

Chemistry - Master of Science

Current Compliance Year: 2023-2024

Full review

Recent Recommendations

Feedback will include recommendations from the last Expedited Review or from your most recent review by your school or college. You may not see any feedback or recommendations until you have completed your first full or mid-cycle review.

Response to Previous Recommendations (if any):

No previous recommendations.

Student Learning Outcomes

The previous Student Learning Outcomes Assessment has been submitted as its own report. Going forward you will use the following prompts to discuss the success of your most recent SLOA plan and address your assessment activities since your last SLOA report (typically the past two years or since your last program review).

Learning outcomes feedback from last review: Feedback and recommendations may not appear until after your first full or mid-cycle review.

Strong

Discuss your SLOA findings, changes you are making and what you hope to see as a result:

Overall, the performance of our MS students is on par with expectations and we do not plan on making any major curricular changes to the program. We recently added the option for our MS students to produce a project or thesis for their degree which was in the works during the previous review period. Ideally, this change will help to increase the number of publications our MS students produce. Our students participate in a wide range of activities to include applying for grants, undergraduate mentorship, conferences including the One Health Conference of Alaska (ORCA). Our Environment Chemistry students traditionally attend the annual E-Chem Symposium. However, it has been suspended due to Covid and we hope to have it back by spring of 2024. Our faculty will continue to promote student participation at conferences and publication production. The goal of one publication per student will remain. In the prior review we were in the process of creating a new accelerated BS/MS program. This program is now available for students to apply to and we had our first BS/MS student begin this fall 2023 term.

Discuss the curricular changes made based on assessing your SLO. If you haven't made any curricular changes, please explain why not and address what you did notice in the review, including strengths of your curriculum through the assessment of your outcomes:

We are not planning any updates to the SLOA plan at this time. We do anticipate a potential change next review period after we have observed the BS/MS program's success with at least its first student.

Are communication outcomes embedded in the SLOA Plan?

As of 2017 all Baccalaureate programs were required to embed the communication outcomes within their SLOA Plans, this is optional for non-Baccalaureate programs.

Not Embedded

Student Success

To access the Student Success Dashboard please sign into a UA computer with VPN connection (if not on campus). You will need your UA credentials and it is best accessed with the most updated version of Chrome, Edge, Firefox or Safari browsers; Internet Explorer is not supported. You will need to filter the data to see your programs. If you need assistance in finding the data for your programs, please contact your data liaison or [Julia Manfredini](#) in the PAIR office.

Data Liaisons

Each school or college has a team of Data Liaisons to help you analyze the data provided in the portal and may be able to help you see your data in multiple contexts. You can find a list of data liaisons on the resources page for Program Review.

The college or school level committee will also have access to this data with the goal that by providing these visualizations data availability will be increased.

Data supplied within the dashboard linked below is intended for Academic Program Review and not for any other purpose.

[Student Success Data Dashboard](#)

Previous Feedback: Feedback and recommendations may not appear until after your first full or mid-cycle review.

Student Success Data Trends:

Increase in majors, Decline in SCH, No change in pass rates, Increase in persistence, Equity gaps

If equity gaps were found in any of your disaggregated student success data, please explain how you plan to address those gaps. Please contact your data liaison or make an appointment with [Julia Manfredini](#) to learn more about analyzing your data.

We see a fairly even spread of gender equity in our graduate programs. However, we could work to promote greater equity in ethnicity among our domestic graduate students to include more [REDACTED] and [REDACTED] students. We admit a large ratio of international students into our graduate programs, including the MS program. Strategies for increasing equity among domestic students may include advertising our graduate programs to historically black colleges, and getting involved with more outreach to our [REDACTED] communities as well as recruiting [REDACTED] undergraduates from UA institutions.

Optional Data Explanation

Feel free to share more of your thoughts on the data provided.

It was difficult, if not impossible, to parse out financial and PAIR data for MS graduate students specifically. It would be helpful to have more specific data metrics for graduate level program reviews in the future.

