

Program Review Self Study Template

Academic unit Department of ChemistryCollege Fairmount College of Liberal Arts and SciencesDate of last review 2012 _Date of last accreditation report (if relevant) 2014 __

List all degrees described in this report (add lines as necessary)

Degree BS Chemistry CIP code 40.0501Degree MS Chemistry CIP code 40.0501Degree PhD Chemistry CIP code 40.0501

1. Departmental purpose and relationship to the University mission

given in section 4c, the program has achieved this goal, 100% of the graduates having gone on to such positions related to their PhD degree (4 employed in research, 5 postdoctoral positions, academic positions). The objectives of this degree are to acquire expertise in a specific area of chemistry, establish proficiency in the techniques of chemical research, and develop the ability to conceive of, express, and carry out an independent research project. The measurable outcomes are (i) cumulative exams taken in the 2nd and 3rd years, (ii) preparation and defense of an original research proposal in the 5th semester, and (iii) the written dissertation based on an original research project and the oral defense thereof.

2. Describe the quality of the program as assessed by the strengths, productivity, and qualifications of the faculty in of SCH, majors, graduates, and scholarly/creative activity (refer to instructions in the WSU Program Review document for more information on completing this section).

Complete the table below and utilize data tables provided by the Office of Planning Analysis (covering SCH by FY nhe1

undergraduate level even at institutions without high level research programs, faculty are encouraged to engage in research so as to expose their students to this aspect of chemistry. At WSU, participation in undergraduate research is a requirement for all BS chemistry majors and the availability of research programs operating at the highest levels makes this a more fruitful endeavor. Furthermore, given the rapidly changing nature of chemistry, the fact that faculty are operating at the frontiers of chemical research allows them to bring that knowledge back into the classroom even at the most introductory levels, instruction is informed by the current state of the discipline.

The Department of Chemistry produces a large number of credit hours, primarily due to the service aspects of the General Chemistry, Organic Chemistry, and Biochemistry classes, which are required for many students majoring in other fields or aspiring to professional education in the health professions. Over the past three years, SCH production by the chemistry department has steadily increased at the 290 and 500-699 levels. SCH produced by tenure-eligible faculty has decreased consistently over the period 2011-2013, with a concomitant increase in SCH produced by lecturers. This situation is explained by the loss of a number of tenured faculty in a short period of time, which necessitated hiring lecturers to teach some general chemistry and organic chemistry classes. We have since hired four tenure-eligible faculty and the percentage of SCH produced by lecturers is decreasing. Degree production has remained strong at both the undergraduate and graduate levels.

maintained a high level of success in securing external funding from federal and state sources (NIH, NSF, ASA, COBRE, KINBRE, etc.) and from industrial sources (e.g., Boeing). The table below shows the total dollar amounts of grant proposals submitted and funded in the past three years by WSU Chemistry Department faculty members:

WSU Chemistry Department external grant submission activity, 2012–2014 (\$)

| submitted | funded | still pending |
|-----------|--------|---------------|
|-----------|--------|---------------|

3. Academic Program Analyze the quality of the program as assessed by its curriculum and impact on students for each program (if more than one). Attach updated program assessment plan (s) as an appendix to instructions in the WSU Program Review document for more information.

- a. For undergraduate programs, compare ACT scores of the majors with the University as a whole. On the rolling average for 2009-2013, as well as individual year data, the ACT scores of chemistry majors are consistently above the ACT scores for the university as a whole. Over the past 5 years for which data are available, this difference has increased each year, from 0.5 in 2009 to 2.0 in 2013.
- b. For graduate programs, compare graduate GPAs of the majors with University graduate GPAs. The GPA for entering graduate students in chemistry is very nearly the same as it is for entering graduate students across the university, with a rolling average for 2009-2013 of 3.4 for chemistry, as compared to 3.5 for the university.
- c. Identify the principal learning outcomes (i.e., what skills does your program expect students to graduate with). Provide aggregated data on how students are meeting those outcomes in the table below. Data should relate to the goals and objectives of the program as listed in the table below. Provide an analysis of the data.

