

## **Academic Department Student Success Plan Annual Update: 2016-2019<sup>1</sup>**



**Department:** Chemistry and Physics

**Department Chair:** Eric Glendening

**Department Mission:** The Department of Chemistry and Physics provides comprehensive, student-centered education leading to bachelor's degrees in chemistry and physics. Students gain knowledge and problem-solving skills through rigorous lecture and laboratory course work as well as through challenging independent research experiences. We are committed to preparing students to pursue careers as scientists, engineers, teachers, and health professionals. We contribute to the scientific literacy of students in other disciplines through our general education courses. Faculty advance knowledge through their own research and provide service to the University and scientific communities, as well as to the public.

### **Department Freshmen (1<sup>st</sup> year) Retention Goal(s):**

Ensure that students are adequately supported in their 100-level chemistry and physics courses and engaged with peers and faculty in the discipline so that they continue to pursue their desired career paths.

#### **Action Steps<sup>2</sup> (with dates & person(s) responsible):**

- a. Continue to offer Preparatory Chemistry (CHEM 101) for students who need to complete the science majors' level general chemistry (CHEM 105/106) but lack the appropriate background in chemistry to succeed. Attempt to correlate performance on the first CHEM 105 exam with final grades so that we can somewhat more aggressively encourage at-risk students in CHEM 105 to switch to CHEM 101. Assess outcomes to determine whether CHEM 101 is supporting student success. Target date for completion: May 1, 2017. Persons responsible: CHEM 101/105 instructors (Gilbert, Glendening, Jeewandara, Moody, Rosenhein)
- b. Continue to offer workshops in general chemistry (CHEM 105/106) and general physics (PHYS 105) to strengthen students' problem-solving skills and to foster strong peer-peer relationships that enhance the likelihood of success in these and advanced courses in chemistry and physics. Consider piloting workshops for PHYS 106. Target date for completion: May 1, 2018. Persons responsible: 105/106 instructors (French, Gilbert, Glendening, Jeewandara, Mikula, Moody, Noll, Rosenhein, West, Zhang)
- c. Fund and organize the Chemistry and Physics Help Center, a free, drop-in tutoring service for students in freshman- and sophomore-level chemistry and physics courses. Target date for completion: May 1, 2017. Persons responsible: Michelle Baltz-Knorr, Eric Glendening, Steve Wolf
- d. Provide student employment opportunities in the Department, including positions as Science Help Center tutors, teaching assistants, laboratory assistants, and stockroom assistants. Also, broaden efforts to recruit

<sup>1</sup> Plan updates are due to your Dean by Nov. 4 as informed by your 2015-16 End-of-Year Report that is due to your Dean by Oct. 3.

<sup>2</sup> **Action Steps Defined:** The specific activities/actions taken to realize progress toward the goal. Such action steps should include not only student support type activities/actions but also student learning enhancement focused activities/actions.

highly qualified student workers. Target date for completion: May 1, 2017. Persons responsible: Michelle Baltz-Knorr, Eric Glendening, Steve Wolf

*Retention Benchmarks*  
(by latest department)

**Fall 2013 Cohort:**  
68.18%

**Fall 2014 Cohort:**  
59.09%

<b>Fall 2015 target &amp; actual:</b> 64% and 80.65%
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**Fall 2016 target:**  
66%

**Fall 2017 target:**  
68%

**Fall 2018 target:**  
70%

*Other Freshmen Retention related benchmarks of focal interest to department*

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### **Department Persistence to Completion Goal(s):**

- Increase the number of students completing the chemistry or physics major by 3% each year.
- Ensure that 80% of sophomore chemistry and physics majors complete the undergraduate degree within four years.
- Ensure that 75% of graduating chemistry and physics majors have had an undergraduate research experience and that at least half of these students have the opportunity to present their research at a professional meeting.
- Support professional development activities so that the faculty remains current in the disciplines.

### **Action Steps (with dates & person(s) responsible):**

- a. Provide opportunities for 15-20 students to participate in chemistry and physics research in the Summer Undergraduate Research Experiences (SURE) program, and expand opportunities for undergraduate research during the academic year. Target date for completion: May 1, 2017. Persons responsible: Rick Fitch, Eric Glendening, Joe West
- b. Ensure that at least half of students participating in the SURE program complete sufficient work to present the results of their research at a regional or national meeting. The Department, Dean's Office, Center for Student Research and Creativity, and the local section of the American Chemical Society will provide travel support. Target date for completion: May 1, 2018. Persons responsible: SURE faculty (Fitch, Flurkey, Glendening, Inlow, Mikula, Noll, Van Hoveln, West, Wolf, Zhang)
- c. Schedule chemistry and physics classes to meet demand for coursework in the physical sciences and facilitate degree completion for all students. The schedule will ensure that all of the 100-level service courses in chemistry and physics (except PHYS 101 and 115/116) are offered every semester, and ensure that chemistry and physics majors have the potential to complete the degree, for certain concentrations, within three years. Target date for completion: May 1, 2016. Person responsible: Eric Glendening
- d. Offer on-line courses in CHEM 100/L and PHYS 105/L beginning Spring 2017. Target date for completion: May 1, 2017. Persons responsible: Michelle Baltz-Knorr, Bill Flurkey, John Moody, Joe West
- e. Consider using OpenStax (free, open-source) textbooks for CHEM 101/105/106. Target date for completion: May 1, 2017. Persons responsible: 101/105/106 instructors (French, Gilbert, Glendening, Jeewandara, Mikula, Moody, Noll, Rosenhein, West, Zhang)
- f. Consider student performance in the chemistry and physics majors and propose mechanisms for fast-fail or gatekeeping that help direct a student out of the major before it becomes essentially impossible for the student to complete the major. Target date for completion: May 1, 2017. Persons responsible: chemistry advisors and physics faculty (Flurkey, French, Inlow, Mikula, Noll, Rosenhein, West, Zhang)

g. Reexamine prerequisites for PHYS 106 and 116. It seems that students who are unable to achieve at least a C in PHYS 105 or 115 are not successful in their next PHYS course (either 106 or 116). Use data from past years to determine whether it is appropriate to establish a grade requirement for students entering 106 or 116. Target date for completion: May 1, 2017. Persons responsible: Valentina French, Eric Glendening

h. Develop six-semester B.A. degrees in chemistry and physics designed for students who plan to pursue teaching opportunities in secondary education, plan to pursue an advanced degree in medicine or other health related areas, or seek to couple their interest in the chemistry or physics discipline with other interests (e.g. criminology, communication, business, mathematics, technology, etc.) Target date for completion: May 1, 2017. Persons responsible: Valentina French, Eric Glendening, Jennifer Inlow

i. Support faculty development by sponsoring travel to attend chemistry and physics teaching conferences, including the Biennial Conference on Chemistry Education (BCCE) and meetings of the American Association of Physics Teachers (AAPT). Target date for completion: May 1, 2018. Person responsible: Eric Glendening

*Completion Benchmarks*  
(by latest department)

**Fall 2010 Cohort:**  
35.29%

**Fall 2011 Cohort:**  
37.50%

<b>Fall 2012 target &amp; actual:</b> 41% and 45.15%
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**Fall 2013 target:**  
44%

**Fall 2014 target:**  
47%

**Fall 2015 target:**  
50%

*Other Persistence to Completion related benchmarks of focal interest to department*

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**Other Goal(s), Action Steps, and Benchmarks of focal interest to department:**

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