2015 Periodic Report
to the
ACS Committee on Professional Training

Please consult the ACS Guidelines (http://www.acs.org/cpt) before completing this report. The information contained in this report should pertain only to your undergraduate program. To facilitate committee review, all responses must be provided on this form. Extra pages for the tables are available under the Templates tab on CPRS.

Name of Institution: New Mexico Highlands University

City, State, and Zip Code: Las Vegas, NM 87701

Report Prepared by (e.g., Dr. Mary Smith or Juan Ruiz): David M. Sammeth
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Current Chemistry Department Chair
Name: David M. Sammeth
Title: Chair of Biology and Chemistry

Name of Department: Biology & Chemistry

Section 1

1.1 Degrees Offered in Chemistry (check those offered)

- Bachelor's ☒
- Master's ☒
- Ph.D. ☐

1.2 Number of Calendar Weeks per Term (not counting final exams)

Semester	15 weeks
Quarter	
4-1-4	
Other	

1.3 Provide the number of students in the current (most recently completed) academic year:

Entire Campus	3560
Undergraduates	2276
Chemistry Seniors	9
Sum of enrollments in all undergraduate chemistry courses	448

1.4 Provide the number of bachelor's-degree graduates during the past six years who went on to:

Graduate School in the Chemical Sciences	6
Medical and other Professional Schools	4
Industry	5
Teaching	2
Other/Unknown	5

Section 2: Institutional Environment

2.1 Is the institution accredited by a regional accrediting association? Yes ☒ No ☐

Name of Accrediting Association: NCA - North Central Association

2.2 Is the chemistry department organized as an independent administrative unit? Yes ☒ No ☐

a. If no, how is the department or program administered and to whom does the department administrator report?

b. If no, who controls budgetary, personnel, and teaching decisions for the chemistry program, and how are chemistry faculty involved?

2.3 Check the Minimum Salary for each Rank of Chemistry Faculty (Nine Months)

Minimum Salary	Professor	Associate Professor	Assistant Professor	Long-term, permanent
Below $51K	☐	☐	☒	☐
$51 - $60K	☐	☒	☐	☐
$61 - $70K	☒	☐	☐	☐
$71 - $80K	☐	☐	☐	☐
$81 - $90K	☐	☐	☐	☐
Over $90K	☐	☐	☐	☐

2.4 Chemistry Expenditures (rough estimates – 2 significant figures):

If your expenditures are over $60,000 per year, excluding internal and external grants, salaries, and library budget, check here ☒ and go to Item 2.5.

	Current	Annual Average Over the Past Five Years
Operating Expenditures Exclusive of Salaries		
Instrument Maintenance and Repair		
Student and Faculty Travel		
Grants		

2.5 Describe whether the level of institutional support allows the department to meet its teaching, infrastructure, and faculty development needs.

The program's budget adequately funds teaching needs, infrastructure for laboratory instruction, and research for faculty, undergraduate, and graduate students. In November 2013, the stockroom manager position was upgraded to Chemical Stockroom Manager and Instrumentation Technician allowing the hiring of an individual to maintain instrumentation. In Fall of 2014, a new position was assigned to Chemistry bringing to 5 the number of full-time, tenure-track positions. A biochemist, hired this spring (2015), will join two other faculty members hired in 2013 and 2012. The biochemist will be responsible for expanding our biochemistry program to include a new BS degree in biochemistry augmenting the BA degree currently in place.

Section 3: Faculty and Staff

3.1 Number of Chemistry Faculty in the Spring 2015 Academic Term **(If you have no faculty in a particular category, record a "0").** Please be sure the totals in the top row (Full-time/Part-time totals) add up below.

Faculty	Total Faculty	With Ph.D.	Male	Female	African American	Native American	Asian American	Hispanic American
Permanent total	5	5	3	2	0	0	1	0
Full-time								
Tenured	2	2	1	1	0			
Pre-tenured	3	3	2	1	0		1	
Long-term, non-tenure track								
Part-time								
Tenured								
Pre-tenured								
Long-term, non-tenure track								
Temporary total								
Full-time								
Part-time								

3.2 Number of Instructional Staff (Do not include faculty listed in Item 3.1 or Teaching Assistants. **If you have no instructional staff in a particular category, record a "0".**)

Instructional Staff	Total Staff	With Ph.D.	Male	Female	African American	Native American	Asian American	Hispanic American
Long-term*								
Full-time	1	1	1					
Part-time								
Temporary								
Full-time								
Part-time								

* Employed for three years or more or expectation of employment for at least three years

3.3 The ACS is concerned about potential overreliance on temporary (part-time and full-time) faculty and instructional staff. If the total number of temporary (full- or part-time) faculty and instructional staff exceeds 50% of the number of permanent faculty and long-term instructional staff listed in items above (3.1 and 3.2), explain their roles in student instruction.

3.4 a. Briefly describe your activities (especially successes) in expanding faculty diversity over the last five years.

Since our 2010 report, we have increased the number of tenured/tenure-track position in the program from 4 to 5. Two of the tenure/ tenure-track positions are now held by women, one Asian and the other Russian.

b. Describe any attributes of diversity among your faculty not captured in Items 3.1 and 3.2.

