ONLINE GRADUATE PROGRAMS IN ENGINEERING IN MINING AND GEOLOGICAL ENGINEERING

LEAD THE MINING INDUSTRY TO NEW DISCOVERIES
SINCE THE FOUNDING OF THE UNIVERSITY OF ARIZONA IN 1885, OUR ENGINEERING PROGRAM HAS BEEN FOCUSED ON PROVIDING PRACTICAL, CAREER-DRIVEN PROGRAMS THAT CAN LEAD OUR STUDENTS TO REAL-WORLD SUCCESS. OUR ONLINE PROGRAMS IN MINERAL RESOURCES ARE DRIVEN BY THE SAME GOAL, PROVIDING THE ADVANCED EDUCATION YOU NEED TO HELP LEVERAGE DISRUPTIVE TECHNOLOGIES AND DISCOVER NEW HORIZONS.

As one of the first and foremost mineral resource management and extraction departments in the nation, we at the Department of Mining and Geological Engineering (MGE) at the University of Arizona strive to be at the forefront of the 4th Industrial Revolution, helping our students to leverage technologies like machine learning and artificial intelligence (AI) rather than be threatened by them. Building on a heritage more than 125 years in the making, our mission is to prepare aspiring mineral engineers like you to pursue boundless innovation in your field and enhanced career opportunities.

Situated in Tucson, where major companies such as Caterpillar, Hexagon and Komatsu make up the hub of modernized mining technology, we remain at the forefront of research and education in a variety of geo-disciplines that are vitally important to society and the environment worldwide. Each program can help you to network with a community of lifelong learners and gain the real-world competencies you need to pursue new professional opportunities and lead the industry into the future.

LEAD THE MINING INDUSTRY TO NEW DISCOVERIES

Mining and material production has an immeasurable impact on the economy, providing the building blocks for products and technologies that form the core of American and global life. What resources we use may change, but the need for skilled engineers to safely gather raw material will be present for years to come.

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Master of Engineering in Mining, Geological and Geophysical Engineering
As one of the only online programs of its kind, the program explores fundamental concepts in mining supported by groundbreaking research in the field. You’ll gain an advanced understanding of core technical principles while also pursuing coursework in finance and management, legal issues, and other administrative concerns specific to mining leadership.

Graduate Certificates in Mining and Geological Engineering
Certificate coursework is technical, interactive, and focused, supporting the development of advanced insight in topics that suit your goals. As each program is provided in a convenient, online format, you can continue to work full-time as you expand your skill-set, completing the certificate in as little as 1 year.
The structure of the courses offered through the online Master of Engineering in Mining, Geological and Geophysical Engineering varies, with some offered in a live, interactive format and others offered in an asynchronous, on-demand structure. Additionally, some courses will run for the entire duration of a semester and other intensive, shorter courses will consist of anything from 2-3 days to 2 weeks of class time. This makes the program both flexible and dynamic.

The Master of Engineering (ME) program is designed to be flexible and to accommodate practicing engineers. The program consists of the following requirements:

**Engineering / Science / Business courses:**
- At least 9 units in emphasis area
- 5-8 units of electives (including up to 6 units of one-unit short courses)
- 0-3 units of independent study or report

<table>
<thead>
<tr>
<th>Course Area</th>
<th>Course Codes</th>
<th>Notes</th>
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<tbody>
<tr>
<td><strong>Geomechanics</strong></td>
<td>MNE 527</td>
<td>Geomechanics (web)</td>
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<tr>
<td></td>
<td>MNE 547</td>
<td>Underground Construction Geomechanics (web)</td>
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<td></td>
<td>MNE 580</td>
<td>The Mechanics of Failure in Rock and Other Brittle Materials (web)</td>
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<tr>
<td></td>
<td>MNE 515</td>
<td>Rock Excavation (web)</td>
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<tr>
<td></td>
<td>MNE 517</td>
<td>Tailings Storage Facility Design</td>
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**Mine Information and Production Technology**
- MNE 507 Equipment Operations Technology (web)
- MNE 519 Mine Planning Software (short course)
- MNE 536 Surface Mine Design (web)
- MNE 538 Underground Mine Design (web)
- SIE 554 The Systems Engineering Process (web)
- SIE 531 Simulation Modeling and Analysis (web)
- SIE 548 Operations Research Modeling (web)