High Impact Practices

According to the AAC&U, High-Impact Educational Practices “have been widely tested and have been shown to be beneficial to college students from many backgrounds.” UAF is particularly interested in Undergraduate Research and/or Scholarly Activity because it is one of our mission

fulfillment indicators, but all of these researched High-Impact Educational Practices should be reflected in your program's student learning outcomes and curriculum.

Previous Feedback: Feedback and recommendations may not appear until after your first full or mid-cycle review.

High-Impact Practices Used in this Program

Please use the following fields to discuss how your program is using the high-impact practices, successes and known issues and solutions, or ways you are considering incorporating them in the future. If you are not using any of the high-impact practices listed, please use the "Other or None of These," field to share what your program is doing to help students be successful.

High Impact Practices that currently apply to your program:

First-Year Seminars and Experiences, Undergraduate Research, Writing-Intensive Courses, Collaborative Assignments and Projects, Diversity/Global Learning

Collaborative Assignments & Projects

MS students work with their PI and committee on highly impactful research projects. This usually involves a large amount of collaboration in and outside of the lab.

Undergraduate Research

While our MS students don't do undergraduate research specifically, they are able to apply for mentorship grants through INBRE and URSA. At least one of our students was awarded an INBRE grant that allowed her to fund and mentor an undergraduate student for their project.

Diversity/Global Learning

We enroll MS students from all over the world and contiguous United States. Their unique experiences add great value to our program through diversification, and connect their experiences with issues related to Alaska and the globe.

ePortfolios

NA

First Year-Seminars & Experiences

We teach graduate level seminar courses that prepare students in grant proposal writing. All of our MS students are expected to align with a PI in their first year in order to form their project or thesis topic. Most of our students begin research within their first year or by their second year which provides them with exceptional, unique, and rewarding research experience.

Writing-Intensive Courses

All MS students must complete either a thesis or project for their degree. Most of our students perform at expectation for their writing skills and above for their presentation skills.

Service-Learning and/or Community-based Learning

NA

Internships

NA

Capstone Courses & Projects

NA

Other or None of these (explain)

Program Profile and Financial Data

The program review elements in this section usually stay consistent for departments. Any responses you provide will be saved for your next visit. So, when it's time for the next program submission, your previous narrative profile answers will be here, ready for editing. You can then decide if any updates are necessary, based on your needs for the next program review cycle.

Financial Data Resources

The Board of Regents shapes program review, through BOR Policy 10.06, to support budget increase advocacy in the state legislature. The standardized financial data template should be analyzed with your data liaison to assess your program's capacity and resource status.

To keep integrity and remain standard across all of UAF it is very important that you do not provide any additional or alternative data.

Financial Template

Your data liaison may have uploaded your template to the Google folder for this program, or you may do so now.

Previous Feedback: Feedback and recommendations may not appear until after your first full or mid-cycle review.

Cost Effectiveness

How does your department/program approach being cost effective?

We compiled our financial data on a department level. Specialized instrumentation needed for chemistry research and teaching is highly expensive. Oftentimes, faculty will purchase new instrumentation through grant funding that can then be used by the department, which allows students and researchers a cost effective way to work on their projects. Additionally, we regularly take stock of our financial environment so we can make informed decisions on where to cut costs. In general, we work hard to remain frugal in our spending and strategize ways to increase enrollment and retention which boosts tuition revenue and has long term, positive, affects to the department as a whole.

Program's Value to Mission

Our MS program adds value to UAF's mission through our workforce development, academics, and research. Our graduates go on to careers in their field of chemistry and many remain in Alaska working for the government, industry, and academics. Our undergraduate programs are ACS (American Chemical Society) accredited which is foundational to our department by setting a high standard in our practices and coursework. We have the only graduate level chemistry programs in Alaska, and our students are involved with research that has a direct impact on our economy and environment.