3.5 a. Number of Support Staff:

Secretarial	1.5
Stockroom	1
Instrument Technicians	1
Other	

b. Comment on the adequacy of support staff:

Including the biology half of the Department, there are 2 secretaries, an Equipment Manager/Technician, and Stockroom/Instrument Technican. While the duties of the Equipment Manager are focused on the needs of the biologist and the Stockroom Technican focuses on chemistry, they work together and essentilally double our technical capabilities.

3.6 Describe the professional development opportunities (including sabbaticals) that are available to chemistry faculty and instructional staff.

All faculty receive a minimum of $700 for professional development each yea Frequently, the amount is supplemented with funds from grants, the programs operational budget, or faculty share the total on alternating years. Sabbaticals are possible every six years, though they are competitive. The institution offers development opportunities every year for both faculty an staff, typically by bringing in an outside expert. Training for staff is available to support programs needs, for example,a workshop in chemical storage and safety.

3.7 Report the number of chemistry faculty and instructional staff who have taken a sabbatical or professional leave in the last six years.

Requested	1
Granted	1

3.8 Teaching Contact Hours for 2014-2015 Academic Year (Classroom and Lab)
Please provide the minimum and maximum numbers that occurred during this academic year. **The ranges reported here should match the numbers reported in Table 3.1.**

a. Contact Hours/week for Chemistry Faculty (exclusive of research):
Range from 12 to 15 ; Average 14

b. Contact Hours/week for Instructional Staff:
Range from 12 to 14 ; Average 14

c. If you need to explain how contact hours are counted or if there is a special situation, for example, for online instruction please explain:

d. Are maximum and/or minimum teaching loads established as an institutional policy?
Yes ☒ No ☐

If yes, explain briefly:
A minimum of 24 credits/year offered over Fall, Spring, or Summer terms.

3.9 a. Do you use undergraduate student teaching assistants? Yes ☐ No ☒

If yes, answer items b. and c.

b. Describe the formal instruction and assistance in laboratory and/or classroom teaching provided to undergraduate student teaching assistants.

c. How are undergraduate teaching assistants supervised in the laboratory?

Table 3.1 – Teaching Contact Hours

Provide the **actual contact hours** per week for each individual involved in undergraduate instruction for the 2014-2015 academic year. List one faculty member per row and enter as many faculty per page as possible. List non-tenure-track faculty, temporary faculty, and instructional staff and **identify them with the key below**. Do not include graduate teaching assistants. If the average number of contact hours for your department is less than 12 contact hours per week, complete Table 3.1 for those individuals with 12 or greater contact hours per week. Additional copies of this table are available under the Template tab on CPRS.

	Fall Semester/1st Quarter 2014				**Spring Semester/2nd Quarter 2015**			
Faculty Member (list according to rank)	**Course Number and Title**	**1***	**2***	**3***	**Course Number and Title**	**1***	**2***	**3***
Curie, Marie (Professor)	CHEM112 – Gen Chem I CHEM 257 – O. Chem I CHEM 358 – O.Chem Lab (2 sections)	3 3 0	0 3 4	13	CHEM257 – Analytical Chemistry CHEM360 – O. Chem II	3 3	3 3	12
Sammeth, David (Prof)	CHEM 211 - Gen Chem 1 CHEM 371 - P-Chem 1	3 3	0 0	6	CHEM 212 - Gen Chem 1 CHEM 372 - P-Chem 2	3 3	0 0	6
Timofeeva, Tatiana (Prof)	CHEM 215 - Gen Chem Lab CHEM 691 - Chem Colloquium CHEM 4/555 - Research Seminar	0 1 1	4 0 0	5	CHEM 495 -Senior Applications CHEM 4/555 - Research Seminar	3 1	0 0	4
Chen, Jiao (Assist Prof)	CHEM 216 - Gen Chem Lab CHEM 321 - Quantitative CHEM 621 - Adv, Analytical	0 3 3	4 4 0	14	CHEM 216 - Gen Chem Lab CHEM 317 - P-Chem Lab CHEM 419-Instrmental Analysis	0 0 0	4 6 6	16
Maki, Brooks (Assist Prof)	CHEM 341 - Organic 1 CHEM 4/561 - Inogranic	5 3	6 0	14	CHEM 342 - Organic 2 CHEM 4/535 - Medicinal Chem CHEM 215 - Gen Chem Lab	5 3 0	6* 0 4	18
Shepherd, Jan (#)	CHEM 212 - Gen Chem 2 CHEM 4/581 - Biochem 1 CHEM 215 - Gen Chem Lab CHEM 215 - Gen Chem Lab	3 3 0 0	0 0 4 4	14	CHEM 211 - Gen Chem 2 CHEM 4/582 - Biochem 2 CHEM 215 - Gen Chem Lab CHEM 216 - Gen Chem Lab	3 3 0 0	0 0 4 4	14
					*CHEM 342- onetime overload			

*1 Number of class hours scheduled per week.
*2 Number of contact hours of lab per week.
*3 Total of columns 1 and 2 for a grand total for each individual.

