

Petroleum Engineering - Master of Science - Mid-Cycle Review & SLOA Year

Current Compliance Year: 2022-2023

Mid-Cycle 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):

Competitively funded research projects—examples of our success

- The successful completion of the [REDACTED] US DOE funded project on heavy oil polymer flooding resulted in the [REDACTED] State of Alaska funding to enhance the recovery of even heavier oils in Ugnu using a novel technology called Polymer Alternating Solvent (PAS). The PAS project commenced on 7/1/2022. Under the PAS project we are closely working with Hilcorp Alaska.
- We also have a [REDACTED] million funded research project on Plains Carbon Dioxide Reduction (PCOR).
- We have recruited a lab assistant and a post-doc. We expect that the post-doc in collaboration with PETE faculty will develop research proposals in the future that will lead to increase in enrollments.

Collaboration with other UAF faculty

We continue our efforts in collaborating with other faculty from diverse fields (math, chemistry, CS and ME), by engaging them on GACs.

Simultaneous offering of graduate courses in Fairbanks and Anchorage

PETE department is perhaps the pioneer in simultaneously teaching graduate courses at both locations (starting with old Pexip), which is especially important as far as Anchorage is concerned given the presence of oil industry professionals.

Graduate certificate program in data analytics applications in petroleum engineering

Our graduate coordinator is exploring the various modalities for this particular offering and will be concentrating efforts after completion of his sabbatical.

Encourage our own UG students to pursue MS in PETE

So far, we have been successful in recruiting two such students and hope to attract more in the future.

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 will be provided once you have completed a full or mid-cycle review.

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

Focus of this SLOA discussion: 7 theses and 2 projects MS students that graduated in AYs 20-21 and 21-22. Discussed in PETE faculty meetings.

- SLOA1 – GAC conducted oral comprehensive examination to test knowledge in core disciplines of drilling, reservoir, production engineering. Each student passed the exam. Records are in the PETE office.

- SLOA2 – Literature review is an integral part of every PETE MS thesis and project report, which is in fact the basis of the problem statement addressed in the scholarly works.

- SLOA3 – Evaluated using students' thesis/project. Specific examples of solution to petroleum engineering problems using fundamental principles include history matching of oil rates; CO₂ sequestration; salinity effect on oil recovery; estimation of unconventional oil and gas reserves.

- SLOA4 – Specific examples of these include the use of industry software such as CMG suite for reservoir simulation; development in a programming language to make accurate production forecasts; and indigenously designing and developing lab set-ups in support of EOR.

- SLOA5 – Evaluated using the students' MS thesis/project defense presentation and report. Some concrete examples are: (1) graduate students are first authors on all publications; (2) combined, this cohort of students produced 3 refereed journal and 4 conference papers in the Society of Petroleum Engineers (SPE) literature; (3) one of the student was a first place winner in the MS division student paper contest at the SPE Western North America Region (April 2022) AND Internationally (October 2022) – first time in the history of PETE/UAF!

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:

No explicit curricular changes were made given the attainment of the SLOAs as discussed above and our long-standing high-impact practices. However, considering the prominence and reputation achieved by the PETE department in the area of (chemical) EOR for heavy oils and CO₂ sequestration, a new trial course on "Advanced Chemical Enhanced Oil Recovery Methods" is being offered in fall 2022. The department plans to make this a regular cataloged offering in the future, as we target even heavier and challenging heavy oil resources that are abundant on Alaska North Slope (~12-18 billion barrels). This was discussed in a faculty meeting prior to start of the fall 22 semester. Similarly, given the importance and application of data sciences in petroleum engineering, some of our students also are taking courses in these subject areas to not just fulfill the coursework credit requirements but to utilize the learnings in their respective MS thesis or project research.

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.

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 will be provided once you have completed a full or mid-cycle review.

Student Success Data Trends:

Decline in majors, Decline in SCH, Decline in persistence, No change in pass rates, 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.

In the six different categories, the most notable among the disaggregated data shows a [REDACTED] drop to 50% in FY20 to FY21 and FY21 to FY22, respectively in the persistence rate. Another noteworthy, albeit positive, trend is the 50% to 100% persistence rate in the [REDACTED] race category (first three year cycles). Some fluctuation also is seen in the [REDACTED] race category. As far as the [REDACTED] category is concerned, we suspect that it is attributable to the fact that sometime students “delay” their completion of MS thesis or the project due to internship opportunities and some are due to the “part time” Anchorage based students that are full time employed in the oil and gas industry. We acknowledge these trends and will monitor in the future to bring the persistence rate to 100%. The plan to address the gaps will involve the GAC chair and department chair advising/counseling or intervening in the case of the perceived, vulnerable students. Note though that for the most part, we have and continue to have a strong track record of ensuring that our students successfully complete the programs.
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Optional Data Explanation

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

Decline in Majors and SCH: Enrollments in petroleum engineering, in general, have declined, which also has direct proportionality with SCHs. Our current emphasis is to recruit PhD students instead of MS so that there is continuity in the research projects.

