

UNIVERSITY OF ALASKA FAIRBANKS
Student Learning Outcomes Assessment Plan
Earth System Science Phd. Program
 College of Natural Sciences and Mathematics
 2025

Expanded Statement of Institutional Purpose	Intended Objectives/Outcomes	Assessment Criteria and Procedures	Implementation (what, when, who)
MISSION STATEMENT: ESS provides a high-quality education that prepares students for professional success and personal satisfaction in careers that meet the challenges of problems in Alaska, the Arctic, and around the world. GOAL STATEMENT: ESS will be recognized for high-quality educational programs that prepare students in both deep disciplinary subjects and interdisciplinary areas, offering flexibility in the balance between the two. The ESS strives to be acknowledged as a premier graduate program in systems thinking through valuing diversity, equity and inclusion.	1. Communication 1a. Written: Students should be able to compose clear text consisting of cogent arguments aimed at multiple audiences: peer-reviewed publications, research reports, stakeholder communications, and public audiences. 1b. Oral: Students should be able to deliver a clear professional presentation for varied audiences (scientific, stakeholder, and public) and field questions related to presentation with confidence and poise.	<u>Instrument:</u> Writing assignments. <u>Rubric:</u> Varies according to product and taught in ESS and Skills courses. <u>Min. Standard:</u> 90% of students meet or exceed expectations. <u>Instrument:</u> Oral presentations. <u>Rubric:</u> The rubrics are taught in ESS and Skills courses. <u>Min. Standard:</u> 90% of students meet or exceed expectations.	Writing exercises are collected from ESS 601, ESS 602, and the majority of Skills courses. Oral presentations are evaluated by instructors and peers in ESS 601. Oral class activities are evaluated by instructors in ESS 601. The ESS Student Research Symposium is open to all students at UAF studying ESS. It includes a 3-hour poster session and adjacent time for networking. Data collected each semester through evaluations and summarized annually as part of ESS assessment.
	2. Problem Solving 2a. Students will be capable of analyzing a research problem, identifying the critical aspects, and devising appropriate methods to answer the questions and address problems that arise. 2b. Students should be able to apply appropriate technical methods to their research	<u>Instrument:</u> Oral comprehensive <u>Rubric:</u> In accordance with concentration. <u>Min. Standard:</u> 90% of the students meet or exceed expectations. <u>Instrument:</u> Thesis defense	Graduate committee evaluation of oral comprehensive exam. Graduate committee evaluation of final thesis defense.

	problem, demonstrate critical thinking, and defend their work.	<u>Rubric:</u> In accordance with concentration. <u>Min. Standard:</u> 80% of students meet or exceed expectations.	ESS 601 features a semester project, tackled in groups of 4-6, that has multiple graded deliverables that address problem formulation (2a), implementation and interpretation (2b) and effective collaboration.
	3. Ethical Knowledge 3a. Ethical guidelines are followed for all data collected and produced and for intellectual property. 3b. Students should be able to identify an ethical dilemma and distinguish between ethical and unethical behavior.	<u>Instrument:</u> Thesis proposal defense. <u>Rubric:</u> Based on existing accepted standards <u>Min. Standard:</u> For each question, 90% of students meet or exceed expectations. <u>Instrument:</u> Annual graduate committee reports, publication attributions and data statements, Thesis defense. <u>Rubric:</u> Based on existing accepted standards. <u>Min. Standard:</u> For each question, 90% of students meet or exceed expectations.	FAIR data principles applied to research data. Inclusion of ethical principles of engagement in indigenous communities in Required courses.
	4. Technical Knowledge 4a. Students should be able to demonstrate a depth of knowledge in their concentration 4b. Students should be able to demonstrate an acceptable level of understanding in critical subject matters.	<u>Instrument:</u> Peer-reviewed publications, scholarly products, proposals, and presentations. <u>Rubric:</u> Various. <u>Min. Standard:</u> Will vary with concentration. For example: 2-3 peer-reviewed publications, or 2-3 scholarly products <u>Instrument:</u> Publications, scholarly products, proposals, and presentations.	Quantity and quality of products. Impact factor of journals and over the longer timescale number of citations; venue for scholarly products; success of proposals; invited presentations.

	4c. Students should be able to demonstrate an acceptable level of understanding beyond their concentration 4d. Students should be able to demonstrate an acceptable level of awareness and respect for Indigenous knowledge.	<u>Rubric:</u> Various. <u>Min. Standard:</u> 90% of students meet or exceed expectations. <u>Instrument:</u> Thesis, reports, scholarly products, and presentations. Oral thesis defense. <u>Rubric:</u> Various. <u>Min. Standard:</u> 90% of students meet or exceed expectations. <u>Instrument:</u> Annual reports, scholarly products, participation in professional development training, and presentations. <u>Rubric:</u> Various. <u>Min. Standard:</u> 90% of students meet or exceed expectations.	Level of interdisciplinarity of products, collaborators, and thesis committee. Graduate committee evaluation of oral comprehensive exam and thesis defense. Level of interdisciplinarity of products, collaborators, and thesis committee. Annual report to graduate committee.
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