Non-tenure faculty
@ Temporary faculty and instructional staff
+ Long-term instructional staff

Table 3.1 – Teaching Contact Hours (continued)

	Third Quarter 2015 (Do not report Summer hours.)			
Faculty Member (list according to rank)	**Course Number and Title**	**1***	**2***	**3***

*1 Number of class hours scheduled per week.
*2 Number of contact hours of lab per week.
*3 Total of columns 1 and 2 for a grand total for each faculty member.

Non-tenure faculty
@ Temporary faculty and instructional staff
+ Long-term instructional staff

Section 4: Infrastructure

4.1 Comment on the adequacy and condition of your department's instruments and lab apparatus to meet your program's teaching and research needs. Describe the arrangements for repair and maintenance of instruments.

The program has sufficient space for teaching and research labs, as well as instrumentation and storage. The repair and maintenance of instrumentation is overseen by a laboratory technician with faculty oversight. The departmental budget is currently sufficient to handle the cost for outside technical support when required. The Office of Research and Sponsored Projects offers assistance for major expenses. As the cost of maintenance and repair continued to increase the present arrangement of this cost being carried by the discipline may become problematic in

4.2 Do you rely on off-site instrumentation to meet your department's research needs? Yes ☐ No ☒

If yes, please describe the arrangement:

4.3 Comment on the adequacy of the facilities and space available for the undergraduate chemistry program.

Dedicated teaching laboratories exist for general chemistry, organic, biochemistry, analytical, physical chemistry. All instrumentation is available for undergraduate teaching and research. Senior research projects typically take place in research laboratories.

4.4 a. Indicate the number of chemistry journals to which students have immediate institutional access on your campus. **If students have access to 30 or fewer chemistry journals, complete Table 4.2.**

30 or fewer ☐ More than 30 ☒

b. Do your students and faculty have access to journals that are not available on campus through interlibrary loan? Yes ☒ No ☐

c. What types of access do undergraduate students and faculty have to chemical information databases on your campus? (Check all that apply.)

Online through ChemSpider ☐
Online through SciFinder ☒
Online through STN ☒
Online through Web of Science ☐
Other access ☐
Specify ____________________

4.5 What is the maximum number of students in a laboratory section who are directly supervised per faculty member, instructional staff member, or teaching assistant? 22

Table 4.1 – Instrumentation and Specialized Laboratory Apparatus

If you have more than one particular instrument, please list up to two. **Only report functioning instrumentation that is used by undergraduate students.** If your department has more than one of a particular instrument type, please list the two newest.

Instrument/Apparatus	Used by Undergraduates		Year Acquired	Manufacturer and Model
	In Chemistry Course Work	In Research		
NMR spectrometer(s)	☒	☒	2007	Bruker 300 MHz
Bruker Avance 300 MHz Broadband VT FT	☐	☐		
Optical Molecular Spectroscopy	☐	☐		
IR spectrometer(s)	☒	☒	2015	Perkin-Elmer Spectrm 2
	☐	☐		
UV-Vis spectrometer(s)	☒	☒	1997	HP 8453 Diode Array
2 x Hewlett-Packard 8453 Diode Array	☐	☐	1995	HP 8453 Diode Array
Other	☐	☐		
Optical Atomic Spectroscopy	☐	☐		
Atomic absorption/emission	☒	☒	1995	Varian SpectAA 55
Fluorometer	☒	☒	2005	Spex Florolog 2
Other	☐	☐		
Mass Spectrometry	☐	☐		
Mass spectrometer(s)	☒	☒	2008	Thermo Scientific LXQ
	☐	☐		
GC-Mass spectrometer(s)	☐	☐		
	☐	☐		
Other	☐	☐		
Chromatography and separations	☐	☐		
Gas chromatograph(s)	☐	☐		
	☐	☐		
Liquid chromatograph(s)	☒	☒	2008	Thermo Scientific LXQ
	☐	☐		
Gel electrophoresis	☒	☒	2009	Redyotek
	☐	☐		
Other	☐	☐		
Electrochemistry	☐	☐		
Electrochemical Instrumentation	☐	☐		
	☐	☐		
Other	☐	☐		
Other	☐	☐		
Radiochemistry (including counting equipment and sources)	☐	☐		
	☐	☐		
Thermal analysis equipment	☒	☒	2014	Hitachi STA 7200
	☐	☐		
Schlenklines and dry box apparatus	☒	☒	2004	VAC NEXUS
	☐	☐		
Imaging microscopy	☐	☐		
	☐	☐		
Other	☐	☐		
Additional Instruments (over $10,000 in cost):				
Laser - tunable solid state	☒	☒	1997	SpectraPhysics MOPO
Single Crystal x-ray diffractometer	☒	☒	2004	Bruker AXS

Table 4.2 – Journal List

Indicate the current chemistry-related periodicals to which students have print or online access. Please use the blanks provided if you have additional journals to list.

