



**Board of Regents Program Action Request**  
**University of Alaska**  
 Proposal to **Add or Change** a Program of Study

<b>1a. UA University</b> UAF	<b>1b. School or College</b> College of Engineering & Mines	<b>1c. Department or Program</b> Geological Engineering BS																																					
<b>2. Complete Program Title:</b> Geological Engineering BS																																							
<b>3. Type of Program:</b>																																							
Undergraduate Certificate <input type="checkbox"/>	Associate <input type="checkbox"/>	Baccalaureate <input checked="" type="checkbox"/>																																					
Master's <input type="checkbox"/>	Doctorate <input type="checkbox"/>	Post-Baccalaureate Certificate <input type="checkbox"/>																																					
<b>4. Type of Action:</b> <input type="checkbox"/> Add <input checked="" type="checkbox"/> Change																																							
Implementation Semester: Fall Year: 2021																																							
<b>6. Projected Revenue and Expenditure Summary:</b>																																							
Provide information for the 5 <sup>th</sup> year after program change approval if a baccalaureate or doctoral degree program; for the 3 <sup>rd</sup> year after program approval if a master's or associate degree program; or for the 2 <sup>nd</sup> year after program approval if a graduate or undergraduate certificate. If information is provided for another year, specify ( ) and explain in the program summary attached. Note that revenues and expenditures are not always entirely new; some may be current (see 7d.)																																							
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Page # of attached summary where the budget is discussed, including initial phase-in:		N/A																																					
<b>7. Budget Status. Items a., b., and c. indicate the source(s) of the general fund revenue specified in item 6. If any grants or contracts will supply revenue needed by the program indicate amount anticipated and expiration date, if applicable.</b>																																							
<b>Revenue source</b>	<b>Continuing</b>		<b>One-Time</b>																																				
a. In current legislative budget request	\$	-	\$	-																																			
b. Additional appropriation required	\$	-	\$	-																																			
c. Funded through new internal UA university redistribution	\$	-	\$	-																																			
<a href="#">d. Funds currently committed to the program[1]</a>	\$	-	\$	-																																			
e. Funded all or in part by external funds, expiration date	\$	-	\$	-																																			
f. Other funding source (specify type):	\$	-	\$	-																																			
<b>8. Facilities. New or substantially (&gt;\$25,000 cost) renovated facilities will be required.</b>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No																																					
If yes, discuss the extent, probable cost, and anticipated funding source(s), in addition to those listed in sections 6 and 7 above.																																							

<b>9. Projected Enrollments (headcount of majors). If this is a program discontinuation request, project the teach-out enrollments.</b>			
Year 1: <input style="width: 40px;" type="text" value="30"/>	Year 2: <input style="width: 40px;" type="text" value="30"/>	Year 3: <input style="width: 40px;" type="text" value="30"/>	Year 4: <input style="width: 40px;" type="text" value="30"/>
Page number of attached summary where demand for this program is discussed:		N/A	
<b>10. Number<sup>2</sup> of new TA or faculty hires anticipated (or number of positions eliminated if a program discontinuation):</b>		<b>11. Number<sup>2</sup> of TAs or faculty to be reassigned:</b>	
Graduate TA	<input style="width: 60px;" type="text" value="0"/>	Graduate TA	<input style="width: 60px;" type="text" value="2"/>
Adjunct	<input style="width: 60px;" type="text" value="0"/>	Adjunct	<input style="width: 60px;" type="text" value="0"/>
Term	<input style="width: 60px;" type="text" value="0"/>	Term	<input style="width: 60px;" type="text" value="0"/>
Tenure track	<input style="width: 60px;" type="text" value="2 (Eliminated)"/>	Tenure track	<input style="width: 60px;" type="text" value="2 (Retained)"/>
Former assignment of any reassigned faculty:		MinGeo	
For more information see attached summary page:			
<b>12. Other programs affected by the proposed action, including those at other campuses (please list):</b>			
Program Affected	Anticipated Effect		
Civil & Environmental Engineering	Civil engineering curriculum will be modified to promote shared concepts/courses between CE and GE		
Mining Engineering	Mining will be in a smaller department, but can still share courses with GE		
Page number of attached summary where effects on other programs are discussed: N/A			
<b>13. Specialized accreditation or other external program certification needed or anticipated. List all that apply or 'none':</b>		<b>14. Aligns with University or campus mission, goals, core themes, and objectives (list):</b>	
Seek to maintain ABET accreditation for GE program		Educates undergraduate students	
		Research creates and disseminates new knowledge - Arctic focused	
		Page in attached summary where alignment is discussed:	
<b>15. State needs met by this program (list):</b>		<b>16. Program is initially planned to be: (check all that apply)</b>	
Promotes development of resource extraction industry		Available to students attending classes at campuses	<input checked="" type="checkbox"/>
Promotes development of infrastructure statewide		Available to students via e-Learning	<input type="checkbox"/>
Develops responses to arctic-related geohazards		Partially available to students via e-Learning	<input checked="" type="checkbox"/>
Develops a well-trained engineering workforce		Page # in attached summary where e-Learning is discussed:	
<b>17. If this program is an addition, would program be eligible for State's Eligible Training Provider List program?</b>			
Yes <input style="width: 40px;" type="checkbox"/>	No <input checked="" type="checkbox"/>		<a href="#">(Click here for more information)</a>
Submitted by: _____			
Chancellor/Provost		Date:	
Consensus support of AC <input style="width: 40px;" type="checkbox"/>	Not supported by AC <input style="width: 40px;" type="checkbox"/>		
Recommend <b>approval</b> by VPASR _____			Date:
Recommend <b>disapproval</b> by VPASR _____			Date:

