

Master of Science in Applied Geological Sciences

Graduate study in applied geological sciences prepares students for work in the multitude of careers including environmental geology/sciences, oil and gas industry, minerals and mining, and state and federal agencies that require a deep and broad foundation in the geological sciences. The Master of Science in Applied Geological Sciences (MSAGS) implies not only an enhanced level of understanding of the fundamentals of geological sciences, but also an applied skill set that allows students to apply advanced concepts of geological sciences to problem solving.

The MSAGS has both a thesis and a non-thesis option. The thesis option includes a focus on skills related to the acquisition of new knowledge and is designed for students who wish to pursue higher entry-level positions into jobs or to eventually pursue a Ph.D. degree. The non-thesis option is designed for students who wish to further emphasize applied geological sciences and prefer to substitute additional classroom education and a comprehensive written exam or a professional project and comprehensive oral exam for graduate research experience.

Program Objectives

The UAA applied geological sciences graduate program objectives are to provide students with graduate-level:

- Technical knowledge within geological sciences.
- Ability to conceive and conduct geological sciences research and problem solving.
- Ability to effectively communicate geological sciences concepts and applications to a broad audience.

Admission Requirements

Complete the Admission Requirements for Graduate Degrees (<http://catalog.uaa.alaska.edu/academicpoliciesprocesses/admissions/graduate/>). Additional information can be found on the Geological Sciences Department website (<https://www.uaa.alaska.edu/academics/college-of-arts-and-sciences/departments/geology/academic-programs/graduate.cshtml/>). All students must hold a baccalaureate degree in geological sciences or closely related discipline and submit to the UAA Office of Admissions:

- A completed UAA graduate application.
- Official transcripts of all college-level work.
- Three letters of recommendation from professors or other professionals particularly qualified to attest to the applicant's qualifications for graduate-level research and study.
- A resume or curriculum vitae.
- A one-page personal statement discussing the applicant's credentials and readiness for graduate studies. This is an opportunity for the applicant to share relevant information, qualifications, and

experience that would not be included with the UAA graduate application form or reflected on official transcripts. It is also the applicant's opportunity to describe their desire and commitment to pursue graduate study in geological sciences.

The application deadline for consideration of teaching assistantship funding in the fall semester is March 1.

Advising

All graduate students enrolled in the MSAGS program must have an academic advisor identified prior to acceptance in the program. The academic advisor will assist the student through all aspects of the degree process, including:

- Mentoring the student throughout the graduate degree duration.
- Approving a graduate studies plan.
- Overseeing the academic progress of the student.
- Guiding the student through the development and completion of the graduate thesis project or professional project, where applicable.
- Working with the graduate committee to evaluate the final thesis or professional project, or to develop and implement a comprehensive written exam, where applicable.

Graduation Requirements

- Complete the General University Requirements for Graduate Degrees. (<http://catalog.uaa.alaska.edu/graduateprograms/degree requirements/>)
- Complete the following program requirements:

Thesis Option

Students must satisfy all university requirements for graduate degrees and complete coursework and thesis work approved in advance by the student's academic advisor and graduate committee.

Students must complete a total of 30 credits of coursework, of which at least 24 credits must be at the 600-level. Up to 6 credits of 400- or 600-level coursework in related disciplines may count toward the degree if not used to fulfill any requirements of a baccalaureate degree. Coursework selected by the student must be approved by the student's graduate committee and must appear on the student's Graduate Studies Plan.

Code	Title	Credits
1. Complete 15 credits of Geological Sciences courses from the following:		
GEOL A623	Advanced Igneous and Metamorphic Petrology	15
GEOL A626	Advanced Mineral Resources	
GEOL A636	Advanced Petroleum Geology	
GEOL A637	Advanced Depositional Systems and Dynamic Stratigraphy	
GEOL A638	Applied Sedimentary Petrology and Diagenesis	
GEOL A640	Advanced Hydrogeology	15
GEOL A641	Paleoclimatology	

GEOL A648	Advanced Structural Geology and Geomechanics	
GEOL A654	Glacial and Quaternary Geology	
GEOL A658	Advanced Geology of Alaska	
GEOL A661	Advanced Geochemistry	
GEOL A663	Environmental Geochemistry	
GEOL A676	Applied Geophysics	
GEOL A677	Integrated Subsurface Mapping and Analysis	
GEOL A678	Petroleum Geophysics and Petrophysics	
GEOL A690	Graduate Topics in Geology	
2. Complete the following professional practices course:		3
GEOL A689	Geology Graduate Professional Practices	
3. Complete 3 credits of geological sciences graduate thesis and at least 3 credits of graduate directed research:		6
GEOL A698	Directed Research	
GEOL A699	Graduate Thesis	
4. Complete a minimum of 6 credits of elective courses, which may consist of 600-level courses in the department (including additional credits in GEOL A698) or 400- or 600-level courses outside of the department that are relevant to the degree and which have been approved on the Graduate Studies Plan.		6
5. A written thesis proposal, submitted to the student's graduate committee by the beginning of the third semester, presenting evidence that the thesis requirements will be satisfied. The proposal will consist of an explicit problem statement, a literature review, and one or more sections describing the research and analytical methods that will be applied. The proposal is subject to approval by the student's graduate committee following an oral thesis proposal presentation scheduled no sooner than two weeks after submission of the written proposal.		
6. Thesis document and oral thesis defense.		
Total		30

A minimum of 30 credits is required for the degree.

