

# Geological Engineering



**School of Mineral Engineering**  
**Department of Mining and Geological Engineering**  
**(907) 474-7388**  
**www.uaf.edu/sme/GeolEng.html**  
**Degrees: B.S., M.S.**  
**Minimum Requirements for Degrees: B.S.: 134 credits; M.S.: 30-33 credits**

Geological engineering deals with the application of geology. Geological engineers work with the environment in the true sense of the word. Properties of earth materials exploration activities, geophysical and geochemical prospecting, site investigations and engineering geology are all phases of geological engineering.

The undergraduate and graduate programs prepare students for employment with industry, consulting companies and government agencies.

## UNDERGRADUATE PROGRAM

### MAJOR

#### Geological Engineering—B.S. Degree

- Complete the general university requirements (page 28).
  - Complete the B.S. degree requirements (page 34).
  - Complete the following program (major) requirements:\*
- |   |   |
|---|---|
| CHEM 105X—General Chemistry**                                 | 4 |
| CHEM 106X—General Chemistry**                                 | 4 |
| ES 201—Computer Techniques                                    | 3 |
| ES 208—Mechanics  | 4 |
| ES 331—Mechanics of Materials                                 | 3 |
| ES 341—Fluid Mechanics  | 4 |
| GE 101—Introduction to Geological Engineering                 | 1 |
| GE 261—General Geology for Engineers                          | 3 |
| GE 365—Geological Materials Engineering                       | 3 |
| GE 375—Principles of Engineering Geology and Terrain Analysis | 3 |
| GE 381W—Field Methods and Applied Design I                    | 2 |
| GE 382W—Field Methods and Applied Design II                   | 4 |
| GE 405—Exploration Geophysics                                 | 4 |
| GE 420—Subsurface Hydrology                                   | 3 |
| GE 471—Remote Sensing for Engineering                         | 3 |
| GE 480W—Senior Design   | 3 |
| GEOS 213 Mineralogy   | 4 |
| GEOS 214 Petrology and Petrography                            | 4 |
| GEOS 332—Ore Deposits and Structure                           | 3 |
| GEOS 421—Sedimentology  | 3 |
| MATH 200X—Calculus**  | 4 |
| MATH 201X—Calculus**  | 4 |
| MATH 202X—Calculus**  | 4 |
| MATH 302—Differential Equations                               | 3 |
| MIN 202—Mine Surveying  | 3 |
| MIN 370—Rock Mechanics  | 3 |
| MIN 408O—Mineral Valuation and Economics                      | 3 |
| PHYS 211X—General Physics**                                   | 4 |
| PHYS 212X—General Physics**                                   | 4 |
| STAT 200—Elementary Probability and Statistics                | 3 |
| Technical electives***  | 6 |

- Minimum credits required ..... 134

\* Student must earn a C grade or better in each ES, GE, GEOS, MIN and technical elective courses.

\*\* Satisfies core or B.S. degree requirements but not both.

\*\*\* Technical elective credits must contain engineering design and be selected by the student from a list of approved technical electives from the geological engineering program in conference with his or her advisor and approved by the department.

Note: Candidates for the B.S. degree in geological engineering are required to take a proficiency exam at the end of their sophomore year. They must also take a comprehensive exit exam in their general field before graduation (as well as the State of Alaska Fundamentals of Engineering examination). Fundamentals of Engineering examination is a first step toward registration as professional engineers.

Note: Students may initiate their geological engineering program in Anchorage and transfer to Fairbanks upon completion of the freshman and sophomore years. Students intending to transfer to UAF should communicate with a faculty member of the UAF mining and geological engineering department.

## GRADUATE PROGRAM

### Geological Engineering—M.S. Degree

- Complete a comprehensive entrance exam.
- Complete the general university requirements (page 43).
- Complete the master's degree requirements (page 46).
- Complete the thesis or non-thesis requirements:

#### Thesis

- Complete the following:
 

GE 635—Geostatistical Ore Reserve Estimation (3)	
or MIN 621—Advanced Mineral Economics (3)	3
GE 620—Advanced Groundwater Hydrology	3
GE 630—Advanced Applied Mining Geology	3
GE 666—Advanced Engineering Geology	3
Geological engineering courses and technical electives	12
GE 699—Thesis	6
- Minimum credits required ..... 30

#### Non-Thesis

- Complete the following:
 

GE 635—Geostatistical Ore Reserve Estimation (3)	
or MIN 621—Advanced Mineral Economics (3)	3
GE 620—Advanced Groundwater Hydrology	3
GE 630—Advanced Applied Mining Geology	3
GE 666—Advanced Engineering Geology	3
Geological engineering courses and technical electives	15
GE 698—Research/Project	6
- Minimum credits required ..... 33



University of Alaska Fairbanks

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