General Content

Accounts of Chemical Research	☐	Chemistry Letters	☐
ACS Central Science	☐	Journal of the American Chemical Society	☐
Angewandte Chemie Intl Edition in English	☐	Nature, Nature Chemistry	☐
Chemical Communications	☐	New Journal of Chemistry	☐
Chemical Science	☐	Proceedings of the National Academy of Science	☐
Chemistry – A European Journal	☐	Science	☐

Topical titles

ACS Chemical Biology	☐	Heterocycles	☐
ACS Chemical Neuroscience	☐	Inorganic Chemistry	☐
ACS Medicinal Chemistry Letters	☐	Journal of the American Society for Mass Spectrometry	☐
ACS Nano	☐	Journal of Applied Polymer Science	☐
Advanced Functional Materials	☐	Journal of Bacteriology	☐
Advances in Heterocyclic Chemistry	☐	Journal of Biological Chemistry	☐
Advanced Materials	☐	Journal of Biological Inorganic Chemistry	☐
Advanced Synthesis and Catalysis	☐	Journal of Catalysis	☐
Advances in Protein Chemistry	☐	Journal of Chemical Ecology	☐
Analyst	☐	Journal of Chemical Education	☐
Analytica Chimica Acta	☐	Journal of Chemical Information and Modeling	☐
Analytical and Bioanalytical Chemistry	☐	Journal of Chemical Physics	☐
Analytical Biochemistry	☐	Journal of Chemical Theory and Computation	☐
Analytical Chemistry	☐	Journal of Chromatography A, B	☐
Applied Catalysis A	☐	Journal of Medicinal Chemistry	☐
Applied Spectroscopy	☐	Journal of Molecular Biology	☐
Beilstein Journal of Organic Chemistry	☐	Journal of Organic Chemistry	☐
Biochemical Journal	☐	Journal of Physical Chemistry A, B, C	☐
Biochemistry	☐	Journal of Physical Chemistry Letters	☐
Biochimica et Biophysica Acta	☐	Journal of Polymer Science Part A	☐
Bioconjugate Chemistry	☐	Journal of Proteome Research	☐
Biomacromolecules	☐	Langmuir	☐
Biomaterials	☐	Macromolecules	☐
Bioorganic Chemistry	☐	Molecular Cell	☐
Bioorganic and Medicinal Chemistry Letters	☐	Nanoletters	☐
Chemical Education: Research and Practice	☐	Nature Chemical Biology, Structural and Molecular Biology	☐
Chemical Educator	☐	Nucleic Acids Research	☐
Chemistry of Materials	☐	Organic and Biomolecular Chemistry	☐
ChemPhysChem	☐	Organic Letters	☐
Chemical Physics Letters	☐	Organometallics	☐
Chirality	☐	Physical Chemistry Chemical Physics	☐
Combinatorial Chemistry and High Throughput Screening	☐	PLOS One	☐
Current Opinion in Chemical Biology	☐	Polymer	☐
Dalton Transactions	☐	Polymer Degradation and Stability	☐
Electrophoresis	☐	Supramolecular Chemistry	☐
Environmental Science and Technology	☐	Synlett	☐
European Journal of Inorganic Chemistry	☐	Synthesis	☐
European Journal of Organic Chemistry	☐	Tetrahedron	☐
FEBS Journal	☐	Tetrahedron Letters	☐
Green Chemistry	☐		☐
	☐		☐
	☐		☐

4.6 a. Are the following laboratory facilities **adequate** for your instructional program?

Safety showers	Yes ☒	No ☐	Hoods	Yes ☒	No ☐
Eye washers	Yes ☒	No ☐	Ventilation	Yes ☒	No ☐
Fire extinguishers	Yes ☒	No ☐			

b. If no is checked for any item above, please explain.

4.7 a.

	Yes	No
Does the department/university have established safety rules?	☒	☐
Does the department/university have emergency reporting procedures?	☒	☐
Does your department have a written chemical hygiene plan?	☒	☐
Are there adequate facilities and arrangements for disposal of chemical waste?	☒	☐
Are safety information and reference materials (e.g., MSDS, SDS, SOPs) readily available to all students and faculty?	☒	☐
Is appropriate personal protective equipment available and used by all students and faculty?	☒	☐

b. If no is checked for any of the above, please explain.

c. Does the chemistry department or program have a safety committee or safety officer?
Yes ☒ No ☐

If a safety committee exists, how often does it meet? ____________________

Section 5: Curriculum

5.1 a. Are all foundation courses taught annually? Yes ☐ No ☒

b. If no is checked above, indicate the foundation courses that are **not** taught annually.
Physical Chemistry (371) & Inorganic (461)

c. If all of the courses required for student certification are not taught annually, describe how students can complete the requirements for a certified chemistry degree within four years.
Physical Chemistry and Inorganic Chemistry are typically each offered every other year. When demand is sufficient, they are offered every year. Through student advisement, a course schedule is developed to insure that students can complete their degree in four years.

d. Are at least four semester-long (or six quarter-long) in-depth courses taught annually, exclusive of research? Yes ☒ No ☐

5.2 Refer to section 5.6 of the ACS Guidelines for the definition of degree tracks and **list only those degree tracks that lead to an ACS-certified bachelor's degree** in chemistry or related field.

Track 1 B.S. - Chemistry
Track 2
Track 3
Track 4
Track 5
Track 6
Track 7

5. 3 Please report the number of hours in each course listed below in Table 5.1 that reflects supervised, hands-on lab experience.

