College: Fairmount College of Liberal Arts and Sciences

Department/Program (s): Chemistry

Degree (s) Offered: BS/BA Chemistry
MS Chemistry
PhD Chemistry

Triggers: MS for majors (13.4)

Brief Description of Each Degree:
The Baccalaureate degree programs in the Department of Chemistry are designed to provide students with a solid background in all areas of chemistry, including organic, analytical, inorganic, physical, and biochemistry.

The Masters of Science program in Chemistry is a strong research-based program designed to provide students with advanced instruction in a variety of chemical disciplines, develop students' technical expertise with chemical instrumentation, and further engage them in state-of-the-art original research.

The PhD program in Chemistry is designed to provide students with advanced instruction over a broad range of chemical disciplines as well as in-depth instruction in a specific area. The expectation is that the student will become an expert in a specific field of study and will develop the skills required to be an independent researcher, including genesis and development of an idea, formulation of a research strategy, collection and analysis of data, drawing appropriate conclusions, and presentation of results.

Assessment of Learning Outcomes (for UG and GR):
The UG assessment is based on the measurement of two learning outcomes rooted in chemical principles and application of these principles in the completion of a research project. The MS program has one outcome based entirely on completion of a thesis. The PhD program has three outcomes based on writing a research proposal, passing cumulative examinations, and defending a dissertation. For the UG programs, the results are mixed and it is reported that the students perform at or near the targets. Numbers of students evaluated was not provided, but there does seem to be improvement from AY 09 to AY 10 in three of the areas tested. The research project was not evaluated as plans are underway to do this in the future. Student quality appears to be above average as evidenced by ACT scores, graduate-level GPAs, and placement of students after graduation (only MS and PhD programs on the latter item). There is no evidence of how these data were used to make improvements.

For both the MS and PhD program 100% of students met the target. Numbers of students participating was not provided, nor evidence of how this data were used to make improvements.

Placement of Graduates (types of positions, starting salary):
For UG programs, data are incomplete as to where they actually end up. The Department provides anecdotal information on where graduates may end up. They have more detailed information on the graduates of the MS and PhD program. Again, there are no details of how this information is used for program improvement.

Faculty Resources:
Evidence is provided that indicate faculty are very productive in terms of research, publications, and grant activity (although latter has declined the past two years, but there are some pending grant applications yet to be factored into total amounts). The grant activity can be explained in some ways by recent faculty turnover, which is being corrected by conducting searches.

Sources of External Support:

See above.

Conclusions and Recommendations:

Commendations:
- Strong department/programs in terms of teaching and research
- Strong degree productivity at all levels
- Involvement of UGs in research
- The Department acknowledges the need to improve program assessment and tracking of graduates for improvement purposes.

By April 1, 2013 (send to the Office of the Provost):
- Document that the program review process is a part of a continuous improvement approach involving all departmental faculty.
- Document program changes that occurred through assessment of student learner outcomes and other data collected.
- The learning outcomes for all programs (and general education courses) should be further developed and a revised assessment process needs to be implemented to include the following for all programs:
    - Learning Outcomes: Statements that describe what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire through their program (e.g., graduates will have the ability to apply principles of organic chemistry).
    - Assessment Methods: Direct measures used to identify, collect, and prepare data to evaluate the achievement of learning outcomes (e.g., quantitative literacy evaluated by a rubric, not grades or other indirect measures).

- o Targets: Expectations of students to achieve the desired outcome to demonstrate program effectiveness (e.g., 90% of students will demonstrate at least the benchmark performance on a project).
  - o Results: Actual achievement on each measurement (e.g., 94% of the students achieved at least the benchmark performance on the project).
  - o Analysis: An evaluation that determines the extent to which learning outcomes are being achieved and leads to decisions and actions to improve the program. The analysis and evaluation should align with specific learning outcomes and consider whether the measurement and target remain valid indicators of the learner.
- Update on plans for increasing majors in the MS program.
- Address concerns of the Graduate School in terms of the assessment process for the graduate programs.

Prior to the next review in 2015:
- Include the new university exit and alumni surveys in assessment plan. This will include placement data, salaries, and student satisfaction.