

# MINING ENGINEERING

College of Engineering and Mines  
Department of Mining and Geological Engineering  
907-474-7388  
<http://cem.uaf.edu/mingeo/>

## BS Degree

Minimum Requirements for Degree: 132 credits

As the nation's northernmost accredited mining engineering program, our mission is to advance and disseminate knowledge for exploration, evaluation, development and efficient production of mineral and energy resources with assurance of the health and safety of persons involved and protection of the environment, through creative teaching, research and public service with an emphasis on Alaska, the North and its diverse peoples.

The mining engineering program emphasizes engineering as it applies to the exploration and development of mineral resources and upon the economics of the business of mining. The program offers specializations in exploration, mining or mineral beneficiation.

Students are prepared for job opportunities with mining and construction companies, consulting and research firms, equipment manufacturers, investment and commodity firms in the private sector, as well as with state and federal agencies.

The mining engineering program educational objectives are to graduate competent engineers who:

- are employed in the mineral and energy industries,
- can solve problems germane to Alaska, and
- are professionals and understand the need to stay technically current.

Mining engineers may aspire to, and achieve, the highest positions in the industry: operating or engineering management, government agency director or entrepreneur. Starting salaries are among the highest in the engineering profession.

Students may initiate their mining engineering program in Anchorage and transfer to Fairbanks upon completion of their freshman or sophomore year. Anchorage students intending to transfer to Fairbanks should contact faculty of the UAF Mining Engineering Department.

Candidates for the BS degree in mining engineering must take the State of Alaska Fundamentals of Engineering examination. The Fundamentals of Engineering examination is a first step toward registration as a professional engineer.

The minor in mining engineering provides non-mining engineering students with an opportunity to acquire employable skills in the mining profession. Students in the mining engineering minor will be trained in a broad variety of topics such as mine ventilation, ground control, mine operation, economics, environmental law and labor management. Students will have the choice of other mining topics to make up the minor requirements.

For more information about the Mining Engineering Program mission, goals and educational objectives, visit <http://cem.uaf.edu/mingeo/abet/>.

## Major — BS Degree

1. Complete the general university requirements. (See page 131. As part of the core curriculum requirements, complete: CHEM F105X, CHEM F106X, LS F101X and MATH F200X.)
2. Complete the BS degree requirements. (See page 136. As part of the BS degree requirements, complete: MATH F201X, PHYS F211X and PHYS F212X.)

3. Complete the following program (major) requirements:\*
- ES F208—Mechanics .....4
- ES F307—Elements of Electrical Engineering.....3
- ES F331—Mechanics of Materials .....3
- ES F341—Fluid Mechanics.....4
- ES F346—Basic Thermodynamics .....3
- GE F261—General Geology for Engineers .....3
- GEOS F262—Rocks and Minerals .....3
- GEOS F332—Ore Deposits and Structure.....3
- MIN F103—Introduction to Mining Engineering .....1
- MIN F104—Mining Safety and Operations Lab.....1
- MIN F202—Mine Surveying .....3
- MIN F225—Quantitative Methods in Mining Engineering .....2
- MIN F226—Introduction to Mine Development.....2
- MIN F301—Mine Plant Design.....3
- MIN F302—Underground Mine Environmental Engineering .....3
- MIN F313—Introduction to Mineral Preparation .....3
- MIN F370—Rock Mechanics.....3
- MIN F407W—Mine Reclamation and Environmental Management.....3
- MIN F408O—Mineral Valuation and Economics .....3
- MIN F409—Operations Research and Computer Applications in Mineral Industry .....3
- MIN F443—Principles and Applications of Industrial Explosives .....3
- MIN F454—Underground Mining Methods .....3
- MIN F482—Computer-Aided Mine Design — VULCAN.....3
- MIN F484—Surface Mining Methods II .....2
- MIN F489W—Mining Design Project I.....1
- MIN F490W—Mining Design Project II .....2
- MIN F485—Mining Engineering Exit Exam.....0
4. Complete the following program (major) requirements:
- MATH F202X—Calculus .....4
- MATH F302—Differential Equations .....3
5. Complete 3 credits\* from the following recommended technical electives:\*\*
- GE F440—Slope Stability .....3
- MIN F401—Mine Site Field Trip.....2
- MIN F447—Placer Mining.....3
- MIN F472—Ground Control.....3
- MIN F481—Computer-Aided Mine Design — TECHBASE .....3
- MIN F415—Coal Preparation .....3
- MIN F646—Mining Engineering in the Arctic.....3
- CE F603—Arctic Engineering .....3
- Approved technical electives ..... 3 – 6
6. Minimum credits required .....132
- \* Students must earn a C- grade or better in each course.
- \*\* Students must plan their elective courses in consultation with their mining engineering faculty advisor. Technical electives are selected from the list of the approved technical electives for mining engineering program and other programs course listing. All elective courses must be approved by the department head.

## Minor

1. Complete the following:\*
- MIN F103—Introduction to Mining Engineering .....1
- MIN F104—Mining Safety and Operations Lab.....1
- MIN F226—Introduction to Mine Development.....2
2. Complete 11 – 12 MIN credits from advisor-approved electives at 300 or 400 level\* .....11 – 12
3. Minimum credits required .....15
- \* Students must earn a C- grade or better in each course.

