**Ranked as the No. 1 mining engineering program in the world** 2016 through 2020 by the QS World University Rankings, Mines has distinguished itself by developing curriculum and research programs geared toward responsible stewardship of the earth and its resources.

The Mines mining engineering graduate program features two degree tracks: mining engineering and earth resources development engineering (ERDE).

**The mining engineering** track is predominantly for mining engineers. Graduate work and research centers around mine planning and development, mine design, rock mechanics, operations research, environment and sustainability considerations, mine mechanization, mine evaluation, finance and management, mine ventilation, safety and health.

**The earth resources development engineering (ERDE)** Master’s and PhD track welcomes applicants with undergraduate degrees in any engineering discipline. Graduate study and research options are similar to those in Mining Engineering with an emphasis on stewardship of the earth’s mineral resources.

**DEGREE OPTIONS**

- **Doctor of Philosophy:** 72 credit hours, comprised of 48 credit hours of coursework and 24 credit hours of research. Students must also complete written and oral qualifying exams, present a thesis proposal and defend their thesis before the thesis committee.

- **Master of Science (thesis based):** 30 credit hours, comprised of at least 21 credit hours of coursework and 9 credit hours of research.

- **Master of Science (non-thesis):** 30 credit hours of coursework, comprised of a minimum of 21 credit hours from within the Mining Engineering Department.
MINING ENGINEERING | PhD, MS

SUBJECT AREAS

- Geomechanics, rock mechanics and ground support for underground surface mining operations
- Computerized mine design and use of simulation techniques and artificial intelligence in mining applications
- Advanced integrated mining systems, operational, management and financial issues
- Underground construction and tunneling
- Mine, construction and project management
- Tailing dam design and management
- Geo-hazard and risk
- Big data and data analytics in mining
- Rock fragmentation
- Site characterization and geotechnical investigations, modeling and design in geotechnology
- Mineral processing, comminution and separation technology
- Bulk material handling
- Mine ventilation
- Mine safety and health
- Corporate social responsibility
- Artisanal and small-scale mining
- Extractive metallurgy, hydro/pyro metallurgy
- Mine water and environment
- Space mining
- Virtual and augmented reality in mining

MINING ENGINEERING DEPARTMENT RESEARCH CENTERS

The Mining Engineering Department includes several world renowned research centers and institutes. These programs offer hands-on experience and research activities for students. These programs include:

- Kroll Institute for Extractive Metallurgy (KIEM)
- Underground Construction and Tunneling (UCT)
- Earth Mechanics Institute (EMI)
- Center for Critical Minerals
- Center for Sustainable Mining
- Edgar Experimental Mine
- Virtual and Augmented Reality Lab
- Mine Automation and Robotics
- Rock Mechanics Lab
- Mineral Processing Lab
- Mine Ventilation Lab

PROGRAM ADMISSION REQUIREMENTS

- A bachelor's degree in some discipline of engineering from an ABET-accredited institution.

- Graduate Record Examination (GRE) is required. Applicants who have graduated from Mines within the past five years are not required to submit GRE scores.

- For international applicants or applicants whose native language is not English, a TOEFL score of 79 or higher (or 550 for the paper-based test, 213 for the computer-based test). In lieu of a TOEFL score, an IELTS score of 6.5 or higher will be accepted.

ACCEPTING APPLICATIONS

TO LEARN MORE, VISIT:
gradprograms.mines.edu/mn or contact mining@mines.edu