

Annual Assessment of Program Learning Outcomes

MS CHEMISTRY FALL 2016-SPRING 2017

Section I: Academic Details

1. Assessment Year (Choose one)

- a. AY 2016-2017

2. College/School (Choose one)

- a. College of Arts & Sciences

3. Degree Program Name and Modality of Delivery (e.g., online, on-ground, hybrid)

On-ground

Section II: Program Learning Outcomes Assessment

4. Program Learning Outcome Assessed (Write only one PLO)

PLO1: *Students will demonstrate competency in two subdisciplines of chemistry relevant to their research goals.*

5. Indicate how the PLO mentioned in Question #4 aligns with one or more of the Institutional Learning Outcomes (ILOs) (Check all that apply)

- a. ILO2 (Students explain and apply disciplinary concepts, practices, and ethics...)

6. Indicate which of the following Direct Measures of Assessment were used to assess the PLO mentioned in Question 4 – (Check all that apply)

Please note that a PLO can be assessed using both direct and indirect measures

- a. Published (Standardized) Test (e.g., Major Field Test)

The American Chemical Society (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. An exam may be retaken once; the benchmark must be met before the start of the second year of enrollment, but may be substituted with undergraduate coursework (see below).

Undergraduate Coursework (PLO #1): In lieu of independent study towards re-assessment of competency as evaluated by an ACS Subject Exam, students may also be offered the opportunity to enroll in Chem 6xx directed study based upon additional requirements when taking an undergraduate level course in the subject area. We consider a grade of B or better in such a course to meet our competency benchmark. This benchmark must be met before the start of the second year of enrollment.

7. Indicate which of the following Indirect Measures of Assessment were used to assess the PLO mentioned in Question 4 – (Check all that apply)

NONE

Section III: Results

8. Mention KEY Results of the Assessment Process

The American Chemical Society (ACS) standardized subject exam was administered at orientation for new students to assess preparation in two subject areas. Benchmark was 60th% percentile or above based on national averages for undergraduates.

	60th% or higher ACS subject exam	<60th % Take a course or directed study (grade B or higher)
AY 16-17 (n=6; 12 exams)	85.0%	100% Pass

These results generally meet our benchmark and are a bit above other incoming students from previous years. Most incoming MS students do not 'pass' one or more of these exams depending upon their undergraduate training (domestic and international students). Remediation usually involves taking a USF course in the subject area or completing directed study with their research director (100% of students not passing completed this requirement within the first year of their studies).

Section IV: Continuous Improvement

9. Indicate Actions the Program Faculty Have Taken in Response to Results

(Check all that apply)

- a. **Other:** Instead of giving credit for undergraduate Courses, a graduate student taking an undergraduate course will be given credit for CHEM 6xx (directed study, with additional requirements versus undergraduates in the course). Benchmark will be grade of B or higher

We are generally happy with this assessment and encourage our incoming MS students to study for the exams by providing them with practice problems or website links to subject matter practice. Directed study courses/ assignments are handled by collaboration between the instructor and the research director for the student.

MS CHEMISTRY	PLO1	PLO2	PLO3	PLO4
Program Learning Outcomes 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 or Program Requirement				
Entrance Requirements	I,D,M			
Opt 1: Diagnostic Test	x			
Opt 2: Directed 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			

USF MS Chemistry Map PLO—> Institutional Learning Outcomes

Institutional Learning Outcomes →	ILO #1	ILO #2	ILO #3	ILO #4	ILO #5	ILO #6	ILO #7
USF MS Chemistry PLO (Program Learning Outcomes)	Students reflect on and analyze their attitudes, beliefs, values, and assumptions about diverse communities and cultures and contribute to the common good. (Critical Thinking)	Students explain and apply disciplinary concepts, practices, and ethics of their chosen academic discipline in diverse communities. (Critical Thinking)	Students construct, interpret, analyze, and evaluate information and ideas derived from a multitude of sources. (Critical Thinking; Quantitative Reasoning; Information Literacy)	Students communicate effectively in written and oral forms to interact within their personal and professional communities. (Written and Oral Communication)	Students use technology to access and communicate information in their personal and professional lives. (Component of Information Literacy)	Students use multiple methods of inquiry and research processes to answer questions and solve problems. (Critical Thinking; Quantitative Reasoning; Information Literacy)	Students describe, analyze, and evaluate global interconnectedness in social, economic, environmental and political systems that shape diverse groups within the San Francisco Bay Area and the world. (Critical Thinking)
PLO1: Students will demonstrate competency in two subdisciplines of chemistry relevant to their research goals.		X	X				
PLO 2: Students will acquire and analyze data demonstrating safe, proficient laboratory practice / instrumental techniques, and analyze that data as necessary for their research area.		X	X		X	X	
PLO 3: Students will be able to communicate their own research project, in written and oral forms.		X	X	X	X	X	
PLO 4: Students will guide undergraduates in laboratory work.	X	X		X	X	X	

BS Chem Curriculum Map: PLO—> Courses: Years 1-3 (Fall 2016-S2019)

Chemistry Program Learning Outcomes Introduced U= Utilized A=Assessed	I =																
	113	114L	230	232L	231	234L	260	340/341	3XX	332	350/351	352L	410	420	397	Electives	
	General II	General Lab II	Organic I	Organic Lab I	Organic II	Organic Lab II	Analytical + Lab	Physical	Advanced Lab	Medicinal	Biochemistry I/II	Biochemistry Lab	Integrated Lab	Inorganic	Research		
LO #1: Student will demonstrate his/her mastery of the four principle disciplines: analytical, organic, physical, and inorganic chemistry	I		I		A		A	A			A		U	A	U		
year of assessment					1-3		1-3	1-3			1-3			1-3			
LO#2: Students will recognize and understand the concepts and skills learned in prerequisite courses at or before the start of the new course or laboratory	I		A		U		A	A	U	U	A	U	U	A		U	
year			1				1	2			2			3			
LO#3: Students or student teams will demonstrate excellent problem solving skills in performing a broad variety of analytical, computational and synthetic procedures using proper safety protocols, and will critically evaluate the results		I		I	U	U	A		A			A	A	A	U		
year		1-3					1-3		2			2	3	3			
LO#4: Students will demonstrate effective scientific communications skills in both written and oral form. Students will be able to write reports and present results while following professional policies regarding intellectual property, plagiarism, and group work		I					A	A	U	U	A	U	U	A	A		
year (written)		1					2	2						3	1-3		
year (oral)									2-3		2-3				3		
LO#5: Students will be encouraged and recognized when they go beyond the minimum requirements in the major via semester or summer-long activities that apply the knowledge gained in the discipline, such as research at USF, NSF-REU programs, science internships, discipline-related volunteer or paid science positions, ongoing outreach/teaching in science or PLTL leadership experience.							I	I		I		I	U		A	U	
year															1-3	1-3	