

**Chemistry Program Review Memorandum of Understanding**  
**12-14-17**

Plan for Improvement: Recommendations from the Program Review that will be pursued:

1. Hire a replacement position in physical chemistry in light of Dr. Ken Martin's retirement, i.e. current search cycle (p. 93).
2. Design a strategic enrollment plan to increase the Department of Chemistry's applicant, conversion, and matriculation rates and decrease migration to other programs, i.e. revisit and/or strengthen General Chemistry and Organic Chemistry intensive lab experiences with FTE faculty (per ERR), and develop a summer bridge program and/or high school partnerships plus internships within local industries. (pp. 62, 93; also p. 5 of ERR)
3. Submit Academic Policy Committee (APC) proposals to refine Chemistry's slate of major requirements and electives to earn approval by the American Chemical Society (ACS).
4. Submit Academic Policy Committee (APC) proposals to refine Chemistry general education courses for wider non-major appeal while providing traditional undergraduates with the empirical knowledge and analytical skills necessary to fulfill GELO requirements (p. 24-26, 37, 93).
5. Design a multi-year schedule with budget projections for upgrades and/or replacements for lab technology and instrumentation funded either through grant-writing and institutional revenue (p. 36).
6. In consultation with the Dean and the Provost, consider performing a cost-benefit analysis and/or market study to ascertain the value of investing time and resources in earning American Chemical Society (ACS) approval for the B.S. in Chemistry (p. 94). To this end, ascertain whether ACS approval would support a goal of offering quality programming competitive with regional colleges, as well as recruit and retain a significant number of Chemistry majors. (Self-study provided a comparator analysis, pp. 25-26.) Resources for ACS approval:  
<https://www.acs.org/content/acs/en/about/governance/committees/training/acsapproved.html>
7. Consider designating a teaching track advisor and/or Single-Subject Matter Program coordinator to mentor prospective (future) Chemistry teachers.
8. Add a required course in Environmental Chemistry to the Environmental Science major.

Action Steps for Implementing Improvements:

1. Physical Chemistry Faculty Member Hired
  - a. Dr. Lane Votapka was hired and joined the chemistry department in Fall 2017.
2. Recruitment and Retention Efforts

- a. Track retention and migration of students into and out of our majors, during their first two years, starting with incoming freshmen in Fall 2018.
    - i. Conduct short surveys or informational interviews to identify students' reasons for switching into or out of our majors.
    - ii. Review statistics and results of surveys/informational interviews each year.
  - b. Continue developing high school summer research experience and/or partnerships.
    - i. Piloted high school summer research experience with West Hills High School chemistry teacher, Savannah Addy, and nine of her students in summer 2017.
    - ii. Build relationships with other local high school chemistry teachers.
3. APC Proposals Submitted and Approved (Major Courses)
- a. The following changes are being implemented this year to align our curriculum with the ACS guidelines.
    - i. Physical Chemistry II (CHE326) was changed from a 2-unit quad course to a 3-unit semester course.
    - ii. Physical Chemistry II Laboratory (CHE327) was changed from a 1-unit quad lab to a 1-unit semester lab.
    - iii. Advanced Inorganic Chemistry (CHE468) was changed from a 2-unit quad course to a 3-unit semester course.
    - iv. Advanced Inorganic Chemistry Laboratory (CHE467) was changed from a 1-unit quad lab to a 1-unit semester lab.
4. APC Proposals Submitted and Approved (GE Courses)
- a. The following changes are being implemented to refine the chemistry general education courses.
    - i. Physical Science (PSC110/110L) will no longer be offered.
    - ii. Physical Science for Teachers (PSC111) is being offered this fall as the first course in a two-course sequence that satisfies the very specific requirements of the CCTC for Physical Science.
    - iii. A new chemistry GE course, Chemistry in Our Everyday Lives (CHE102/102L), will be developed and offered in the 2018-2019 academic year.
5. Schedule for Instrumentation Upgrades and Replacements
- a. Create inventory of current instrumentation which includes manufacturer, model, serial number, purchase history, condition, maintenance history, maintenance options, costs, how often it is used, and expected lifetime.
  - b. Create a projected schedule and budget for instrument repair, replacement, and purchasing needs.
6. Cost-benefit Analysis and/or Market Study about ACS Approval
- a. Outline potential costs and benefits of obtaining ACS approval.
    - i. Discuss costs and benefits as department.
    - ii. Discuss costs and benefits with Kerry and Jim.
  - b. Submit any necessary curricular changes to APC.
  - c. Submit pre-application form to ACS.
  - d. Submit full application form to ACS.
7. Teacher Track BA/BS Chemistry

