strive to instill values of social responsibility with ethical behavior as part of a chemical research community culminating in the writing of a research thesis.

Program Learning Outcomes:

1. Students demonstrate a broad knowledge in areas of chemistry relevant to their research interests.
2. Students will become safe and proficient in laboratory practice and instrumental techniques necessary for their research area.
3. Students will be able to communicate the subject of chemistry, especially their own research project, in written and oral forms including: correspondence, reports and short presentations that may utilize multimedia tools that support effective communication
4. Students will become critical thinkers who are able to judge scientific arguments and make their own arguments based on experiments conducted during their research project
5. Students who graduate with an MS degree in chemistry from USF will be well prepared to pursue further graduate studies or employment in chemistry or related scientific fields.

Program Learning Goals:

1. Students will demonstrate competency in two subdisciplines of chemistry relevant to their research goals.
2. Students will acquire and analyze data demonstrating safe, proficient laboratory practice / instrumental techniques, and analyze that data as necessary for their research area
3. Students will be able to communicate their own research project, in written and oral forms.

4. Students will guide undergraduates in laboratory work.

Curricular Map: (No Changes)

MS CHEMISTRY	PLG1	PLG2	PLG3	PLG4
Program Learning Goals X Courses	Students will demonstrate competency in two subdisciplines of chemistry relevant to their research goals.	Students will acquire and analyze data demonstrating safe, proficient laboratory practice / instrumental techniques, and analyze that data as necessary for their research area.	Students will be able to communicate their own research project, in written and oral forms.	Students will guide undergraduates in laboratory work
Courses of Program Requirement				
Entrance Examinations	I, D, M			
Opt 1: Diagnostic Test	x			
Opt 2: Independent Study	x			
Opt 3: Undergraduate Coursework	x			
CHEM 698 Graduate Research Methods		I, D, M	I, D	I, D, M
CLO1		x		
CLO2			x	
CHEM 699: Thesis Writing			M	
CLO1			x	
CLO2			x	
Teaching Assistantship				I, D, M

Key:
I = Introductory
D = Developing
M = Mastery

Assessment Schedule:

- F21 – PLO1 (*current*)
- F22 – PLO2
- F23 – PLO3
- F24 – PLO4
- F25 – PLO5

Program Assessment:

Assessment Methodology:

To assess PLO1, the chemistry department requires all incoming graduate students to take two American Chemical Society (ACS) Subject Exams in areas related to the student's research interests. The particular two Subject Exams to be taken are decided by the incoming student's research advisor. The ACS Subject Exams are produced by the Division of Chemical Education and are written and carefully controlled by the Institute to accurately measure student knowledge in a variety of content areas across the discipline of chemistry.

We consider a score in the 60th percentile or higher to meet our benchmark for competency. This competency benchmark must be met before the student's second year of enrollment. If the student fails to demonstrate competency in one or both subject areas during orientation, they may either retake the failed exam once or enroll in a graduate version of the relevant undergraduate course. For this latter option, graduate students enroll in CHEM 6xx, a directed

study version of the undergraduate course, with additional graduate requirements beyond those stipulated in the undergraduate syllabus. We consider a grade of B or better in such a course to meet our competency benchmark.

Results:

The American Chemical Society (ACS) standardized subject exams were administered at orientation for new students to assess preparation in two subject areas. A benchmark of 60th percentile or above (based on national averages for undergraduates) was used to assess competency.

	60% or higher (1st ACS Subject Exam)	60% or higher (2nd ACS Subject Exam)	B or higher (Directed Study)
AY 20-21 (n = 5)	60%	0%	100%

These results generally meet our benchmark, but are a bit below incoming students from previous years. Although research active faculty encourage our incoming MS students to study for the exams by providing them with practice problems and/or website links to subject matter practice, most incoming MS students do not “pass” one or more of these exams depending upon their undergraduate training (domestic and international students). For AY 20-21, 3 of 5 incoming students demonstrated competency on one of their Subject Exams, while 0 out of 5 students demonstrated competency on both, requiring all 5 incoming students to undergo remediation. Remediation usually involves taking a graduate version of a USF course in the relevant subject area. 100% of students who needed remediation achieved competency after taking the relevant USF course (measured as a B or higher). These results support our efforts to ensure that PLO1, which requires that *students demonstrate a broad knowledge in areas of chemistry relevant to their research interests*, has been met.

Student-specific results are shared with research active faculty by email, ensuring that research advisors have input over student remediation. Holistic results are shared with the department at department meetings, and through shared APR documents.

Feedback to the Previous Year’s Report:

As far as I am aware, no significant feedback was received regarding last year’s report.