**Mine Health and Safety**
- MNE 522 Engineering Sustainable Development (web)
- MNE 526 Health and Safety in Mining (web)
- MNE 576 Fundamentals of Mine Ventilation (web)
- CPH 553 Toxicology and Chemical Exposures (web)
- BIOS 576A Biostatistics (web) (may be used to satisfy math requirement)
- HPS 577 Social and Behavioral Aspects of Public Health (web)
- PHPM 574 Health Administration and Policy (web)
- EHS 575 Environmental and Occupational Health (web)
- EPID 573A Basic Principles of Epidemiology (web)

**Mineral Processing**
- MNE 511 Mineral Processing (web)
- MNE 539 Surface Chemistry of Flotation (web)
- MNE 550 Elements of In-situ Leaching (web)
- MNE 565 Hydrometallurgy (web)
- MNE 567 Applied Pyrometallurgy (web)

**Sustainable Resource Development**
- MNE 522 Engineering Sustainable Development (web)
- MNE 541 Environmental Management and Mine Reclamation (web)
- ABE 526 Soil and Water Conservation Engineering
- AREC 576 Natural Resource Law and Economics

In addition to completing the requirements for an emphasis area, you’ll also need to fulfill the following course criteria:

- Electives (5-8 units) - These courses are subject to the approval of the advisory committee. Up to 6 units of short courses (696x, 697x, etc.) may be used as elective credit.
- Business Fundamentals (at least 3 units) - Take one of the following courses: SIE 557, ENGR 565, MNE 530
- Applied Engineering/Mathematics (at least 3 units) - Take one of the following courses: SIE 530, ABE 513, MNE 520
- Entrepreneurship/Innovation/Design (at least 3 units) - Take one of the following courses: SIE 567, MNE 536, MNE 515
- Advanced Engineering Science (at least 3 units) - Take one of the following courses: MNE 527, MNE 517, MNE 507
- Independent Study (MNE 599) or Report (MNE 909) (up to 3 units) - The project or independent study must be appropriate to the student’s plan of study, and is subject to the approval, in advance, by the student’s advisory committee.

The following chart explores some of the example emphasis areas that you can choose from. However, additional emphasis areas are possible within the general topics of mining engineering, geological engineering, geophysical engineering, and other appropriate areas of study.
GRADUATE CERTIFICATES IN MINING AND GEOLOGICAL ENGINEERING

Each of the online graduate certificates offered through the Department of Mining and Geological Engineering is technical, interactive, and focused, supporting the development of advanced insight in topics that suit your goals. As each program is provided in a convenient, online format, you can continue to work full-time as you expand your skill-set, completing the certificate in as little as 1 year.

Graduate Certificate in Geomechanics/Rock Mechanics

If you're seeking to develop specialized skills in rock mass behavior and properties, the online Graduate Certificate in Geomechanics/Rock Mechanics is the perfect solution. The program, offered entirely online, provides in-depth insight into geological engineering and mining principles shaped and taught by experts in the industry and leading faculty. As a student, you'll closely explore aspects of underground construction and stability analysis, learning to harvest raw materials while eliminating the hazards of mineral extraction.

Example Courses:
- MNE 527 Geomechanics
- MNE 580 Rock Fracture Mechanics
- MNE 547 Underground Construction Geomechanics
- MNE 515 Rock Excavation

Graduate Certificate in Mining Occupational Safety and Health

There are roughly 14,400 mines inspected by the Mine Safety and Health Administration each year for compliance with occupational and health regulations. Each of these sites requires the expertise of safety-minded professionals to ensure that every measure of risk avoidance is properly taken. The online Graduate Certificate in Mining Occupational Safety and Health can help you rise to the challenge of creating a hazardless mining environment and bring specialized, well-honed skills to your workplace.