Undergraduate BS

| Learning Outcomes (most programs will have multiple outcomes) | Assessment Tool (e.g., portfolios, rubrics, exams) | Target/Criteria (desired program level achievement) | Results | Analysis |
|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|---------|----------|
| principles of organic, inorganic, physical (), analytical (), and biochemistry | American Chemical Society exams in each field are administered at the conclusion of the appropriate course | 85% of students will demonstrate satisfactory performance on exam by performing within \pm of the national norm or above. | | |

Graduate- MS

| Learning Outcomes (most programs will have multiple outcomes) | Assessment Tool (e.g., portfolios, rubrics, exams) | Target/Criteria (desired program level achievement) | Results | Analysis |
|--------------------------------------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------|----------|
| Demonstrate the ability to communicate chemical concepts orally | Oral communication rubric analysis of two presentations in Chem 700 | 80% of scores for each component of the rubric will be very good or excellent | We have not yet initiated this analysis and will do so in the near future. | |
| Demonstrate the ability to communicate chemical concepts in written form | Written communication rubric analysis of thesis based on original research | 80% of scores for each component of the rubric will be very good or excellent | We have not yet initiated this analysis and will do so in the near future. | |
| Demonstrate proficiency at carrying out and analyzing chemical research | Written thesis based on original research and defense thereof | 100% successful defense of thesis | | |

Graduate- PhD

| Learning Outcomes (most programs will have multiple outcomes) | Assessment Tool (e.g., portfolios, rubrics, exams) | Target/Criteria (desired program level achievement) | Results | Analysis |
|-----------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------|-----------------------|
| Demonstrate the ability to communicate chemical concepts orally | Oral communication rubric analysis of departmental research presentation | 80% of scores for each component of the rubric will be very good or excellent | We have not yet initiated .9(e)-31 | scn 30.36 4tsis of sr |

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Note: Not all programs evaluate every goal/skill. Programs may choose to use assessment rubrics for this purpose. Sample forms available at: <http://www.aacu.org/value/rubrics/>

f. For

4. Analyze the student need and employer demand for the program Complete for each program if appropriate (refer to instructions in the WSU Program Review document for more information on completing this section)

- a. Evaluate tables 1115 from the Office of Planning Analysis for number of applicants, admits, and enrollments and percent URM students by student level and degrees conferred. The data show that slightly over 50% of applicants to the chemistry graduate programs are admitted to the programs, which indicates a good level of selectivity. Data on underrepresented minorities in the undergraduate program are largely in line with the data for the university and the college. For the chemistry graduate programs, the number of underrepresented minorities is quite small, as the vast majority of our graduate students are foreign.
- b. Utilize the table below to provide data that demonstrates student need and demand for the program.

Undergraduate BS

| Employment of Majors* | |
|-----------------------|--|
| Average Salary | |

optometry, Arizona School of Dentistry and Oral Health), (v) employment in chemistry fields (EHS inspector for state of Kansas, technician at Fragrance West, chemist at Spirit Aerosystems). The increasing reliance on high manufacturing and the continued search for new and better medicines, bode well for future employment prospects for chemists.

Graduate MS

| Employment of Majors* | | | | | | | Projected growth from BLS** Current year only |
|-----------------------|----------------|-----------------------|---------------------------|------------------------------------|---------------------------------|-------------------------------------------------|-----------------------------------------------|
| | Average Salary | Employment % In state | Employment % in the field | Employment: % related to the field | Employment: % outside the field | No. pursuing graduate or professional education | |
| Year 1 | | 33 | 67 | 0 | 0 | 33 | |
| Year 2 | | 0 | 0 | 0 | 0 | 100 | |
| Year 3 | | 0 | 100 | 0 | 0 | 0 | |

* May not be collected every year

** Go to the U.S. Bureau of Labor Statistics Website: <http://www.bls.gov/oco/>

5. Analyze the service the Program provides to the discipline, other programs at the University, and beyond
Complete for each program if appropriate

6. Report on the Program's goal(s) from the last review. List the goal(s), data that may have been collected to support the goal, and the outcome. Complete for each program if appropriate

students are exposed to the same and are afforded the chance to experience a true research experience and use state-of-the-art instrumentation. At the same time, our undergraduate classes are, for the most part, taught by tenured and tenure