<sup>2</sup>Net FTE (full-time equivalents). For example, if a faculty member will be reassigned from another program, but his/her original program will hire a replacement, there is one net new faculty member. Use fractions if appropriate. Graduate TAs are normally 0.5 FTE. The numbers should be consistent with the revenue/expenditure information provided.

Attachments:  Summary of Degree or Certificate Program Proposal  Other (optional)

Revised: 11/11/2019

[\[1\] Sometimes the courses required by a new degree or certificate program are already being taught by a UA university, e.g., as a minor requirement. Similarly, other program needs like equipment may already be owned. 100% of the value is indicated even though the course or other resource may be shared.](#)

March 23, 2020

TO James R. Johnsen, President, University of Alaska

FROM Daniel M. White, Chancellor, University of Alaska Fairbanks

RE UAF Expedited Academic Review

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In accordance with Regents' Policy 10.06.10, and as required by University Regulation 10.06.10.C.2, UAF followed the following process for expedited, exceptional Program Review that was tailored to UAF's particular financial circumstances. The process and timeline are included on the Provost's web site (<https://uaf.edu/assessment-review/expedited-review.php>). The effort began last October and we are now nearing the final stages of the process. Remaining steps are as follows with this step constituting step number 1, below:

1. Monday, March 23 by 5pm - Chancellor recommendations will be sent to the UA President and VP of Academic, Students, and Research.
2. April 1, 2020 – President's recommendations go to the SW Academic Council
3. April 9, 2020 – BOR Public Testimony
4. April 13-14, 2020 – BOR Academic and Student Affairs committee meets to discuss recommendations
5. June 4-5, 2020 – Board of Regents meets to vote on any program changes, including eliminations.

My program review recommendations are based on my review of the committee's analysis and recommendations, dean's reviews, consultation with the Provost, faculty senate motions, public input, budget considerations, and our need to make vertical cuts rather than ongoing horizontal cuts. I did not ask the program review committee to reach a specific budget target because I wanted to make sure that the review committee members were given the latitude to evaluate all of the aspects of the programs and not pit programs against one another. As a result, and not surprisingly, very few program reductions were recommended by the committee. I think that is a reasonable result of the process to date. While it is true that all of our programs have value, history, and students, it is also true that some programs will need to be reduced. All aspects of the university will need to play a part in meeting our budget targets. Furthermore, I have received feedback imploring me to make some vertical cuts to programs, not just horizontal percentages from all units. As a result, my recommendations for program reduction are greater than what has been recommended by the committee. Even with greater reductions, academic programs are only one aspect of our overall reductions. I continue to focus on reductions in space, functions at the

edges of our mission, and reducing footprint. And we will continue to identify what work we can simply stop doing.

Per the review committee's recommendations we will proceed to deletion the following programs already suspended.

1. Chemistry
  - a. BA Chemistry
  - b. MA Chemistry
  - c. MS Biochemistry
  - d. MS Environmental Chemistry
2. Construction Trades Technology
  - a. AAS Construction Trades Technology
3. Economics
  - a. MS Resource and Applied Economics
4. Physics
  - a. MS Computational Physics
  - b. MS Space Physics
5. Power Generation
  - a. Certificate in Power Generation
6. Process Technology
  - a. Certificate in Mining Application and Technology
7. Renewable Resources
  - a. AAS Renewable resources
8. Sociology
  - a. BA Sociology
  - b. BS Sociology
9. Veterinary Science
  - a. Certificate in Veterinary Science

Per the review committee's recommendations we will reinstate the following program already suspended

1. Music
  - a. Masters in Music, Music Performance

I agree with the review committee's new recommendations for suspension or deletion in the following programs:

