

**Minutes and Evaluation Report for
Audit & Review Face-to-Face Meeting
University of Wisconsin-Whitewater
Chemistry Majors and Minors, 2016-2017**

Date: February 10, 2017

Time: 2:00-3:00 pm

Place: Upham 222

Attended: Provost Susan Elrod; AVC Greg Cook; Dean David Travis; Department Chair Baocheng Han; Steve Anderson; Jessica Bonjour; Catherine Chan; John Ejnik; Marsha Goodell; John Grutsch; Paul House; Hephzibah Kumpaty; Kim Naber; Steven Girard; Hassimi Traore; Chris Veldkamp; Audit & Review Team Chair Dale Splinter; Audit & Review team members James Collins, Joan Cook, Kerry Katovich

- 1) Call to order at 2:02 pm
- 2) Introductions
- 3) Overview of review team evaluation, program comments
 - Committee Chair asked if department had an opening statement and Dr. Han noted that the evaluation had been discussed by members of chemistry department
 - A review of the Recommended Results and Recommended Actions of the report took place. The Committee Chair noted that the majority of self-study reviewers voted for “continuation with minor concern.” One individual voted for “continuation with major concern” and this vote was cast solely because of a resource concerns that is not the faulty of the department.
- 4) Discussion of Review Team’s evaluation:
 - Assessment
 - (a) Review team noted that multiple assessment metrics are being utilized and that SLOs for each emphasis have been created, but these SLOs still need to be assessed.
 - (b) Discussion about how to best use results from the ACS, MFT, and GRE tests ensued. Committee would like to see test questions from the ACS and MFT embedded into assessment design in the future. Document how scores on the ACS and MFT are used in future curricular changes. For this to be done questions from the ACS and MFT must be mapped to SLOs. Members of chemistry department noted that this occurs, but it has not been documented.
 - Resources
 - (a) Much of the conversation in this meeting revolved around resources.
 - (i) Dr. Baocheng noted that most courses are at maximum enrollment and growing.
 - (ii) Dean Travis acknowledged the growing enrollment and associated issues.
 - (iii) Provost Elrod noted that other campuses are building large interactive problem-solving classrooms and stated she would be willing to support looking into this type of classroom model at UW-W. She followed up by stating she would be willing to pay for a trip to go visit one of the institutions that uses this teaching model.
 - (iv) A discussion ensued about how to use Supplemental Instructors in these large classes.
 - (v) Concern was raised that the large classes may result in decreased student learning and performance. Lower results from the ACS test were used to support this possibility.
 - Tracking graduates
 - (a) Social media is being used to track graduates.
 - (i) Facebook and LinkedIn are the two main outlets used for tracking students.

- 5) **Recommended Actions:** The evaluation report lists 2 recommended action (see page 5) related to assessment and the resource concerns.

- 6) **Recommended Result:** *Continuation with Minor Concerns.*
 - Please make use of the detailed comments in the evaluation report (below).
 - **The program's next full self-study is due by October 1, 2021 to the Dean of the College of Letters & Sciences and by November 1, 2021 to the Audit & Review Committee.**

- 7) Adjourn at 3:00 pm.

**University of Wisconsin-Whitewater
Committee Form: Review of Audit & Review Self-Studies
Chemistry, 2016-2017
Majors/Minors and Standalone Minors**

Date of Evaluation 11/15/16 Short Self Study (SS*) X

Program Chemistry Major X Minor X

Evaluations submitted by: Dale Splinter, James Collins, Joan Littlefield Cook

Review meeting attended by: Dale Splinter, James Collins, Joan Littlefield Cook, Nick Guo, and Kerry Katovich

If the program included introductory remarks, please add any comments you have on this introductory information. (Note: Programs are not required to include introductory remarks.)

Our department offers six undergraduate degree programs (or tracks/emphases), including the Liberal Arts, the Professional ACS (American Chemical Society), the Honors Emphasis, the Chemistry BSE, the Biochemistry and the Analytical/Instrumental tracks. In light of the Committee's recommendation, we have developed the learning outcomes for each of the tracks. We have also aligned our courses with the learning outcomes for each track, which are given in the Appendix I. During the review period, we have implemented several assessment projects including the ACS standard exam, the Major Field Test (MFT), GRE, the ACS five-year report for our accreditation (ACS assessment), the analysis of student lab reports, CHEMX survey, internship program, and senior exit interview. We have analyzed these results, except the senior exit survey which is analyzed every other five-year cycle, and we have used these assessment tools to determine the strengths and weaknesses of our students and to improve our curriculum. The alignments between these assessments and the student learning outcomes for each track are given in Appendix II.

