Program Review Self-Study Template

Academic unit: Chemistry

College: LAS

Date of last review 2007

Date of last accreditation report (if relevant) 2009 (review, not accreditation)

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

Degree: BS Chemistry CIP* code: 40.0501

Degree: MS Chemistry CIP code: 40.0501

Degree: PhD Chemistry CIP code: 40.0501

*To look up, go to: Classification of Instructional Programs Website, http://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55

Faculty of the academic unit (add lines as necessary)

Name	Signature
James G. Bann (Associate Professor)	
Moriah R. Beck (Assistant Professor)	
Dennis H. Burns (Professor)	
David M. Eichhorn (Professor and Chair)	
Douglas S. English (Associate Professor)	
William C. Groutas (Professor)	
D. Paul Rillema (Professor)	
Erach R. Talaty (Professor)	
Kandategе Wimalasena (Professor)	(Professor)

development of an idea, formulation of a research strategy, collection and analysis of data, drawing appropriate conclusions, and presentation of results. The degree culminates in the writing and defense of a dissertation based on an original research project. Recipients of the PhD are prepared for employment in senior positions in industry and government, teaching at four-year colleges, and postdoctoral positions leading ultimately to teaching positions at research universities.

d. Has the mission of the Program (s) changed since last review? ☐ Yes ☒ No
    i. If yes, describe in 1-2 concise paragraphs. If no, is there a need to change?

e. Provide an overall description of your program (s) including a list of the measurable goals and objectives of the program (s) (both programmatic and learner centered). Have they changed since the last review? ☐ Yes ☒ No

The undergraduate program in Chemistry offers a number of degrees tailored to prepare students for different career or higher education options. The BS in Chemistry is certified by the American Chemical Society and is geared to students intending to seek employment in chemical or chemistry-related industry or those planning to pursue advanced degrees in chemistry. A biochemistry option is available with this degree, which would be attractive to those students intending to pursue advanced degrees in biochemistry. The BS in Chemistry-Premedicine is designed for students intending to pursue advanced degrees in health-related fields, such as medicine, pharmacy, or dentistry. The BS in Chemistry/Business is a joint venture with the Barton School which is designed for students seeking careers in the pharmaceutical or chemical industries. The Field Major in Biochemistry, shared with the Department of Biological Sciences, also prepares students for graduate study in biochemistry and biomedical fields. The department also offers a BA degree in Chemistry.

The objectives for all degrees are to develop a solid foundation in the principles of chemistry including all major subdivisions of the field, to become familiar with the synthetic and analytical techniques of chemistry, and to gain an understanding of the scientific method and application of the principles learned in classes to chemical research. Measurable outcomes include (i) assessment exams taken following completion of most undergraduate courses and (ii) a written report on the independent research project.

The MS program in chemistry is a strong, research-based program whose intent is to prepare students for employment in the chemical or pharmaceutical industry, for teaching at the high-school or junior college level, and to pursue advanced degrees in chemistry. The objectives of this degree are to build on the undergraduate foundation with advanced instruction in a broad range of chemical disciplines and to master the principles and techniques of chemical research. The measurable outcome is the written thesis based on an original research project and the oral defense thereof.

The PhD program in chemistry is intended to prepare students for careers as independent researchers in the chemical industry and for academic positions at four-year colleges and research universities. 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.

If yes, describe the changes in a concise manner.

2a. Describe the quality of the program as assessed by the strengths, productivity, and qualifications of the faculty in terms of SCH, majors, graduates and scholarly productivity (refer to instructions in the WSU Program Review document for more information on completing this section). Complete a separate table for each program if appropriate.

UG Program - BS (SCH from entire department)

* Winning by competitive audition. **Professional attainment (e.g., commercial recording). ***Principal role in a performance. ****Commissioned or included in a collection. KBOR data minima for UG programs: Majors=25; Graduates=10; Faculty=3; KBOR data minima for master programs: Majors=20; Graduates=5; Faculty=3 additional; KBOR data minima for doctoral programs: Majors=5; Graduates=2; Faculty=2 additional.

a. Provide a brief assessment of the quality of the faculty/staff using the data from the table above as well as any additional relevant data. Programs should comment on details in regard to productivity of the faculty (i.e., some departments may have a few faculty producing the majority of the scholarship), efforts to recruit/retain faculty, departmental succession plans, course evaluation data, etc.