1. AAS Drafting Technology – Suspension
2. MEd People, Place and Pedagogy – Delete
3. MEd Second Language Acquisition, Bilingual Education and Literacy – Delete
4. Certificate Safety, Health and Environment Awareness Technology – Delete
5. MS Water and Environmental Science – Delete

I concur with the committee's recommendations in all other areas of continuation or deletion except in the following where I have recommended a different path:

1. Atmospheric science – delete with opportunities for students in existing departments in similar areas (e.g., physics, chemistry, engineering) including possible alternative appointments at UAF for research intensive faculty
2. BA Earth Science – delete
3. BA in Arctic and Northern Studies – continue
4. Certificate in Ethnobotany – delete
5. Certificate Environmental Studies – delete
6. Masters of Education, Med Online Innovation and Design – delete
7. Geography – delete with opportunity to recombine with synergistic programs, including alternative appointments at UAF for research intensive faculty
8. Mining and Geological Engineering – Separate programs. Maintain Mining Engineering BS and MS. Merge Geological Engineering with Civil Engineering in order to offer the ABET accredited GE program with fewer resources than currently needed.

The programs above were selected because there are logical paths for many of the students in those programs to continue pursuing degrees at UAF. It is important to note that only half of our programs were considered this year. We will look at the other half next year. This means that our less expensive programs (on a per student basis) will have the same scrutiny.

If UAF's reduction is ~ \$30 million over the next two years, how will these reductions get us there? We expect less than 10% of the cuts to come directly from academic programs. I do think that we will identify significant savings for this year as a result of our expedited administrative review, our shared services model, and continued strategic use of land, facilities and resources.

This is a difficult time within the university and within the state. No decisions made on program reductions or resource elimination are made lightly. As academic needs, wants and delivery strategies change, we have to change with them and understand that we are committed to a long-term strategy and looking to the future. Thank you.

DMW:jdp

## COMMITTEE RECOMMENDATION FOR GEOLOGICAL ENGINEERING

### STRENGTHS:

- The Geological Engineering (GE) program has been ranked among the top 10 in the nation on several occasions- it is an ABET accredited program.
- *NOT* duplicated in the UA system.
- Program is critical to resource development in Alaska.
- High level of faculty research productivity, with success in attracting external funding.
- There is strong donor & industry support and robust community engagement.
- The program contributes to providing a highly skilled workforce in high-demand resource extraction areas, consulting, and for state and federal agencies.

### WEAKNESSES:

- It is a challenge to deliver ~50 credits to undergrads and grads: there is little margin of error in planning timelines of course offerings.
- GE Program is at a critical mass due to retirements, sabbaticals, attrition. It is extremely difficult to teach all required courses with existing faculty.
- Funding for modernizing equipment for lab spaces needed; other limiting factors Budget cuts.
- Low enrollments and graduation numbers.

### OPPORTUNITIES:

- Alaska is a resource rich state- critical nature of the Mining and Geological Engineering Department and the value it brings to the University and the State can be leveraged to increase revenue and stakeholder involvement.
- The mining sector in Alaska is an untapped market- GE graduates are needed in this and other related fields.
- The industry has not seriously engaged UAF in many of its problems. Therefore, these problems in the mining sector also represent an untapped market and potential revenue streams.
- Alaska Miners Association (in the Appendix) states that “mining and geological engineers” are a priority occupation because of difficulty in recruiting them.
- US Bureau of Labor Statistics, jobs for Mining and Geological Engineers are expected to increase by 6% through 2024.

### THREATS:

- Faculty attrition has led to loss of capacity and stability that impact accreditation. Loss of accreditation imperils program.
- Relative low number of students compared to other CEM programs
- Budget cuts with more to come.

### CENTRALITY TO MISSION:

- Central to UAF Mission: *“The mission of the only Geological Engineering program in Alaska, is to advance and disseminate knowledge related to mineral and energy*

*exploration, evaluation, development and production; engineering site selection, construction and construction material production; and groundwater and geo-environmental engineering including geologic hazards assessment, through creative teaching, research and public service with an emphasis on Alaska, the North and its diverse peoples.”*

- The department serves Alaska workforce development needs for resource extraction.
- Addresses UAF Core Themes Educate and Engage.

**INDICATORS OF QUALITY:**

- High level of faculty research productivity.
- GE undergraduate students won the first place in AEG annual meeting poster contest in 2017 and third place in 2019.
- Graduates of the program typically join the resource industry, engineering consulting companies, or state or federal agencies.
- Department organized the prestigious 2015 APCOM International Conference in Fairbanks.

**COST-EFFECTIVENESS:**

- Salaries and Benefits total for ME & GE~ \$1.33M, which is a high cost per student.