The completed thesis must:

- Describe how the work is associated with the current state of the science in the candidate's graduate field of study.
- Contribute to the body of knowledge in the candidate's field of graduate study.
- Be eligible to be published in either peer-reviewed technical conference proceedings or a peer-reviewed journal as judged by the candidate's graduate committee.
- Demonstrate command of knowledge and skills associated with the candidate's program of graduate study and as stated in the Student Learning Outcomes.

- Be defended by the student in an oral presentation to the candidate's graduate committee.

Non-Thesis Option

Students must satisfy all university requirements for graduate degrees, complete coursework selected from one of three focus areas approved in advance by the student's graduate advisor, and complete either a professional project or additional coursework. Completion of a professional project requires the student to have a graduate committee.

Students must complete a total of 30 credits of coursework, of which 24 credits must be at the 600 level. Up to 6 credits of 400- or 600-level coursework in related disciplines may count toward the degree if not used to fulfill any requirements of a baccalaureate degree. Coursework selected by the student must be approved by the student's graduate advisor and must appear on the student's Graduate Studies Plan.

Code	Title	Credits
1. Complete at least 15 credits from one of the geological sciences focus areas below:		15

I. Applied Environmental Geology

GEOL A637	Advanced Depositional Systems and Dynamic Stratigraphy
GEOL A640	Advanced Hydrogeology
GEOL A641	Paleoclimatology
GEOL A648	Advanced Structural Geology and Geomechanics
GEOL A654	Glacial and Quaternary Geology
GEOL A661	Advanced Geochemistry
GEOL A663	Environmental Geochemistry
GEOL A676	Applied Geophysics

II. Applied Petroleum Geoscience

GEOL A636	Advanced Petroleum Geology
GEOL A637	Advanced Depositional Systems and Dynamic Stratigraphy
GEOL A638	Applied Sedimentary Petrology and Diagenesis
GEOL A640	Advanced Hydrogeology
GEOL A648	Advanced Structural Geology and Geomechanics
GEOL A658	Advanced Geology of Alaska
GEOL A661	Advanced Geochemistry
GEOL A677	Integrated Subsurface Mapping and Analysis
GEOL A676	Applied Geophysics
GEOL A678	Petroleum Geophysics and Petrophysics

III. Applied Mineral Resources

GEOL A623	Advanced Igneous and Metamorphic Petrology
GEOL A626	Advanced Mineral Resources

GEOL A648	Advanced Structural Geology and Geomechanics	
GEOL A658	Advanced Geology of Alaska	
GEOL A661	Advanced Geochemistry	
GEOL A663	Environmental Geochemistry	
GEOL A676	Applied Geophysics	
2. Complete the following professional practices course:		3
GEOL A689	Geology Graduate Professional Practices	
3. Complete 12 credits of electives, which may include 600-level courses in the department and up to 6 credits of 400- or 600-level courses in a related supporting discipline as approved by the student's graduate advisor. 3 credits of GEOL A688 may be applied toward this requirement.		12
4. Successfully complete a comprehensive written exam or a professional project report and comprehensive oral exam.		
Total		30

A minimum of 30 credits is required for the degree.

The project must solve an applied or practical problem in the geological sciences to the extent that original developments by the student are evident in the project report.

- The project problem and solution must be explained in the context of the current state of the science by means of a thorough review of pertinent literature.
- The project must include advanced technical components directly involving modern practice and applications of geological sciences.
- The project must have sufficient scope to clearly demonstrate the student's advanced technical expertise in geological sciences.
- The project report must demonstrate command of knowledge and skills directly associated with the student's graduate program of study and chosen focus area (I, II, or III above).
- The project proposal, submitted prior to enrolling in GEOL A688, must present evidence that the above requirements will be satisfied and will generally consist of an explicit problem statement, a literature review, and methodology.
- The final project will be in the form of a written report and oral presentation to the student's graduate committee.

Program Student Learning Outcomes

In keeping with the program objectives, the expected student learning outcomes of the UAA MSAGS program include an ability to:

- Use rigorous methods of scientific analysis.
- Demonstrate mastery of graduate-level geological sciences theory.
- Conduct advanced geological sciences research and/or demonstrate skill application.
- Apply the scientific method to graduate-level problems in one or more focus areas of geological sciences.
- Work effectively within the professional framework of geological sciences careers or be prepared for Ph.D. research programs.