- a. Identify comparator/aspirant schools that offer a teaching track and create a list of course requirements.
  - b. Survey alumni and current students to determine potential demand.
  - c. Discuss course requirements (education courses and chemistry courses) with School of Education and Chemistry Department.
8. Environmental Chemistry Course
- a. Identify quality environmental chemistry courses offered at other institutions and determine if an environmental chemistry course is a better fit for the major than our current Instrumental Analysis (CHE370) course.
  - b. Determine how the course would be offered without significantly increasing our department's teaching load and who would develop and teach the course.
  - c. Prepare APC proposal (if applicable).

#### Assessment Measures:

2. Recruitment and Retention Efforts
- a. Track number of majors and graduates.
  - b. Review statistics and results of surveys/informational interviews each year.
  - c. Conduct exit surveys at end of high school summer research experience.
6. Cost-benefit Analysis and/or Market Study about ACS Approval
- a. If we apply and are given ACS approval, we have been successful.
  - b. Related assessments may also include:
    - i. Increased recruitment of incoming freshman declaring an intended chemistry major (attracted by our ACS approved degree)
    - ii. Increased acceptance rates to graduate schools (due to recognition of our degree, and of our students' achievements via ACS awards)
    - iii. Increased employment of graduates (due to recognition of our degree, and of our students' achievements via ACS awards)
7. Teacher Track BA/BS Chemistry
- a. If we develop a teaching track, we will monitor the number of students who choose this track.

#### Financial Implications of the Action Steps:

5. Schedule for Instrumentation Upgrades and Replacements
- a. Cost of repairing, replacing, and purchasing instruments.
6. Cost-benefit Analysis and/or Market Study about ACS Approval
- a. Faculty time to submit proposals, prepare application, meet with site visitors, etc.
  - b. Assigning full credit for lecture course instruction, in order to bring our total contact hours down to numbers that the ACS considers consistent with quality chemistry instruction. (We will also explore creative ways to offset this cost to the university.)

7. Teacher Track BA/BS Chemistry
  - a. May increase size of some chemistry classes.
  - b. Advising and support of this cohort may require some load release.
8. Environmental Chemistry Course
  - a. May increase department's teaching load units.

Areas of Accountability:

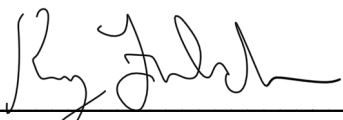
1. The Chemistry department will work with the Dean and Provost to investigate, identify and implement a strategy to make the programs within the department more sustainable and scalable. The existing model was created in a very different context than what current exists. The current model consists of largely no lab credit for students, nearly every course having a lab associated with it, a relatively broad curricular offering and faculty loading parameters that underload them for lectures and give unfunded load for labs (no lab credit for students). The target for this strategy is to gain a 40% efficiency in the baseline\* unfunded load numbers if possible. Recognizing certain steps have already been taken, progress already obtained counts towards the efficiency target. A strategy should be identified during AY17-18 so that any curricular adjustments can be proposed in AY 18-19 for a targeted implementation in AY 19-20.
2. The department, in collaboration with the Dean and Provost will look at strategies to help bring greater work/life balance to the faculty and students in the department. Some of the issues related to item #1 are related to this issue, but there may be other potential ways to address this outside of that particular context as well. This process should occur concurrent with #1.

\* Baseline will be based on 16-17 numbers recalibrated to account for correct loading policies and any changes for unfunded load already implemented.

Agreement:

The Provost and the Chemistry Department mutually agree to pursue these recommendations for the Chemistry Department. The Provost will provide material and administrative support for the actions taken as the result of the recommendations provided that the Chemistry Department makes satisfactory annual progress on the initiatives. The Chemistry Department will carry out these actions and submit an annual report of progress.

Signed:



Kerry Fulcher, Ph.D., Provost



Matthieu Roufett, Ph.D., Chair, Chemistry