Comments related to introductory remarks: None

Recommendation #1

Revise the assessment activity in the department to focus more on direct and indirect assessments of the degree to which students are achieving the department's student learning outcomes. Collect data for at least a few learning outcomes each year, and develop a plan for assessing all outcomes over time. Use these assessment data to inform improvements in teaching and learning. Share results with stakeholders.

Recommendation #1 Overall Evaluation

Answer	Count
Good Progress	1
Making Progress	1
Little/No Progress	1

Comments related to recommendation #1.

The CHEMX survey project was interesting, and the data are being used to make changes within individual courses--good!

The lab reports assessment is a good direct assessment, and the program is using the results to modify instruction--good!

One concern about the lab reports assessment is that it doesn't clearly state which SLOs are being assessed and, if more than one is being assessed, how that is reflected in the rubric. This project is a very good start, just needs some elaboration (in the scoring and 'pulling apart' of data on different SLOs).

The internship assessments are good surveys, but need to recognize that this is a very small sample (and probably very select group of students). There's nothing wrong with this, but be careful about generalizing from this at this point.

It's commendable that the program uses the ACS Standard exam as the final exam within courses. How do the exam items align with/address the program's SLOs? Do these exams test just the content of the particular course?

Very good example of following up on the effect of making a data-based change (scores have improved since implementing online homework in Spring 2014).

In general, students seem to do well on the ACS standard exam(s). What are the means based on (e.g., just Chemistry majors, or all students in the course)?

MFT and GRE: How does the number of students taking these tests compare with the number of students graduating? I'm trying to understand how representative this sample of students is.

MFT results: Given the problems mentioned, is it still worthwhile doing this test? As with the ACS exam, how are the MFT items aligned with specific SLOs?

GRE: As with the ACS and MFT tests, how do the items on the GRE align with the program SLOs?

I think it's great that the program uses external exams but it would be useful to look closely at what can be pulled from these to address specific program SLOs.

I selected "Little/No Progress" because it does not appear that the Chemistry Learning Goals were directly measured outside of the ACS Standard Exam, Major Field Test, GRE, and ACS Assessment. A lot of good information can be gained from the aforementioned tests, but it does not appear that the testable information of the four tests were directly linked to the Chemistry learning outcomes.

I am interested in knowing what learning outcomes are tested in the three tests (not sure the GRE is a good measure) and how did students from different tracks score on the exams. For example, do the three tests assess cognitive development? What aspects of cognitive development are assessed? There needs to be additional assessment in the chemistry department that focus on said learning goals.

Progress appears to have been made in this area.

Use of the ACS exam as a final for classes will allow a standardized method of evaluating students in each section, as well as the effectiveness of the respective instructors for those classes.

MFT scores for UWW students indicate consistent under-performance in all domains measured relative to other universities, which is a concern. The doubling of students scoring \leq 20th percentile on the MFT during the 2015-16 school year strikes me as a warning signal that could have broader implications in the upcoming years. The department offers an explanation for this (particularly that MTF scores are not consequential because they're not linked to graduation requirements). Do the comparison schools link scores to graduation? It would be useful to know how other programs use these scores and if higher-performing colleges tend to use them as a gatekeeper for graduation.

The timing of when this assessment is given to students also seems to be problematic because it constricts the validity of findings. In other words, because this assessment is given to students during their last week of classes (during times that they're extremely busy), low scores aren't necessarily representative of what students know. This should be something to consider in the future.

Use of the GRE also seems logical, but I suspect that the Chemistry Subject portion would be most useful for making strategic programmatic changes; data from only two students are available at this time.

Recommendation #2

Define at least a few learning outcomes unique to each emphasis, to differentiate the learning expected for each emphasis. Include these outcomes in the overall assessment plan.

Recommendation #2 Overall Evaluation (please select your choice).

Answer	Count
Good Progress	2
Making Progress	1
Little/No Progress	0

Comments related to recommendation #2

The program has defined SLOs for each emphasis.

Is there a reason why the program has maintained the three categories of SLOs (e.g., does their accrediting body require these categories)?

Consider revisiting and possibly revising some of the SLOs. For example, C.i contains 3 SLOs in one (could it be stated more generally?); C.ii. seems to have 2 pretty distinct SLOs.

Also, consider whether some of the SLOs could be stated more clearly (e.g., what does it mean to "demonstrate a command" of a body of knowledge? What are "frontier developments"?)

Are all SLOs being assessed? The curriculum map shows where each is addressed, but doesn't specify where they are assessed. Consider elaborating this map to differentiate where each SLO is introduced, developed, and assessed; and work towards adding what specific embedded assignments assess each SLO (if the program is/plans to use an embedded assessment approach in addition to the ACS Standard Exam and MFT).

