Student Learning Outcomes Assessment Summary

Chemistry, Bachelor of Science,

College of Natural Sciences and Mathematics

2016-17 and 2017-18

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1. Assessment information collected

a. American Chemical Society Exams were administered for General Chemistry I Chem F105X (one-semester exam), General Chemistry II F106X (one semester exam), Organic Chemistry I and II (two-semester exam), and Capstone Chemistry (F434). The results of these exams were compared to national norms as published by the American Chemical Society.

AY	Exam	Students
2016-17	Gen Chem I, F105X	297
2016-17	Gen Chem II, F106X	213
2016-17	Organic Chem I and II, F321,F325	38
2016-17	Capstone Chem, F434	5
Summer 2017	Gen Chem I, F105X	15
Summer 2017	Gen Chem II, F106X	18
2017-18	Gen Chem I, F105X	342
2017-18	Gen Chem II, 106X	280
2017-18	Organic Chem I and II, F321, F325	56
2017-18	Capstone Chem, F434	10

b. Seminars by undergraduate students are evaluated in written form by peers and faculty in the Chemistry Seminar sequence (Chem F481 and F82). These evaluation forms are assessed in terms of organization, knowledge, visual aids, and overall strengths and weaknesses of the presentation. The data is analyzed and assessed by the instructor.

c. Written reports for Chemistry & Biochemistry research students (Chem F488) were collected, evaluated and archived for future accreditation purposes by the American Chemical Society.

d. Research posters presented by undergraduate research student were presented and judged by faculty at the annual URSA Research Day at UAF in April. Eight students presented posters in April 2017 and eleven

students presented posters in April 2018. The department chair of Chemistry & Biochemistry judged all posters in 2018. Students also presented posters at the annual departmental potluck poster session year.

e. Student research proposals to URSA, BLaST, and INBRE are encouraged and success rates are examined.

2. Conclusions drawn from the information summarized above

a. ACS Exams. General Chemistry (F105, F106) and Organic Chemistry (F321 and F325) in Chem F32 scored in the 35-60th percentile nationally on ACS exams during the two-year period. The results indicate that the General and Organic Chemistry courses offer a rigorous curriculum consistent with national standards.

Students (5) in the 2016 Capstone Course averaged at the 33rd percentile nationally, whereas students (10) in the 2017 course average at the 69th percentile. The overall average was 57th percentile, with one student at the 99th percentile. The data was analyzed according to subdisciplines, relating each question to either Physical, Organic, Analytical, and Inorganic Chemistry (Biochemistry is not addressed in this exam). There were no statistically significant differences in performance across the subdisciplines, although students scored somewhat higher on the organic chemistry questions.

b. Students seminars overall were regarded as high quality by faculty with respect to organization, knowledge, visual aids, and presentation. The faculty recognized that students need more opportunity to observed seminars by professional chemists and biochemists. Budget constraints limit student exposure to these professional seminars, which has been partly compensated for by having departmental faculty present research seminars periodically.

c. Written reports are generally regarded as good quality, although students exhibit a wide range of writing skills. Many of our students need to more fully develop scientific writing skills.

d. Research posters presented by students are of high quality. Our students are enthusiastic about presenting at posters at research venues both on campus and at national conferences. Several undergraduates have presented at national conferences, with one student winning a third place at a national honors conference.

e. Students have been highly successful at obtaining research funding at UAF through programs like URSA, INBRE, and BLaST. Eight students received funding from URSA, three from BLaST and four from INBRE during the period. This success is a good indication that our students are receiving good mentoring in terms of writing proposals.

3. Curricular changes resulting from conclusions drawn above

No major curricular changes are being made in terms of coursework offered.

Seminars need to be enhanced by inviting (and funding) outside professional speakers.

The General Chemistry Honors Laboratory course is now overseen by a faculty member who has developed new experiments for the students, with an emphasis on instrumentation. The course has been well-received by students. We are planning to make the Honors Lab course a requirement for all chemistry majors, which should enhance enrollment.

Writing skills always need to be enhanced and efforts are being made to formally teach writing skills in the Capstone course (F434) using a text written specifically for chemists.

4. Identify the faculty members involved in reaching the conclusions drawn above and agreeing upon the curricular changes resulting

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5. Has your SLOA plan been updated to include assessment of the program's Communication Plan, as required by Faculty Senate motion? (required for baccalaureate programs only)

Our SLOA plan has been updated to include assessment of their communications skills. See 4. Communications skills, which focuses on three courses as part of our B.S. curriculum; Seminar Chem 482, Research Chem 488, and Capstone Chem 434.