Laboratory contact hours required for general chemistry lab courses(CHEM 215 & 216) total to 112 hours for both.

Complete Tables 5.1 – 5.4 only for those courses in degree tracks that may lead to an ACS-certified bachelor's degree.

Table 5.1 – Introductory Course Work

List all introductory chemistry course work students may use to prepare for the foundation course work listed in Table 5.2. Do not include courses listed in Table 5.2 and 5.3 or courses that are not used for ACS certification purposes. Enter only one course per row.

Dept. & Course Number	Course Title	Total Hours[1]		Textbook and Author	Credit Hours	Tracks[2]						
		Class	Lab			1	2	3	4	5	6	7
Chem 211	General Chemistry 1	45	0	General Chemistry: Donald McQuarrie, 4th edition	3	R						
Chem 215	General Chemistry Laboratory	1	56	No text book	2	R						
Chem 212	General Chemistry 2	45	0	General Chemistry, Donald McQuarrie, 4th edition	3	R						
Chem 216	General Chemistry Laboratory	1	56	No text book	2	R						

1. Total Hours refers to the total contact hours per term. Do not record credit hours or contact hours per week in this column.
2. Using the drop-down menu, indicate whether a course is required (R) or one of two or more alternatives (A) that students may choose for each degree track.

Table 5.2 – Foundation Course Work

List below all course work students may use to satisfy the FOUNDATION requirements in the sequence suggested for ACS certification. Do not include courses listed in Tables 5.1 and 5.3 or courses that are not used for ACS certification purposes. Refer to Section 5.3 of the ACS Guidelines for the definition of a foundation course. Enter only one course per row.

Dept. & Course Number	Course Title	Total Hours[1]		Textbook and Author	CH[2]	Subdisciplinary % Breakdown[3]					Tracks[4]						
		Class	Lab			A	B	I	O	P	1	2	3	4	5	6	7
CHEM 317	Physical Chemistry Lab		90	Experimental Physical Chemistry, Halpern & McBane	3					100	R	_	_	_	_	_	_
CHEM 321	Quantitative Analysis	45	60	Quanitative Chemical Analysis, Harris, 8th edition	4	100					R	_	_	_	_	_	_
CHEM 341	Organic Chemistry 1	45	60	Organic Chemistry, T.W. Graham Solomons, 11th edition	4				100		R	_	_	_	_	_	_
CHEM 342	Organic Chemistry 2	45	60	Organic Chemistry, T.W. Graham Solomons, 11th edition	4				100		R	_	_	_	_	_	_
CHEM 371	Physical Chemistry 1	45		Physical Chemistry, David W. Ball	3					100	R	_	_	_	_	_	_
CHEM 461	Inorganic Chemistry 1	45		Inorganic Chemistry, Shriver & Atkins	3			100			R	_	_	_	_	_	_
CHEM 481	Biochemistry 1	45		Biochemistry: The Molecular Basis of Life, McKee & McKee	3		100				R	_	_	_	_	_	_
											_	_	_	_	_	_	_
											_	_	_	_	_	_	_
											_	_	_	_	_	_	_

1. Total hours refers to the total contact hours per term including the final. Do not record credit hours or contact hours per week in this column.
2. Indicate the credit hours (CH) for each course listed.
3. State the approximate percentage of each subdiscipline found in each course (analytical chemistry (A), biochemistry (B), inorganic chemistry (I), organic chemistry (O), and physical chemistry (P)). The percentage coverage must add up to 100% for each course. For example, Biophysics I might be 40% biochemistry and 60% physical or Organic Chemistry I might be 100% organic.
4. Using the drop-down menu, indicate whether a course is required (R) or one of two or more alternatives (A) that students may choose to meet the foundation requirements for each degree track.

Table 5.2 – Foundation Course Work (continued)

Dept. & Course Number	Course Title	Total Hours[1]		Textbook and Author	CH[2]	Subdisciplinary % Breakdown[3]					Tracks[4]						
		Class	Lab			A	B	I	O	P	1	2	3	4	5	6	7
											_	_	_	_	_	_	_
											_	_	_	_	_	_	_
											_	_	_	_	_	_	_
											_	_	_	_	_	_	_
											_	_	_	_	_	_	_
											_	_	_	_	_	_	_
											_	_	_	_	_	_	_

1. Total hours refers to the total contact hours per term including the final. Do not record credit hours or contact hours per week in this column.
2. Indicate the credit hours (CH) for each course listed.
3. State the approximate percentage of each subdiscipline found in each course (analytical chemistry (A), biochemistry (B), inorganic chemistry (I), organic chemistry (O), and physical chemistry (P)). The percentage coverage must add up to 100% for each course. For example, Biophysics I might be 40% biochemistry and 60% physical or Organic Chemistry I might be 100% organic.
4. Using the drop-down menu, indicate whether a course is required (R) or one of two or more alternatives (A) that students may choose to meet the foundation requirements for each degree track.

5.4 If any courses are listed as alternative courses in Table 5.2, please explain how students satisfy the foundation requirements for certification for each degree track. List the names and course numbers. If a course is listed here, ensure it is also entered in Table 5.2.

