Geological Sciences Program Review 2023-24

Closing MOU **Date: June 26, 2024**

Overview

Degree/Certificate Programs Reviewed:	B.S. Geology B.S. Geophysics B.S. Hydrogeology B.S. Geological Engineering M.S. Geology M.S. Geophysics M.S. Hydrogeology M.S. Hydrology M.S. Geological Engineering Ph.D. Geology Ph.D. Geophysics Ph.D. Hydrogeology Ph.D. Hydrology
Department Chair & Dean:	Dr. Paula Noble Department Chair & Dr. Louisa Hope-Weeks
External Reviewers & Affiliation:	Dr. Peter Reiners, Geosciences Dept., University of Arizona Dr. Adam Kent, College of Earth, Ocean, & Atmospheric Sciences, Oregon State University Dr. Tissa H. Illangasekare, Civil and Environmental Engineering, Colorado School of Mines
Date of External Visit:	April 7-8

Review Process Summary

The Geological Sciences program was scheduled for regular program review as mandated by the Board of Regents and University policy. A self-study document for the department and its programs was developed by the department faculty and completed in the Fall of 2023 for Geological Science programs. These respective reports were provided to the reviewers before they conducted a visit on April 7-8, 2024. The external reviewers reviewed the program and met with relevant faculty, staff, students and administrators to determine the department's accomplishments, examine strengths and weaknesses, and identify opportunities as it plans for the future. A final report was issued by the review team shortly after the review visit. In accordance with institution practice, responses to the review were solicited from the department and the dean. A final meeting took place on August 26th, 2024. This document represents the final MOU of recommendations and findings from the review.

Signatures

Executive Vice President & Provost:	 Jeffrey S. Thompson	Date:	10/16/2024
Vice Provost, Undergraduate Education:	 David Shintani	Date:	10.16.24
Vice Provost, Graduate Education & Dean, Graduate School	 Markus Kemmelmeier	Date:	10.16.24
Dean, College of Science:	 Louisa Hope-Weeks	Date:	10/16/24
Chair, Geological Sciences Department	Paula Noble Paula Noble	Date:	10/16/24

Major Findings and Conclusions

Geological Sciences is an academic and research focused department engaged in training future geoscientists and accredited geological engineers, interfacing with the public to promote the importance of geoscience in the lives of Nevadans and global citizens, and promoting diversity, equity, and inclusion in all aspects of our mission. We seek to advance our understanding of the Earth through our research in a wide array of disciplines, including Earth and planetary surface processes, geodynamics, volcanology, geochemistry, petrology, earthquakes and seismology, mineral and energy resources, hydrology and hydrogeology. We contribute to the core UNR objectives of inclusive excellence, learning, discovery, and engagement, through our undergraduate and graduate education programs, and our faculty and graduate student research. We contribute to the economic and environmental needs of Nevada citizens and maintain close association with Nevada mining and mineral industries, water resources and managers, and environmental and geo-engineering business sectors. Our faculty are internationally recognized and collaborate at the local, national and international level with a wide range of partners in earth science focused inquiry.

The reviewers called out many strengths of the department such as strong undergraduate programs, the recruitment efforts that are in place, the nationally recognized graduate programs, collaboration with other units, and increase in diversity. The commended the tenured/tenure faculty and their participation in national and international research. The committee was also impressed with the expertise, productivity and vision of the teaching and administrative faculty.

The areas that the reviewers thought should be addressed are as follows:

- In order to reverse declines in some of the graduate degree programs, DGSE could consider a more visionary approach to research themes and emphases, including acknowledging the changing needs and opportunities in industry, community, and workforce capacity in Nevada and elsewhere. To enhance insight into the skills required by graduate students to be sought-after by industry and organizations in the state and region, DGSE could conduct a survey or listening sessions involving alumni and potential employers. Examples of the kinds of directions this could take include modern aspects of geological engineering outside the traditional mining-related applications, including carbon storage, renewable/clean energy management in the subsurface, environmental sensing, subsurface contamination, etc. We further suggest that DGSE consider leveraging these strategies by exploring and bringing a large, interdisciplinary, use-inspired research grant to the program, such as a National Research Traineeship (NRT) , Industry-University Cooperative Research Center (IUCRC), Convergence Accelerator, Regional Engine, or other type of grant focusing on regionally and societally relevant applied geology topics (e.g., lithium, water resources, critical minerals, etc.) that could also help build better collaborations with industry and community.
- We recommend curricular review. All reviewers felt that the number of undergraduate classes offered by DGSE was large, leading to higher teaching loads (or frequent course cancellations and difficulties in student progression). If the number of delivered undergraduate classes were reduced, this would produce benefits with respect to faculty workloads, and with degree simplicity and student progression. There is no doubt that such efforts are difficult and require compromise but there also could be a significant payoff. In concert with this, we also felt there may be untapped opportunities to work across campus to collaborate with other departments (e.g., in engineering and environmental sciences) to find efficiencies in content coverage, faculty workload, and connection with students and initiatives in related areas.
- Increase efforts to boost stakeholder engagement. We recognize the tremendous natural strategic advantage that DGSE has from its geographic location in the state of Nevada as a nexus of existing and future resource and environment-based research needs.
- It is clear that one of the real gems of DGSE and the Mackay School is the Microbeam Lab managed by Joel DesOrmeau. The instruments (some of which are cutting-edge) and Dr. DesOrmeau himself serve many researchers and students with state-of-the-art analytical capabilities and training. This lab serves to generate primary research data for DGSE faculty and students, other units at UNR, and other universities, as well as doing contract work for local industry. Discussions during the external reviewers' visit indicate that there is great potential for growth and significantly more industry use of the facility than they are currently able to accommodate, primarily because of lack of staff. Given our impression of the exceptional abilities and track record of Dr. DesOrmeau and others supporting the lab, as well as the apparent analytical needs of users in industry regionally and more broadly, we suggest that provisional, pilot investment in an administrative faculty position in the lab to work with Dr. DesOrmeau would be a good investment to grow and preserve this facility. Permanent allocation of the staff funding could be made contingent on the lab demonstrating some level of increased industry engagement, revenue, or other metric.