Provide assessment

The high level of research activity among the faculty of the Department of Chemistry is important for all three degree programs. An education in chemistry requires engagement in original laboratory research. At the graduate level, this is obvious, since the major portion of the graduate degree (MS or PhD) is the research project, which is carried out in close collaboration with the student's major advisor – students in these programs embark on their final research project no later than their second semester in the program. This is, however, no less true at the 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 often [illegible]

WSU Chemistry Department external grant activity, 2009 – 2011 ($)

	submitted	funded	still pending
2009	10,191,029	2,834,028	0
2010	8,320,443	322,500	1,899,842
2011	2,522,743	292,243	2,230,500

Finally, the scholarly standing of the faculty can be addressed by their participation in review of papers and grant proposals and service on editorial boards and as officers in professional societies. Without exception, all the faculty members in the Department of Chemistry are actively engaged in such activities, serving as reviewers for many of the journals and funding agencies listed above. Board and officer positions held by members of the WSU chemistry faculty during the period of review include chair of the Wichita section of the American Chemical Society, associate editor of the ; editorial advisory board member of , , , and ; of the American Chemical Society Divisional Activities Committee and Chemical Education Committee

During the period of review, the Department of Chemistry has seen the loss of five active faculty members, two anticipated due to retirement and three unexpected (one death and two departures). This circumstance has required us to utilize the services of instructors for our introductory courses at a rate higher than we would desire. However, we have been fortunate to have at our disposal highly qualified individuals. One has a Masters degree and has taught very effectively in our department for many years. The rest of the instructors have PhD degrees in chemistry. The quality of the instruction for our students has, therefore, been maintained at a high level. We are aggressively addressing the loss of faculty members by the addition of highly promising young faculty members to the department – we added a physical chemist in Fall 2008 and a biochemist in Fall 2010. In addition, we initiated two faculty searches in Fall 2011, one of which has bej/TT2i51Tf.20TD0Tc<0003Tj/TT21Tf.2240TD.0014Tc(2011,)Tj/TT11Tf2.2

2b. Describe the quality of the program as assessed by the strengths, productivity, and qualifications the faculty in terms of SCH, majors, graduates and scholarly productivity (refer to instructions in the WSU Program Review document for more information on completing this section). Complete a separate table for each program if appropriate.

Graduate - MS

* Winning by competitive audition. **Professional attainment (e.g., commercial recording). ***Principal role in a performance. ****Commissioned or included in a collection. KBOR data minima for UG programs: Majors=25; Graduates=10; Faculty=3; KBOR data minima for master programs: Majors=20; Graduates=5; Faculty=3 additional; KBOR data minima for doctoral programs: Majors=5; Graduates=2; Faculty=2 additional.
*From the table on page 3, indicate number of faculty (and instructional FTE) teaching in the graduate program.

a. Provide a brief assessment of the quality of the faculty/staff using the data from the table above as well as any additional relevant data. Programs should comment on details in regard to productivity of the faculty (i.e., some departments may have a few faculty producing the majority of the scholarship), efforts to recruit/retain faculty, departmental succession

2c. Describe the quality of the program as assessed by the strengths, productivity, and qualifications of the faculty in terms of SCH, majors, graduates and scholarly productivity (refer to instructions in the WSU Program Review document for more information on completing this section). Complete a separate table for each program if appropriate.

PhD Program

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* Winning by competitive audition. **Professional attainment (e.g., commercial recording). ***Principal role in a performance. ****Commissioned or included in a collection. KBOR data minima for UG programs: Majors=25; Graduates=10; Faculty=3; KBOR data minima for master programs: Majors=20; Graduates=5; Faculty=3 additional; KBOR data minima for doctoral programs: Majors=5; Graduates=2; Faculty=2 additional.

3. Academic Program: Analyze the quality of the program as assessed by its curriculum and impact on students. Complete this section for each program (if more than one). Attach updated program assessment plan (s) as an appendix (refer 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.

Last 3 Years	Total Majors - From fall semester	ACT – Fall Semester (mean for those reporting)	
		Majors	All University Students - FT
Year 1	159	22.4	22.66
Year 2	162	23.0	22.72
Year 3	162	23.9	22.81

KBOR data minima for UG programs: ACT≤20 will trigger program.

b. For graduate programs, compare graduate GPAs of the majors with University graduate GPAs.*

Last 3 Years	Total Admitted - By FY		Average GPA (Admitted) – Domestic Students Only (60 hr GPA for those with ≥54 hr reported) By FY					
					Comparisons			
	MS	PhD	MS GPA	PhD GPA	College – MS	College – PhD	Univ - MS	Univ PhD
Year 1 08	6	13	3.46	3.65	3.44	3.75	3.48	3.62
Year 2 09	2	19	3.10	3.53	3.41	3.61	3.48	3.62
Year 3 10	4	11	3.11	3.53	3.32	3.67	3.48	3.67

Undergraduate - BS

Learning Outcomes (most programs will have multiple outcomes)	Assessment Tool (e.g., portfolios, rubrics, exams)	Target/Criteria (desired program

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 proficiency at carrying out and analyzing chemical research	Written thesis based on original research and defense thereof	100% successful defense of thesis	100% of students defending thesis have passed	

Graduate - PhD

Learning Outcomes (most programs will have multiple outcomes)	Assessment Tool (e.g., portfolios, rubrics, exams)	Target/Criteria (desired program

d. Provide aggregate data on student majors satisfaction (e.g., exit surveys), capstone results, licensing or certification examination results, employer surveys or other such data that indicate student satisfaction with the program and whether students are learning the curriculum (for learner outcomes, data should relate to the goals and objectives of the program as listed in 1e).