Table 5.3 – In-Depth Course Work

List the in-depth course work used for ACS certification. Do not include courses listed previously in Tables 5.1 and 5.2. Refer to Section 5.4 of the ACS Guidelines for the definition of an in-depth course. Enter only one course per row.

Dept. & Course Number	Course Title	Total Hours[1]		Textbook and Author	Foundation Prerequisite Course #	CH[2]	Tracks[4]						
		Class	Lab				1	2	3	4	5	6	7
CHEM 322	Instrumental Analysis	45	60	General Chemistry, Donald McQuarrie, 4th edition	CHEM 321	4	R						
CHEM 372	Physical Chemistry 2	45		Physical Chemistry, David W. Ball	CHEM 371	3	R						
CHEM 419	Adv. Synthesis & Instrumental Analysis		90		Chem 321	3	E						
CHEM 441	Reaction Mechanisms	45		The Art of Writing Reasonable Organic Mechanisms, Robert Grossman	Chem 317, 342, 372	3	E						
CHEM 442	Synthetic Chemistry	45		Drug Snythesis, Jie-Jack Li, et al	Chem 317, 342, 372	3	E						
CHEM 462	Inorganic Chemistry 2	45		Inorganic Chemistry, Shriver & Atkins	Chem 461	3	E						
CHEM 473	Chemical Kinetics	45		Physical Chemistry, David W. Ball	Chem 371	3	E						
CHEM 482	Biochemistry 2	45		Biochemistry: The Molecular Basis of Life, McKee & McKee	Chem 481	3	E						
CHEM 495	Senior Chemistry Applications	10	80			3	R						
CHEM 499	Independent Research		60		Chem 371	3	E						

1. Total hours refers to the total contact hours per term including the final. Do not record credit hours or contact hours per week in this column.
2. Indicate the credit hours (CH) for each course listed.
3. Indicate whether a course is required (R) or elective (E) for each track using the drop-down menu.

Table 5.3 – In-Depth Course Work (continued)

Dept. & Course Number	Course Title	Total Hours[1]		Textbook and Author	Foundation Prerequisite Course #	CH[2]	Tracks[4]						
		Class	Lab				1	2	3	4	5	6	7
							_	_	_	_	_	_	_
							_	_	_	_	_	_	_
							_	_	_	_	_	_	_
							_	_	_	_	_	_	_
							_	_	_	_	_	_	_
							_	_	_	_	_	_	_
							_	_	_	_	_	_	_
							_	_	_	_	_	_	_
							_	_	_	_	_	_	_
							_	_	_	_	_	_	_
							_	_	_	_	_	_	_
							_	_	_	_	_	_	_

1. Total hours refers to the total contact hours per term including the final. Do not record credit hours or contact hours per week in this column.
2. Indicate the credit hours (CH) for each course listed.
3. Indicate whether a course is required (R) or elective (E) for each track using the drop-down menu.

Table 5.4 – Physics and Mathematics Courses

List the physics and mathematics course work required for ACS certification. Refer to Section 5.7 of the ACS Guidelines. Enter only one course per row.

Dept. & Course Number	Course Title	Total Hours[1]		Department	Credit Hours	Tracks[2]						
		Class	Lab			1	2	3	4	5	6	7
MATH 211	Calculus 1	60	0	Math	4	R						
MATH 212	Calculus 2	60	0	Math	4	R						
MATH 213	Calculus 3	60	0	Math	4	R						
MATH 320	Linear Algebra	45	0	Math	3	R						
PHYS 291	Calculus Physics 1	60	60	Physics	5	R						
PHYS 292	Calculus Physics 2	60	60	Physics	5	R						

1. Total hours refers to the total contact hours per term including the final. Do not record credit hours or contact hours per week in this column.
2. Indicate whether a course is required (R) or elective (E) for each track using the drop-down menu.

5.5 How do your ACS-certified graduates **in each degree track** meet the in-depth course requirements? List the names, course numbers, and indicate if required or elective. If a course is listed here, ensure it is also entered in Table 5.3. Where a student may choose among two or more courses, clarify the options, and how many courses are required for certification.

The ACS-certified BS requires the following 12 credit hours of in-depth courses. 9 credit hours from the following required courses: CHEM 322 Instrumental Analysis, CHEM 372 Physical Chemistry 1, and 495 Senior Chemistry Applications. In addition, 3 credit hours of electives are required from the following courses and/or research: CHEM 419 Adv. Synthesis & Instrumental Analysis, CHEM 441 Reactions Mechanisms, CHEM 442 Synthetic Chemistry, CHEM 462 Inorganic Chemistry 2, CHEM 473 Chemical Kinetics, CHEM 482 Biochemistry 2, and CHEM 499 Independent Research. Special topic course such as Medicinal Chemistry, Materials Chemistry, and Spectroscopic Analysis are offered and can be used for required electives.

5.6 How do ACS-certified graduates **in each degree track** meet the laboratory requirement of 400 hours? Include the subdisciplinary area (ABIOP) covered by each course, the course name, the course number, the number of lab hours devoted to each area, and indicate whether courses are required or elective. Please record the total number of labs hours for the courses listed in each track. Do not include lab hours from general or introductory lab courses. If a course is listed here, ensure it is also entered in Table 5.2 or 5.3.

