

# PROGRAM ASSESSMENT REPORT AY 2008-2009

**Report Date:** 6/1/2009

School/College: Arts and Sciences

**Department/Program:** Chemistry/MS degree

**Person completing the Report:** Larry Margerum

- 1. **Overview Statement**: Briefly summarize the assessment activities that were undertaken this academic year, indicating:
  - a. Which program learning outcomes were assessed this year?
    - i. 1a. Students will demonstrate knowledge on American Chemical Society (ACS) subject exams and/or selected final exam questions.
    - ii. 1b. Students will organize and summarize relevant resources in the chemical literature pertaining to their research area via progress reports and/or a research thesis
    - iii. 3a. Students will exhibit and employ good communication and teaching practice as assistants in undergraduate laboratories
    - iv. 3b. Students will exhibit the ability to prepare professional reports and/or multi-media presentations in formal (seminars, courses, professional meetings) and informal (group meetings) settings.
    - v. 3c. Students will exhibit the skills and competencies necessary for professional and effective oral presentations.
  - b. Whom in your department/program was involved in the assessment of the above learning outcomes

**Professors Margerum, Curtis and Meloni** 

## 2. Please Answers the Following Questions for Each of the Student Outcomes Assessed:

# a. What did you do?

Describe clearly and concisely how you assessed the learning outcomes that were evaluated this year (e.g., measures, research methods, etc.). [Please use bullet points to answer this question]

- 1a: Compare results of ACS exams to national norms (60th percentile benchmark). Use common final exam question in Inorganic Chem 420 and grade by rubric for content knowledge/analysis
- **1b:** Embedded in a research seminar by MS students and graded by all faculty present using rubric (1<sup>st</sup> year assessment does not include any theses)
- **3a:** Survey of general chemistry students (TA evaluation)

# UNIVERSITY of SAN FRANCISCO

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• **3b and 3c**: Public seminar for MS students as part of Chem 698 (Research Methods/Practice). Assessment by rubric from all faculty members present.

## b. What did the faculty in the department or program learn?

Summarize your findings and conclusions as a result of the assessment indicating strengths and weaknesses in student learning demonstrated by this assessment.

The first year of assessment was completed with the first year cohort of MS students (sample size: two students). We are a small program with extensive screening and review of applicants (on paper and by phone) before we accept 2-5 new students each year. We pride ourselves on having an individualized, research based graduate program. Therefore, most student weaknesses are addressed on a case-by-case basis.

**1a: Demonstrate Knowledge:** Students come to the MS program from very diverse backgrounds that may not match the content on ACS exams (for example, almost none of our Pacific Rim students pass the Inorganic ACS exam as these students do not normally take a senior-level course in this area, while US students do). Our goal is to learn if these deficiencies can be corrected by the end of the first year of the MS program after taking coursework or others plans of study. We are looking for improvement before (ACS exam) versus after (70% or more on final exam questions or above 60<sup>th</sup> percentile upon retaking the ACS exam)

(Before) ACS exams:	# of student's		
Very Good preparation	0/2		
Average preparation	0/2		
Poor preparation	2/2		

## (After) Final exam question in coursework or retake of ACS exam

Very Good preparation	1/2
Average preparation	0/2
Poor preparation	1/2

## **Findings/Conclusion**

We have data for the last 15 years on our 1<sup>st</sup> year MS student on ACS standardized exams as a means of detecting gaps in student knowledge. The results above are typical and highly depend upon student preparation. Individual students are directed to coursework and generally overcome poor preparation. One of these students took coursework and obtained Very Good on a final exam essay question (the equivalent of a B+ essay-the benchmark is above C+. please see attached rubric). The other student retook the ACS exam after independent review (not in the field of research) and still did not obtain the 60<sup>th</sup> percentile benchmark. Students who do not take a course and do not pass the second attempt at the ACS exam are guided on an individual basis as to a course of study in order to pass a second ACS subject exam as long as good research progress is being made.



1b: Summarize relevant resources in the chemical literature First year MS students do not normally complete enough research to produce full research reports with complete citations of the chemical literature. We choose to evaluate this outcome via a research (oral) seminar by MS candidates in Chem 698.

17 Rubrics on 6 students (mostly 2<sup>nd</sup> year MS students)

Average score: on <u>Literature Review/Citations</u>: 2.5 out of 4 (60%):

[Rubric 2/5: "journals cited, but few articles" or 3/5 "appropriate journals but shallow"]

Findings/conclusions This was one of the lowest scores on the seminar rubric and tells us that we must make clear instructions on what this means for presentations versus written reports.