Undergraduate - BS

Student Satisfaction (e.g., exit survey data on overall program satisfaction).* If available, report by year, for the last 3 years			Learner Outcomes (e.g., capstone, licensing/certification exam pass-rates) by year, for the last three years				
Year	N	Result (e.g., 4.5 on scale of 1-5, where 5 highest) Exit survey completed by all graduating majors	Year	N	Name of Exam	Program Result	National Comparison±
1	13	11 of 13 indicated they would recommend program	1				
2	25	25 of 25 indicated they would recommend program	2				
3	22	20 of 22 indicated they would recommend program	3				

*Available for graduate programs from the Graduate School Exit Survey. Undergraduate programs should collect internally. ± If available.

Graduate - MS

Student Satisfaction (e.g., exit survey data on overall program satisfaction).* If available, report by year, for the last 3 years			Learner Outcomes (e.g., capstone, licensing/certification exam pass-rates) by year, for the last three years				
Year	N	Result (e.g., 4.5 on scale of 1-5, where 5 highest) Graduate School Exit Survey	Year	N	Name of Exam	Program Result	National Comparison±
1	58	73% reported being satisfied or very satisfied – note this	1				
2		number is combined MS and PhD students for the 5-year	2				
3		period from F06 – S11	3				

*Available for graduate programs from the Graduate School Exit Survey. Undergraduate programs should collect internally. ± If available.

Graduate - PhD

Student Satisfaction (e.g., exit survey data on overall program satisfaction).* If available, report by year, for the last 3 years			Learner Outcomes (e.g., capstone, licensing/certification exam pass-rates) by year, for the last three years				
Year	N	Result (e.g., 4.5 on scale of 1-5, where 5 highest) Graduate School Exit Survey	Year	N	Name of Exam	Program Result	National Comparison±
1	58	73% reported being satisfied or very satisfied – note this	1				
2		number is combined MS and PhD students for the 5-year	2				
3							

GRASP). Over the past 3 years, undergraduate chemistry students have received four first place and two second place awards at URCAF -undergraduate students have also received one first place, two second place, and two honorable mention awards in the Alvin and RosaLee Sarachek Award competition at URCAF. Graduate students have garnered two second place and one fifth place award in

Retention & Graduation Rates

4b. **Analyze the student need and employer demand for the program. Complete for each program if appropriate (refer to**

Provide a brief assessment of student need and demand using the data from the table above. Include the most common types of positions, in terms of employment, graduates can expect to find.

Provide assessment here:

Students obtaining MS degrees in chemistry from WSU have been very successful in obtaining employment in chemistry or related fields or admission to programs for further education in chemistry. Graduates from the MS program in the past three years went on to the following positions:

John Bullinger – high-school physics teacher, Wichita Collegiate School
Justin Lygrisse – analytical scientist – Novartis OTC Pharmaceticals, Lincoln, NE
Guijia He – research assistant – WSU chemistry department
Dale Kerstetter – Chemist – Hospira Pharmaceuticals, McPherson, KS
Ryan Dain – PhD student – University of Utah
Hong Aw – Chemist – Hospira Pharmaceuticals, McPherson, KS
Anusha Dissanayake - Chemist – Hospira Pharmaceuticals, McPherson, KS
Anu Amin – unknown
Mohammad Islam – unknown
Ritu Gurung – PhD student – WSU

* May not be collected every year

** Go to the U.S. Bureau of Labor Statistics Website: http://www.bls.gov/oco/ and view job outlook data and salary information (if the Program has information available from professional associations or alumni surveys, enter that data)

*** NRA=Non-resident alien; H=Hispanic; AI/AN=American Indian/ Alaskan Native; A=Asian; B=Black; NH/PI=Native Hawaiian/Pacific Islander; C=Caucasian; MR=Multi-race; UNK=Unknown

KBOR data minima for UG programs: Majors=25; Graduates=10; Faculty=3; KBOR data minima for master programs: Majors=20; Graduates=5; Faculty=3 additional; KBOR data minima for doctoral programs: Majors=5;

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5. **Analyze the cost of the program and service the Program provides**

6. **Report on the Program's goal (s) from**