Lot of overlap in the SLOs of the different emphases, but this is okay. Shouldn't be drastically different.

How do the Liberal Arts and the ACS emphases differ? I didn't see any differences in the SLOs for these two.

The learning outcomes have been created, but I do not see where or how they were assessed. The assessment data in this short self-study comes from the ACS test, MFT test, GRE, and the ACS program review. Direct assessment of learning goals do not appear to be reported here.

These are mapped and clearly articulated in appendices I and II.

There is quite a bit of overlap across areas of emphasis, but I suspect that this would be difficult to avoid.

Recommendation #3

Work with the Dean and others to develop a plan for accommodating the increasing number of majors and other students in Chemistry courses. How can the pressures on classrooms, labs, equipment, personnel and other resources be addressed?

Recommendation #3 Overall Evaluation (please select your choice).

Answer	Count
Good Progress	1
Making Progress	1
Little/No Progress	1

Comments related to recommendation #3

I don't see any discussion of how this is being addressed. Space problems are mentioned (pg. 10) but not dealing with increasing number of majors. Although the rate of increase has slowed down, the number still increased significantly since the previous review (almost 30%).

The Dean of L&S knows about the space problems plaguing the science departments in Upham Hall.

Members of the Chemistry Department have explained their need for an instrument technician and I am hopeful that there will be conversation between the Chair of Chemistry, the Dean of L&S, and the Provost for a new hire.

With the increase in Chemistry and Biology majors and the popularity of the Environmental Science program, more students will be taking chemistry courses and thus additional resources are needed to support this major.

The department didn't specifically address the extent to which recommendation #3 has been met. However, it was noted that the Dean is aware of the problems and that various proposals have been made to alleviate space constraints (i.e., use of the former Sentry store, Roseman building, etc.), but details related to the progress were not available. The department noted a high degree of confidence that this issue would be resolved soon, which is why I rated this as "Making Progress" rather than the other options. I did note a concern though when viewing classroom sizes swelling from 48-64 in 2015, which was explained as a possible reason for decreases in student test scores. Taking this into consideration, I agree that a tangible plan needs to be made soon to ensure a suitable learning environment for students.

Also of concern is the department's acknowledgement of limited faculty resources, which has resulted in CHEM 352 being offered only once in the fall of 2017 with projected enrollment of up to 80 students. What is the plan for managing enrollment in light of the space issues? How many minors does the program have?

If the program included additional information/remarks at the end of the short self-study, please add any comments you have on this additional information. (Note: Programs are not required to include additional information/remarks.)

Additional comments:

The self-study was not required to address these questions, but I'm curious:

- What process is used to review and discuss data on student learning, and how are decisions made to take actions on the basis of these data?
- What role does the Advisory Board play in reviewing assessment data and making recommendations for data-based actions?

The program is ACS accredited--excellent!

The program faculty are very successful in winning grants (pg. 10).

The ACS Standard Exam and the Major Field Test cannot solely be used to assess student learning in chemistry.

Defined student learning outcomes (by track or core courses) need to be assessed. Assessment projects that could be developed include student writing, critical thinking skills, and laboratory analysis. If these are already embedded in courses, it should be easy to pull these together.

I find it hard to believe that there has only been seven internships by chemistry majors over the last five years.

Department must do a better job tracking internships. Valuable assessment data is being lost here.

Recommended Actions:

1. Continue to develop and implement assessment plan:
 - a. Align assessments with program SLOs. How do the tests given provide disaggregated information about each SLO? For example, assign test questions from assessment tests (ACS, MFT, and ACS) to learning outcomes and compare results by each emphasis area within the major.
 - b. Expand the curriculum map to determine where each SLO is introduced, developed, and assessed. Use this analysis to identify and fill in any gaps in instruction and assessment.
 - c. Explore other possible embedded assessments (like the lab report) to assess skills developed.
2. Continue to examine innovative ways to lessen the pressure on the limited resource base in your department and Upham Hall.

Recommended Result

Insufficient Information in the self-study to make a determination; revise self-study & resubmit.	
Continuation without qualification	
Continuation with minor concerns	X
Continuation with major concerns in one or more of the three areas; submit annual progress report to the College Dean & Associate Vice Chancellor for Academic Affairs on progress addressing the major concerns	
Withhold recommendation for continuation, place on probation, and require another complete Audit & Review self-study within 1-3 years, at the Committee's discretion.	
Withhold recommendation for continuation, place on probation, recommend placing in receivership within the college, and require another complete Audit & Review self-study within 1-3 years at the Committee's discretion.	
Non-continuation of the program.	

The program's next full self-study is due by October 1, 2021 to the Dean of the College of Letters & Sciences and by November 1, 2021 to the Audit & Review Committee.