Example: Organic Chemistry II (CH 232), Organic 45 hours

Laboratory contact hours for required courses are: Analytical Chemistry (CHEM 321, 322), Analytical 120 hours, Physical Chemistry Lab (CHEM 317)Physical 90 hours, Organic Chemistry (CHEM 341, 342) Organic 90 hours. Senior Chemistry Applications (CHEM 495) A/B/I/O/P 80 hours. This gives a minimum of 410 laboratory contact hours beyond the 112 hours obtained in general chemistry.

5.7 Describe the computational chemistry facilities and software (e.g., Gaussian) that students use in their course work and research.

In quantum mechanics, students perform calculations using Gaussian 05 in the computational lab with 10 computers. Students learn how to deal with graphical interface, optimize molecular geometry, evaluate rotational barriers, vibrational spectra and other characteristics. Also, research students study structural analysis (molecular and crystal lattice) by molecular mechanics and 3D quantum calculations using Materials Studio and Cerius2 from Accelrys Inc.

5.8 How do students gain hands-on experience using chemical instrumentation?

In analytical chemistry courses students prepare their own solutions, and run reactions that they analyze themselves under the supervision of the instructor and TA. The organic chemistry sequence introduces students to NMR and IR and requires there use routinely. As part of the Physical Chemistry laboratory course students are required to become independent on the set-up and operation of chemical instrumentation. Senior Applications requires all students to experience the processes of designing, implementing, and analyzing the results of a chemical experiment using appropriate instrumentation. All students will use the NMR, FT-IR, MS, UV-vis, AA, fluorometer, electrochemical workstation, and LCMS as part of their chemical education. Additionally, some students use the single-crystal x-ray diffractometer.

5.9 a. Are any classes required for student certification taught wholly online? Yes ☐ No ☒

b. If you are having problems or concerns with the arrangements for these courses, please describe them.

Section 6: Undergraduate Research

6.1 Undergraduate Research

a. Do you use undergraduate research to fulfill certification requirements for lab hours?

Yes ☒ No ☐

b. Do you use undergraduate research to fulfill certification requirements for in-depth course work?

Yes ☐ No ☒

If yes to either question above, is a comprehensive written report required? Yes ☒ No ☐

If no, go to Item 6.3

6.2 Submit a sample of the comprehensive student research reports or theses representative of multiple disciplines and faculty, with the grade the student received indicated on each report. Also indicate on each report the number of terms (semesters or quarters) and actual student hours per term of research covered by the report.

Number submitted 5 (3-5 reports, 5 maximum)

6.3 Report on the participation in undergraduate research during the last five years.

a. Number of undergraduate majors (all degrees offered by your program) who participated in a research experience 36

b. Number of chemistry faculty who were regularly involved in research with undergraduates 5

6.4 If undergraduate research done outside of your institution is used to satisfy certification requirements, are students required to submit a comprehensive written research report that a faculty member at your institution evaluates and approves?

Yes ☐ No ☐ Not applicable ☒

6.5 How are students provided with experiment-specific safety education and training?

The first meeting of every laboratory course includes a required safety lecture that covers relevant terms and resources and the demonstration of appropriate safety techniques and equipment in the labs. In addition to this lecture, as new procedures and materials are introduced, the relevant points of safety are discussed. Students who perform research in chemistry laboratories are required to attend a 1-credit class, "Fundamental Principles of Laboratory Safety." The course is offered both fall and spring semesters.

Section 7: Student Skills

7.1 Describe the experiences that develop student professional skills in problem-solving, oral/written/presented communication, teamwork, and ethics (responsible scientific conduct).

To aid our students in the development of professional skills, they learn to work both independently and as part of a team. The results of their work are presented by them in a number of various formats throughout their studies. These include written reports, oral presentations, and posters. Whenever possible, students are encouraged to present at scientific meetings. Owing to our low student-teacher ratio, each student received individual mentoring from faculty members. These close interactions allow students opportunities to discuss professional topics such as ethics and responsible scientific conduct. Our capstone course is designed to exposed our soon-to-be graduates to the fundamental aspects of chemical research, literature review, research proposal, implementation of research, achieving and reporting results, as well as ethical and professional expectations in the work place.

7.2 Describe how your students gain experience with the effective retrieval and use of chemical literature, data management, archiving, and record-keeping.

Beginning with general chemistry students are instructed in the proper use of a laboratory notebook. These expectations are reinforced and further developed as the student moves through the curriculum. Senior Chemistry Applications, the capstone course required for all students and Chemistry Seminar involve students in research projects that require that they develop skills needed to explore chemical literature, manage data and recording-keeping. The library staff provides trainings for students enrolled, these training include the use of various data bases such as Sci-finder, inter-library loans and document delivery services. The library has almost all ACS journals, including archives, as well as various printed journals

7.3 Describe how your program conveys safe lab practices and safety risk assessment to students throughout their undergraduate experience. When and where is the first safety instruction delivered?