Decline in Graduation-Informed Persistence: As per the GIP table, from year to year a slight decline in persistence is seen (in particular to 84.6% in FY21 to FY22). We believe that this may be due to the unique set of students that we have that are based in Anchorage (full time employed and complete their degrees per their work schedules), However, when we compare our GIPs with the rest of the MS cohort within CEM, our data falls in between the CEM lows and highs.

Average Course Pass Rate: For the most part the average course pass rate across Gender, Ethnicity and Age appears to be nearly 100%; however, as reported in the Race category, we do note a drop to 77.8% in 2019.

Employment: Very important to note that with the exception of one (unknown) the entire cohort is gainfully employed in the oil and gas or allied sector, which strongly loops back to the attainment of all 5 SLOAs.

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 will be provided once you have completed a 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:

Internships, Collaborative Assignments and Projects, Diversity/Global Learning

Other or None of these (explain)

Submission

Submitter & Collaborator Names

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Submitter Email

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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

Increase enrollment

Explanation of Recommendations

You have many plans for growth at the graduate level. Continuing the research success will be an effective way to maintain program strength, as will your continued collaboration with industry. Please monitor the success of these efforts.

Student Learning Outcomes Assessment Feedback (tags)

"Clear, concise presentation of findings"

Student Learning Outcomes Assessment Feedback (narrative)

The committee appreciates the way the program has made some curricular changes based on changing needs of the industry and strengths of the program. However, the program might consider revising the MS SLOA assessments to include more modalities, rather than pass/fail option.

Profile Feedback

Financial Feedback

Student Success & Equity Feedback

Your report was thoughtful and thorough. You identified equity gaps and plans to improve them. It was helpful to see some discussion of the tags that you have chosen and of the students' employment as the attainments of all 5 SLOAs.

High-Impact Practices Feedback

You identified a number of HIPs that seem like a powerful way to engage and train students, though there is a challenge for international students in participating in internships.

UNIVERSITY OF ALASKA FAIRBANKS
Student Learning Outcomes Assessment Plan
Master of Science in Petroleum Engineering
 College of Engineering and Mines
 Updated November 8, 2022

Expanded Statement of Institutional Purpose	Intended Objectives/Outcomes	Assessment Criteria and Procedures	Implementation (what, when, who)
MISSION STATEMENT: The mission of the Petroleum Engineering Program is to provide its students with quality education and training in the field of Petroleum Engineering through effective teaching, research and public service, with emphasis on Alaskan petroleum resources. GOAL STATEMENT: To be the foremost PE program dedicated to the creation of innovative solutions for the extraction and the sustainable development of energy resources in the circumpolar North and beyond.	(1) Students will demonstrate a broad appreciation of the core disciplines of petroleum engineering, i.e., Drilling, Reservoir and Production.	A comprehensive exam that will test the three broad technical areas in petroleum engineering—drilling, production and reservoir engineering (Pass or Fail)	Graduate committee evaluation at the end of the students' second semester and / or Graduate committee evaluation approximately one semester before final defense and / or Graduate committee evaluation during final defense
	(2) Students will demonstrate an ability to conduct a proper literature review and relate previous work to current challenges.	Evaluation of thesis/project report (Pass or Fail)	Graduate committee evaluation approximately one semester before final defense and / or Graduate committee evaluation during final defense
	(3) Students will be able to apply principles of engineering, science, and mathematics to identify, formulate, provide insight into or solve a petroleum engineering problem.	Evaluation of thesis/project report (Pass or Fail)	Graduate committee evaluation during final defense

Submitted by: Obadare Awoleke and Abhijit Dandekar

Expanded Statement of Institutional Purpose	Intended Objectives/Outcomes	Assessment Criteria and Procedures	Implementation (what, when, who)
	(4) Students will demonstrate the ability to use or develop modern engineering tools.	Class projects and/or Evaluation of thesis/project report (Pass or Fail)	Class instructor and/or Graduate committee evaluation during final defense
	(5) Students will demonstrate good oral and written communication skills.	Evaluation of thesis/project report (Pass or Fail)	Graduate committee evaluation during final defense