#### 3a Good communication/teaching practice

We conduct an extensive student evaluation of the TA in General Chemistry (27 questions) on the Lickert scale: (5=Outstanding, 3=Adequate, 1=Needs Improvement)

Category Averages	Fall 2008	Fall 2008	Spring 2009	Spring 2009
First Year TA's	TA 1 (n=12)	TA 2 (n=16)	TA 1 (n=17)	TA 2 (n=16)
Personal and Professional	4.53	4.39	4.75	4.65
(4 questions x 5=20)				
Teaching Skills	4.43	3.65	4.57	4.23
(10 questions $x 5 = 50$ )				
Planning and Preparing	4.42	3.56	4.64	4.13
(7 questions x 5=35)				
Classroom Management	4.67	4.35	4.80	4.60
(5 questions x 5=25)				
Overall (TA was effective	4.45	3.56	4.82	4.26
teacher)				

**Findings/conclusions:** Both students showed improvements in all areas from fall to spring. These scores are at or above the average for all TAs in this course. The improvements are due to experience gained in English (1 of 2 students), weekly TA meetings in which teaching skills are reviewed and more mature 2<sup>nd</sup> semester students (undergraduates in the course). Normally, our biggest challenges are TAs with limited ESL experience or with strong accents. We encourage these students to seek outside help and to speak English with their fellow MS students.

# 3b Prepare professional reports/presentations and 3c skills and competencies for effective oral presentations Results of Spring 2009 Chem 698 Seminars

Graduate Student Seminars 17 Rubrics Received (Benchmark 3 out of 4 or 75%)

Demonstrates understanding of topic 87% Delivery of research topic 88%

 Content 85%

Literature review

60% Demonstrates sound chemical background

 Presentation (appropriate to the subject) 97%

93%



Speaking skills 92%Sources (citations) 75%Overall Average 85%

**Findings/conclusions:** Except for the Literature Review/Source items discussed above, we were very pleased to find these high marks. Most of the seminars were from 2<sup>nd</sup> year students with research experience. Our main conclusion is that students rise to the occasion when given this task. They are given clear instruction and guidelines from the Chem 698 professor and seek input from their research director in planning what and how to say things. These excellent performances serve as a model for 1<sup>st</sup> year students.

#### c. What will be done differently as a result of what was learned?

Discuss how courses and/or curricula will be changed to improve student learning as a result of the assessment. Include a discussion of how the faculty will help students overcome their weaknesses and improve their strengths.

#### 1a: Demonstrate Knowledge:

Again, the plan to address student weakness based on poor ACS exams or coursework has been in place for over 15 years. It is somewhat rare for students to not pass the exam a second time (but does happen when we cannot offer at formal course for them to take). The student must meet with their research director and the MS Program Director to discuss options. They are: 1) Complete a set of written homework problems from a textbook in the field of interest prior to re-taking the ACS exam at the end of the summer or 2) complete a summer undergraduate or graduate level course in the field with a B grade or above or 3) drop out of the MS program. Most students choose option #1 and pass the exam.

**1b:** Summarize relevant resources in the chemical literature: In the future, this outcome will also be assessed as part of the written MS thesis for each student. Also, starting in year 2 of the assessment we will require a short written summary/progress report in Chem 698 (all MS students take this course) on their current research project. Handouts or guidelines for literature review will be made clear and the grading rubric will be handed out to students before the assignment.

**3a Good communication/teaching practice** We plan to continue a 1 day workshop for new TAs (teaching strategies and cultural issues with the USF Biology Department) every fall in addition to course specific TA meetings before classes start. Professors in charge of the TAs will continue with in-depth weekly meetings where TAs practice experiments, assess last week's experiment and gain knowledge on the upcoming experiment. Finally, we will continue our practice of having new TAs attend the beginning of lab in a section run by an experienced TA before they teach the same experiment (mentoring or pairing new with experienced TA is very successful)

3b Prepare professional reports/presentations and 3c skills and competencies for effective oral presentations. We will continue to have students in Chem 698 present research seminars in their 2<sup>nd</sup> year. We may consider recording practice sessions for additional feedback



plus we may post summary slides on our MS department webpage to emphasize the importance of the professional presentation. We already provide extensive feedback on the presentation outline (slides) via research directors and Chem 698 professor. In future assessment years, the MS thesis will also be assessed under this outcome.

- 3. Attach a copy of the components of the department/program assessment plan that have been modified since its initial submission:
  - a. Program Mission-no changes
  - b. Program Learning Goals no changes
  - c. Program Learning Outcomes-no changes
  - d. Program Learning Rubrics aligned with outcomes
    - i. Chemistry Department Seminar Rubric
    - ii. Grading Rubric for Exam Essays
  - e. Curriculum map that shows the courses that pertain to the outcome-no changes

Please return to: Provost Office by June 1, 2009

You can send your replies as either a Word attachment (to: <a href="marin@usfca.edu">marin@usfca.edu</a>) or as a hard copy to: Provost Office, Lone Mountain Rossi Wing 4<sup>th</sup> floor.

If you have any questions, please contact: William Murry, Director of Institutional Assessment (wmurry@usfca.edu or x5486).