Next Steps for this Program/Department (topics will vary)

- We are already making several successful efforts to reverse the decline in undergraduate enrollment including ideas such as assigning a faculty member to ramp up on recruitment efforts with a 1 time course release, designing new brochures, reviewing attendance lists for Nevada Bound and sending custom emails to prospective students in advance of the event, having a DGSE faculty member attend each of the Nevada Bound events to promote the and running custom visits for targeted prospective students (i.e. presidential scholars). We will expand on the increased recruitment strategies working with the current Mackay Recruiter, and COS Advising Recruiting & Retention Director.
- Work on retention. We will continue to initiate activities that improve the department climate and engage the undergraduates, creating more connection between the undergraduates, graduate students, and faculty
- Continue to modify and improve our curriculum to keep in step with current expectations and demands in the field. Streamline aspects of the curriculum, and continue to make sure the courses are the most relevant to todays' students and workforce.
- Consider development of an Associate Chair role to provide a viable leader succession model and help with the current quantity of chair responsibilities.
- Get additional staffing for the Mackay Microbeam laboratory. This is a priority and different avenues for funding are being explored.
- Pursue two critical needs for staff, Economic Geology and a Hydrologist.
- Establish a Department-level Advisory Board.
- Will pursue development of larger initiatives.

Vital Statistics on NSHE Reports

Number of students with declared major in the program area:

2023-2024	B.S. Geology	66
	B.S. Geophysics	11
	B.S. Hydrogeology	14
	B.S. Geological Engineering	29
	M.S. Geology	17
	M.S. Geophysics	5
	M.S. Geological Engineering	2
	Ph.D. Geology	14
	Ph.D. Geophysics	6
	Ph.D. Geological Engineering	16

Number of graduates from the program for the following years:

2021-2022	B.S. Geology	11
	B.S. Geophysics	4
	B.S. Hydrogeology	2
	B.S. Geological Engineering	9
	M.S. Geology	9
	M.S. Geophysics	3
	M.S. Geological Engineering	1
	Ph.D. Geology	4
	Ph.D. Geophysics	0
	Ph.D. Geological Engineering	1
2022-2023	B.S. Geology	10
	B.S. Geophysics	1
	B.S. Hydrogeology	4
	B.S. Geological Engineering	11
	M.S. Geology	4
	M.S. Geophysics	1
	M.S. Geological Engineering	1
	Ph.D. Geology	3
	Ph.D. Geophysics	1
	Ph.D. Geological Engineering	0
2023-2024	B.S. Geology	16
	B.S. Geophysics	1
	B.S. Hydrogeology	2
	B.S. Geological Engineering	6
	M.S. Geology	5
	M.S. Geophysics	3
	M.S. Geological Engineering	1
	Ph.D. Geology	2
	Ph.D. Geophysics	1
	Ph.D. Geological Engineering	1

Program-level graduation rate using first-time, full-time, degree-seeking cohort at 150 percent completion time:

2021-2022	B.S. Geology	20% n =2
	B.S. Geophysics	60% n =3
	B.S. Hydrogeology	50% n =2
	B.S. Geological Engineer	64% n=9
	M.S. Geology	60% n=3
	M.S. Geophysics	100% n=2
	M.S. Geological Engineering	0% n=0
	Ph.D. Geology	86% n=6
	Ph.D. Geophysics	80% n=4
	Ph.D. Geological Engineering	n/a
2022-2023	B.S. Geology	23% n =3
	B.S. Geophysics	n/a% n =
	B.S. Hydrogeology	0% n=0
	B.S. Geological Engineer	43% n=6
	M.S. Geology	88% n=7
	M.S. Geophysics	100% n=1
	M.S. Geological Engineering	0% n=0
	Ph.D. Geology	100% n=1
	Ph.D. Geophysics	n/a
	Ph.D. Geological Engineering	67% n=2
2023-2024	B.S. Geology	33% n =2
	B.S. Geophysics	n/a% n =
	B.S. Hydrogeology	0% n=0
	B.S. Geological Engineer	56% n=5
	M.S. Geology	83% n=5
	M.S. Geophysics	100% n=1
	M.S. Geological Engineering	100% n=1
	Ph.D. Geology	100% n=1
	Ph.D. Geophysics	50% n=1
	Ph.D. Geological Engineering	n/a

Headcount of students enrolled in any course related to the program (duplicated):

2023-2024	B.S. Geology	1,236
	B.S. Geophysics	46
	B.S. Hydrogeology	1,236

B.S. Geological Engineer	182
M.S. Geology	250
M.S. Geophysics	2
M.S. Geological Engineering	52
Ph.D. Geology	250
Ph.D. Geophysics	2
Ph.D. Geological Engineering	52