Duplicative Programs

N/A

Community or Other Partnerships

We work closely with UAA's Chemistry Dept as they do not have a graduate program but have very active faculty. This partnership has been beneficial to students who wish to remain in Anchorage but want to obtain a higher level degree in Chemistry. It has also benefited the faculty who need research assistants. The primary set back to this arrangement is that there are sometimes roadblocks or obstacles for curricula and credit ratio requirements. We are also looking to create additional pipelines with government and industry employers in Alaska so that we can maximize employment potential for students who wish to remain here.

Value of Service Courses (Optional)

We work closely with UAA's Chemistry Dept as they do not have a graduate program but have very active faculty. This partnership has been beneficial to students who wish to remain in Anchorage but want to obtain a higher level degree in Chemistry. It has also benefited the faculty who need research assistants. The primary set back to this arrangement is that there are sometimes roadblocks or obstacles for curricula and credit ratio requirements. We are also looking to create additional pipelines with government and industry employers in Alaska so that we can maximize employment potential for students who wish to remain here.

Post-Graduate Success

Of the 10 students that graduated between 2019-2023, at least five have remained in Alaska. Four are working in their field, the other is attending pharmacy school at UAA. Additionally, we have an Environmental Chemistry graduate pursuing their PhD in [REDACTED] and two others pursuing PhD's in the contiguous United States. Other students are working in their field at Vanderbilt, Flint Hills (before they closed), and in the Army. These stories point to the success of the program. Not only are we keeping some students in Alaska, despite the relatively small job market for chemists, but all are either continuing their education in chemistry or working in their field.

Submission

Submitter & Collaborator Names

Brian Rasley

College or School Review Committee

The college or school committees set the tone for helping each program feel seen during this process. We have provided you with strength-based feedback tags to attach to this program review. Please select as many as applicable.

Overall Recommendations

Address equity gap, Increase enrollment, Increase graduates

Explanation of Recommendations

This program adds value to UAF's mission through workforce development, academics, and research. This is the only MS level chemistry program in Alaska, and students are involved with research that has a direct impact on Alaska's economy and environment. Many graduates chose to remain in Alaska working for the government, industry, and academics. Their BS programs are ACS (American Chemical Society) accredited which is noteworthy.

Number of majors and students in the MS program seems stable in the last three years. The program is attracting a smaller percentage of [REDACTED] students. The percentage of female graduates has dropped substantially in recent years. There is an opportunity to increase enrollment and ethnic diversity by attracting more [REDACTED], [REDACTED] and [REDACTED] students. We encourage the department to continue their effort in increasing enrollment and closing the equity gap.

The program has identified a number of high impact practices. We encourage the department to continue with those high impact practices.

Close collaboration with UAA's Chemistry department. A new accelerated BS/MS program began in the fall 2023 term. A new option for MS students to produce a project or thesis. Students actively participate in local conferences. The goal of having one publication per student is commendable. However, none of the SLOA outcomes are supported by data. As per the SLOA Implementation the program should be collecting direct metrics on all SLOA outcomes. The committee recommends reporting of data to support the SLOA outcomes along with narratives.

Student Learning Outcomes Assessment Feedback (tags)

Strong alignment with SLOA plan, Missing a direct measure

Student Learning Outcomes Assessment Feedback (narrative)

Close collaboration with UAA's Chemistry department. A new accelerated BS/MS program began in the fall 2023 term. A new option for MS students to produce a project or thesis. Students actively participate in local conferences. The goal of having one publication per student is commendable. However, none of the SLOA outcomes are supported by data. As per the SLOA Implementation the program should be collecting direct metrics on all SLOA outcomes. The committee recommends reporting of data to support the SLOA outcomes along with narratives.