# Baccalaureate Core Requirements

## Communication . . . . . 9 Credits

- ENGL F111X—Introduction to Academic Writing.....(3)  
*ENGL F190H may be substituted.*

Complete one of the following:

- ENGL F211X—Academic Writing about Literature.....(3)
- ENGL F213X—Academic Writing about the Social and Natural Sciences.....(3)

Complete one of the following:

- COMM F131X—Fundamentals of Oral Communication: Group Context.....(3)
- COMM F141X—Fundamentals of Oral Communication: Public Context.....(3)

9

## Perspectives on the Human Condition . . . . . 18 Credits

Complete all of the following four courses:

- ANTH F100X/SOC F100X—Individual, Society and Culture.....(3)
- ECON F100X or PS F100X—Political Economy.....(3)
- HIST F100X—Modern World History.....(3)
- ENGL/FL F200X—World Literature.....(3)

12

Complete one of the following three courses:

- ART/MUS/THR F200X—Aesthetic Appreciation: Interrelationship of Art, Drama and Music.....(3)
- HUM F201X—Unity in the Arts.....(3)
- ANS F202X—Aesthetic Appreciation of Alaskan Native Performance.....(3)

3

Complete one of the following six courses:

- BA F323X—Business Ethics.....(3)
- COMM F300X—Communicating Ethics.....(3)
- JUST F300X—Ethics and Justice.....(3)
- NRM F303X—Environmental Ethics and Actions.....(3)
- PS F300X—Ethics and Society.....(3)
- PHIL F322X—Ethics.....(3)

3

Or complete 12 credits from the above courses plus one of the following:

- Two semester-length courses in a single Alaska Native language or other non-English language
- Three semester-length courses (9 credits) in American Sign Language taken at the university level.

6 – 9

## Mathematics . . . . . 3 Credits

Complete one of the following:

- MATH F103X—Concepts and Contemporary Applications of Mathematics.....(3)
  - MATH F107X—Functions for Calculus\*.....(4)
  - MATH F161X—Algebra for Business and Economics\*\*.....(3)
  - STAT F200X—Elementary Probability and Statistics.....(3)
- \* No credit may be earned for more than one of MATH F107X or F161X.

Or complete one of the following:\*

- MATH F200X—Calculus I\*\*.....(4)
- MATH F201X—Calculus II.....(4)
- MATH F202X—Calculus III.....(4)
- MATH F262X—Calculus for Business and Economics.....(4)
- MATH F272X—Calculus for Life Sciences.....(4)

\* Or any math course having one of these as a prerequisite

\*\* No credit may be earned for more than one of Math F200X, F262X or F272.

3 – 4

## Natural Sciences . . . . . 8 Credits

Complete any two (4-credit) courses.

- ATM F101X—Weather and Climate of Alaska.....(4)
- BIOL F100X—Human Biology.....(4)
- BIOL F101X—Biology of Sex.....(4)
- BIOL F103X—Biology and Society.....(4)
- BIOL F104X—Natural History.....(4)
- BIOL F115X—Fundamentals of Biology I.....(4)
- BIOL F116X—Fundamentals of Biology II.....(4)
- BIOL F120X—Introduction to Human Nutrition.....(4)
- BIOL F213X—Human Anatomy and Physiology I.....(4)
- BIOL F214X—Human Anatomy and Physiology II.....(4)
- CHEM F100X—Chemistry in Complex Systems.....(4)
- CHEM F103X—Basic General Chemistry.....(4)
- CHEM F104X—Beginnings in Biochemistry.....(4)
- CHEM F105X—General Chemistry.....(4)
- CHEM F106X—General Chemistry.....(4)
- GEOG F111X—Earth and Environment: Elements of Physical Geography.....(4)
- GEOS F100X—Introduction to Earth Science.....(4)
- GEOS F101X—The Dynamic Earth.....(4)
- GEOS F106X—Life and the Age of Dinosaurs.....(4)
- GEOS F112X—History of Earth and Life.....(4)
- GEOS F120X—Glaciers, Earthquakes and Volcanoes.....(4)
- GEOS F125X—Humans, Earth and Environment.....(4)
- MSL F111X—The Oceans.....(4)
- PHYS F102X—Energy and Society.....(4)
- PHYS F103X—College Physics.....(4)
- PHYS F104X—College Physics.....(4)
- PHYS F115X—Physical Science I.....(4)
- PHYS F175X—Astronomy.....(4)
- PHYS F211X—General Physics.....(4)
- PHYS F212X—General Physics.....(4)
- PHYS F213X—Elementary Modern Physics.....(4)

8

## Library and Information Research . . . . . 0 – 1 Credit

- Successful completion of library skills competency test or LS F100X or LS F101X prior to junior standing

0 – 1

## Upper-Division Writing and Oral Communication

Complete the following at the upper-division level:

- Two writing intensive courses designated (W) and one oral communication intensive course designated (O), or two oral communication intensive courses designated (O/2) (see degree and/or major requirements)

Total credits required 38 – 39

All degrees (e.g. B.A., B.S., etc.) require additional courses.

Refer to specific degree and program requirements.

Students must earn a C- grade or better in each course used toward the baccalaureate core.