	MAJORS	DEGREES
Geological Engineering BS	FY15: 45/ FY19: 43	FY15: 7/ FY19: 7
Geological Engineering MS	FY15: 4/ FY19: 4	FY15: 1/ FY19: 2

**COMMITTEE RECOMMENDATION FOR GEOLOGICAL ENGINEERING**

**Geological Engineering BS:**

RECOMMENDATION:	ADDITIONAL COMMENTS:	DATE FOR FOLLOW-UP:
Revision or restructure (8 votes)	create concentration in Geological Engineering within the Civil Engineering BS & at that point eliminate Geological Engineering BS	One year

**Geological Engineering MS:**

RECOMMENDATION:	ADDITIONAL COMMENTS:	DATE FOR FOLLOW-UP:
Deletion (8 votes)	fold emphasis into Civil Engineering graduate program	

## **Summary of initial plan to restructure Geological Engineering BS and MS programs and migrate them into a single department shared with the Civil and Environmental Engineering programs**

Note: Due to the intertwined relationship between the Geological Engineering BS and MS programs, calculations on the PAR forms (e.g. revenues and expenditures, faculty FTE, etc) refer to the combined programs. The Geological Engineering BS and MS programs together currently host four faculty members. The restructure will garner cost savings by retaining only two of the current GE faculty members, and delivering the remainder of the curriculum through resources shared with other CEM programs.

Geological Engineering (GE) is interdisciplinary by nature, integrating mathematics, physics, chemistry, geology, hydrology, and engineering science to: 1) recognize and mitigate anthropomorphic and natural hazards, 2) design and construct embankments and earthen structures, 3) manage and remediate groundwater resources, and 4) locate and harvest mineral and energy resources. Because of GE's interdisciplinary nature, GE programs are associated with mining engineering (MIN), geology (GEOS), and civil engineering (CE) programs, depending on the university. While having been in the Department of Mining and Geological Engineering since its inception at UAF, the GE program also can have a logical home within the Department of Civil and Environmental Engineering for the following reasons:

- Developing efficiencies between the GE and CE programs. Currently, there are several courses with similar content that are taught both by GE (and/or MIN) and CE faculty in both departments. These courses (which include surveying, soil mechanics, groundwater hydrology, and engineering economics) could be combined and taught once a year for students in both programs, reducing the workload for faculty. The senior design courses for both programs also could be combined; having CE and GE students work in interdisciplinary groups in one senior design course would strengthen the curriculum for ABET review.
- Strengthening the geotechnical component of both programs. Geotechnical engineering is at the intersection of geological and civil engineering, where engineers use the properties of soil, rock, and groundwater to construction projects on the earth surface. Both GE and CE currently have a basic soil mechanics course that is the foundation of geotechnical engineering. By reducing faculty workload through course sharing, additional courses focused on topics such as foundation engineering and site investigation could be introduced to both programs, strengthening UAF's role in geotechnical engineering and improving our graduates' skills set for the workforce.
- Improving curriculum to address "big data." Engineering is changing as we have more and more data available to us. This requires our graduates to know how to 1) acquire data; 2) compile and manage data; 3) analyze data, and 4) visualize and distribute data in the best way for the intended audience. Both GE and CE fields use sensors to gather data from the subsurface and/or structures, and can use spatial analysis methods, such as GIS, to



organize, analyze, and present that data. While courses exist in both programs on instrumentation and GIS analysis, combining GE and CE into one department offers the opportunity to revitalize these courses and others addressing the growing need for addressing big data in engineering.

- Increasing synergy between the GE and CE programs. Sharing the expertise of faculty members between these two programs will increase the synergy and student opportunities. Currently, GE students take several CE classes as technical electives (e.g., CE341, CE344, CE498), and vice versa (e.g., GE440, GE441). Additionally, GE and CE faculty co-teach one graduate-level course (GE/CE626). Migrating the GE program into the CE department will facilitate CE students to take more GE courses as technical electives and vice versa through greater advertisement of the course offerings and potential co-teaching opportunities.
- Maintaining the ability to address the needs of the Mineral Resources community. Graduates of the GE program will still be able to work in the mining industry, regardless of where the program resides. Depending on their interests, the GE students can take GEOS 332 Ore Deposits and Structure as a technical elective and complete a Mining minor to focus on mineral-related engineering problems and design.
- One concern: to remain an ABET-accredited program, GE must include geophysics. As part of the ABET criteria, graduates from the GE program must be able to apply elements of geophysics to engineering problems. Thus, regardless of where GE resides, the program must retain a faculty member with the needed expertise to teach geophysics. Those geophysics-related courses could be offered to other departments, as required.