Profile Feedback

Program is mission-centric to UAF or college/school, Program is unique in the state, Collaborative with other UA programs, Providing job placement for graduates, Strong post-graduation success for students, Strong ties to the community or industry

Financial Feedback

Opportunities to Increase Revenue

Student Success & Equity Feedback

Number of majors and students in the MS program seems stable in the last three years. The program is attracting a smaller percentage of [REDACTED] students. It would be good to know how the current percentage compares with similar programs across UAF, UAA and UAS. The percentage of [REDACTED] graduates has dropped substantially in recent years. There is an opportunity to increase ethnic diversity by attracting more [REDACTED], [REDACTED] and [REDACTED] students. The program has listed a few ideas for increasing equity among domestic students. However, no concrete plans for implementation are discussed. We encourage the department to continue their effort in closing the equity gap.

High-Impact Practices Feedback

The program has identified a number of high impact practices. We encourage the department to continue with those high impact practices. Under the ‘writing-intensive course’ practice the program discusses thesis and project writing which are not typically part of a course. The program should support the statement “most of our students perform at expectation for their writing skills and above for their presentation skills” with data, for example using the counts of peer-reviewed publications and conference presentations where a MS student is first author or co-author.

Dean’s Review Feedback

The close collaboration with the UAA chemistry department is especially valuable. I am excited to see the accelerated BS/MS program take shape and expect this program to be of value, especially for high achieving students.

Vice Provost Feedback

SLOAs – Provided 4 SLOs; SLO #4 is a program outcome and not a SLO; the program might consider revising the SLOs to include more “action” words (<https://tips.uark.edu/blooms-taxonomy-verb-chart/>). Need to address closing the loop and continuous improvement.

HIPs - Provided overviews of these practices; could have used more details for each practice with specific examples. Not clear if these are required for all students or if students can choose from a group of options. Frequency of these opportunities? Where in the program/what classes? Required or optional? What proportion of students involved?

UNIVERSITY OF ALASKA FAIRBANKS
Student Learning Outcomes Assessment Plan
 Chemistry M.S. program

MISSION STATEMENT:

The Chemistry MS program seeks to provide students with training well in advance of a Bachelors degree in one of the primary subdisciplines of chemistry that includes computational, analytical, organic, inorganic, and physical. Training will be in the form of advanced coursework, advanced techniques associated with a research project, and dissemination of ideas in both written and oral communications.

GOAL STATEMENT:

Students graduating with a MS degree in chemistry will either be accepted into nationally accredited graduate or professional programs or will have secured professional employment that makes significant use of their MS training. Results from student research will result in peer-reviewed publications or form the basis for future publications.

Intended Objectives/Outcomes	Assessment Criteria and Procedures	Implementation (what, when, who)
Graduates attain a level of technical ability and knowledge to function as professionals in their discipline.	Students will demonstrate their abilities and progress through presentations, manuscripts, and annual committee meetings.	Annual graduate committee meetings will include questions to assess student progress toward the stated objective (Form "GradProgramAssessmentForm"). Annual progress reports will be reviewed by faculty to assure program goals are being met.
Masters graduates have performed research using technical, safety, and problem solving skills to contribute to their field.	Graduates will contribute to the peer-reviewed literature and/or present work at conferences.	Masters students should have contributed to at least one manuscript ready for submission to the peer-reviewed literature at time of defense or have presented work at a conference. Thesis defense quality will be assessed "GradProgramAssessmentForm".
Communication/presentation skills are consistent with professional standards.	Graduate students will have experience in giving oral presentations at disciplinary conferences, preparation of peer-reviewed manuscripts and development of research proposals.	Survey of graduate students and student committees (including oral defenses and exams) will include questions to assess their progress towards the stated objective (Form "GradProgramAssessmentForm"). Assessments of student performances seminar courses will be compiled and reviewed annually. List of peer reviewed publications and conference presentations will be compiled and reviewed annually.
Graduates obtain employment or continue education in the field following graduation.	90% of students will be employed or continue education in a related field one year after graduation	Graduates will be surveyed (Form "Graduate Student Exit Interview") and faculty will be surveyed annually regarding recent graduates.