The first meeting of every laboratory course includes a required safety lecture that covers relevant terms and resources and the demonstration of appropriate chemical disposal (if needed) as well as safety techniques, safety equipment, and evacuation routes in the labs. In addition to this lecture, as new procedures and materials are introduced, the relevant points of safety are discussed. Students who perform research in chemistry laboratories are required to attend a 1-credit class, "Fundamental Principles of Laboratory Safety." The course is offered both fall and spring semesters. As student progress to more advanced courses the burden of assessing the possible safety hazards involved with the work being performed is slowly shifted to the student. For example, before performing an experiment in the physical chemistry laboratory course, the student must show the instructor that require safety issues have been addressed before they are allowed to begin.

7.4 How are all of the student skills describe in Items 7.1, 7.2, and 7.3 assessed?

Lab safety in general chemistry is formally tested and is part of the course grade. The assessment of safety and its documentation in the laboratory notebook is also a factor in determining laboratory course grades. The one-credit laboratory safety course contributes to a student's GPA. Professional skills are assessed during presentations of work regardless the format. The capstone course is designed to assess all aspects of what is required of a professional chemist.

Section 8: Program Self-Evaluation

8.1 Describe the program self-evaluation activities that your department has undertaken over the past five years. Provide quantitative information, if available.

In 2010, with the realization that the chemistry program was going to be hiring an almost entirely new faculty over the next five years, an assessment of the program was undertaken. The result of this process was the decision to strengthen the offerings in biochemistry and materials chemistry. The primary factors in this decision were student interest, existing facilities, and opportunities for chemistry graduates. We have since hired three new chemists: an organic chemist, a biochemist, and an analytical chemist. These hires required, and now include, the addition of a new tenure-track line to the program. This means that we now have increased from four to five the number of full-time, tenure-track faculty members. This coming July (2015), the new biochemist will join us. One of the first goals is to strengthen the biochemistry program by developing and implementing modern laboratory experiences associated directly with the biochemistry courses. Heretofore, introductions to such techniques have been spread over a number of existing courses. Eventually, we hope to offer an ACS approved biochemistry degree. In order to kick-start the envisioned biochemistry program, a BA in biochemistry was developed and approved by the university three years ago. Since then, we have experience more than a doubling of declared chemistry majors due to this new offering and will have our first biochemistry graduates next year. This Spring, our new analytical chemist completed her first year and is busy developing a robust program in nanomaterials that will increase both our research and course offerings.

8.2 Describe how the results of your department's self-evaluations have been used to improve student learning, student skills, exploration of alternate pedagogies, and the effectiveness of the chemistry program.

Supplemental Instructional Leaders or SILs (undergraduate students who have successfully completed a course and are then hired to attend that class and offer optional, structured learning opportunities to current students outside of the regular class time) have been added to General Chemistry 1 & 2 and Organic Chemistry 1 & 2. This is in response to students requesting more practice in problem solving. The impact appears to be that grades move-up one letter if they attend these sessions regularly. A very structured and deliberate approach has been taken in general chemistry laboratory 1 to introduce the proper use of lab notebooks. The very first things students do in lab is tape a hand-out of detailed instructions on page 3 of their lab notebook. The subsequent grading of their lab books is partially based on success of following these instructions. The program as a whole has embraced this approach, and as such, it is reinforced as it moves thorough the chemistry curriculum. This is in response to our dissatisfaction with the quality of lab notebooks, reports, and professionalism (plagiarism). In order to increase student awareness of career opportunities, expand their chemical knowledge, and expose them to different scientific perspectives we actively encourage every student to take advantage of a summer research program at least once during their undergraduate career.

Final Comments

Please comment on (in as much detail as you wish) changes in the last five years in faculty, diversity initiatives, professional development, support personnel, facilities, capital equipment, curriculum, and any other items related to your program that you believe would be of interest to CPT. We are especially interested in any new programs you are about to undertake. Use additional sheets, if necessary. Please do not include actual self-evaluation documents or reports.

In summary, the program has undergone almost a complete turn-over in staffing during the past four years. During this time of rebuilding, we have gone from four to five full-time, tenure-track positions and upgraded the chemical stock position to now be Stockroom Manager and Instrument Technician. This incidentally coincided with the creation of an Equipment Manager position, which provided additional resources to maintain and repair instruments and equipment. The additional tenure-track faculty position is being used to grow and develop a newly approve BA degree in biochemistry with the hope of eventually achieving an ACS certified program in biochemistry.

While developing the new program in biochemistry we reviewed both the Chemistry BA and BS degree programs. Results of this review were to change CHEM 419 (Adv. Synthesis & Instrumental Analysis) to an elective and to add biochemistry laboratory components to CHEM 481 and 482 (Biochemistry 1 & 2). The laboratory aspects of the courses will be developed in the coming year by the newly hired biochemist with plans to offer them the following year.

Concurrently, we are encouraging and supporting a budding program in nanomaterials.

Students have responded positively to both of these new focus areas, which has resulted in a marked increase in the number of declared majors, a trend we plan to continue to support. A third and novel research area that has recently been developed is optically stimulated luminescence (OSL) dating and its application to archaeology and geology as chronological tool. Recently funded grants have allowed the acquisition of an OSL reader and gamma spectrometer. This equipment will be used to investigate the luminescence phenomenon of quartz and feldspar crystals as well as provide dating services to colleagues in geology and archaeology.