Fiscal Report for <u> CHEM </u>		Department/Program		
	FY2021	FY2022	FY2023	
Total Student Credit Hours (SCH)	3740	3399	3619	
Service SCH	2283	1947	2257	
Department FTEs	10.2	10.2	10.2	
Total SCH per Department FTE	366.67	333.24	354.80	
Service SCH per Department FTE	223.82	190.88	221.27	
Majors in Programs				
Department FTEs	8.4	8.4	8.4	
Majors per Department FTE	10.12	9.17	9.40	
Total Unrestricted Expenditures				
Total Restricted Expenditures				
Total Unit/Central Support Allocated to Program(s)				

Tuition Revenue			
State Appropriation Revenue			
Restricted/Sponsored Project Revenue			
Fees			
Other UA Receipts/Revenue			

Workload allocation: Teaching Units	140	115	45
Workload allocation: Service Units	162	118	50
Workload allocation: Research Units	132	98	40

Full-time Equivalent Worksheet**	FY2021	FY2022	FY2023
Faculty FTEs	5.4	5.4	5.4
Adjunct FTEs	0.95	0.9	0.5
Staff FTEs	2.83	2.83	2.83
Graduate TA/RA FTEs	12	11.25	12.75
Total Departmental FTEs	21.18	20.38	21.48

****Note:** FTE definitions and calculations for the purpose of Academic Program Review

Definitions for the compiling staff

Provided in SCH tab in the student success data provided by PAIR.

Sum rows labeled as "In unit, outside department, Service" and "Outside unit, Service" in the SCH tab of the data provided by PAIR.

for each employee type, and then use the total from row 31 here.

Sum for all programs from the Majors Total tab in the data provided by PAIR.

From row 31 below or row 5 above

Total Expenditures made from budgets with an F1 or F7 fund type designation, from provided cycle report data filtered by Data Liasion
Total Expenditures made from budgets with revenue of the F2 or S2 fund type designation, from provided cycle report data filtered by Data Liasion

Expenses incurred for direct support of instruction within orgs identified as central or academic support, if applicable

Receipts to college from tuition generated by the department/program (F1).

NOTE: under the current 80/20 percent tuition distribution model generating units receive 80%. PLEASE USE PAIR REPORTED SCH TO REPLACE ZEROES IN CELL CALCULATIONS.

Appropriations for current funds operation of the university from the general fund of the State of Alaska through the annual budget cycle. This category also includes TVEP and State Mental Health Trust funds, if allocated to the department. (F1)

Revenue from external sponsors; includes grants, contracts, sponsored projects & restricted (grant) accounts funded by UA Foundation funds (F2/S2)

Course Fees (9159)

e.g. Performance and Sales Receipts, Space Rental Revenue, Indirect Cost Recovery (F1/F7); NOTE: COURSE FEES (9159) REPORTED ABOVE

Department facultys' workload units assigned to teaching

Department facultys' workload units assigned to service

Department facultys' workload units assigned to research

Split appointments are multiplied by the % of effort assigned to this adjuncts in a year divided by 40 = the FTE of adjuncts in that year.

Split appointments are multiplied by the % of effort assigned to this

0.75 FTE.

Sum of all employee FTEs

view are different than for other institutional reporting processes (e.g. C

Definitions for the programs and reviewing committees

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Receipts to college from tuition generated by the department/program, based on the campus's active tuition distribution model, which determines how much the unit receives of their generated tuition, and how much the campus keeps (in addition to the out-of-state surcharges) to support central offices/functions. The current distribution model is 80/20, where the unit/college receives 80% of their generated in-state tuition.

Appropriations for current funds operation of the university from the general fund of the State of Alaska through the annual budget cycle.

Revenue from external sponsors; includes grants, contracts, sponsored projects & restricted (grant) accounts funded by UA Foundation funds

OMB or IPEDS reporting)

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