Example Courses:
- MNE 576 Mine Ventilation
- MNE 526 Mine Health and Safety
- EHS 575 Environmental and Occupational Health

Graduate Certificate in Mine Production and Information Technology

If you're interested in developing your ability to find (or build) the right tool for the challenge at hand and use it effectively and efficiently, the online Graduate Certificate in Mine Production and Information Technology can help you reach your goals. The program, designed and taught by leaders in the mining industry and accomplished UA faculty, consists of detailed courses in the applications, software, and advanced technologies used to shape the production process on a daily basis. The program can offer you the opportunity to complete technical training in various systems and gain insight into the systems engineering process, preparing you to create new platforms and structures that suit any situation.

Example Courses:
- MNE 507 Equipment Operations Technology
- MNE 522 Engineering and Sustainable Development
- MNE 515 Rock Excavation
- MNE 530 Mine Examination and Valuation
- SIE 557 Project Management
- SIE 530 Engineering Statistics
- SIE 531 Simulation Modeling & Analysis
- SIE 548 Operations Research Modeling

Graduate Certificate in Mineral Processing and Extractive Metallurgy

The online Graduate Certificate in Mineral Processing and Extractive Metallurgy can help you effectively use the industry’s most current methods of ore and mineral processing to efficiently harvest the metals and other materials civilization depends on. The program's curriculum presents both a scientific and financial examination of mineral extraction techniques to offer you a complete perspective on the challenges of extractive metallurgy. As a student of the program, you can also explore hydrometallurgy, leaching, and water chemistry, building on your expertise to master aqueous extraction.

Example Courses:
- MNE 511 Mineral Processing
- MNE 539 Surface Chemistry of Flotation
- MNE 550 Elements of Solution Mining
- MNE 565 Hydrometallurgy

Students also choose 3 elective credits in consultation with their assigned advisor.
Ideal candidates for the online graduate programs in engineering offered by the University of Arizona will meet the following admissions standards:

- Minimum 3.0 GPA in previous academic coursework
- Graduated from an accredited engineering bachelor’s program or have earned a degree in a related discipline
- Some courses may also require that students have completed specific prerequisites

GPA Exceptions – Non-degree-seeking Status

If you do not meet the minimum 3.0 GPA requirement with your undergraduate coursework, you may be admitted to the Graduate College as a Non-degree student. After completing 12 semester units of non-degree graded 500-level or higher coursework with a minimum grade-point average of 3.0, you will be eligible to apply to a degree program.

To apply for any of the University of Arizona’s online programs in engineering, please follow the process below:

1. Complete the online application*, which can be found at: online.engineering.arizona.edu/apply
2. Upload other required materials through the online application process:
   - Unofficial transcripts from all universities/colleges attended. Official transcripts must be sent once accepted into the program.
   - Personal statement
   - An updated resume or CV
   - One letter of recommendation
   - International students must also meet English proficiency requirements. This can be done by submitting TOEFL, IELTS, or Pearson PTE Academic results
3. If admitted, send official academic transcripts to:

   Graduate College
   The University of Arizona
   Administration 322
   PO Box 210066
   Tucson, AZ 85721-0066

   Express mail (for FedEx, DHL, etc):
   Graduate College
   The University of Arizona
   1401 E University Blvd, #322
   Tucson, AZ 85721
   Phone: 520-621-3471
   Fax: 520-621-4101

* The process requires the payment of a $95.00 application fee for international applications, $85.00 for domestic applications, and $45.00 for domestic, non-degree seeking applicants.
We’re proud to offer these programs at a competitive tuition cost to professionals around the world. For more information about fees and tuition costs, please visit online.engineering.arizona.edu/tuition.

We encourage all students to explore the many funding options available, whether through federal or private loans. Grants and scholarships may also be available. Please visit financialaid.arizona.edu for more information.

Since its founding in 1885, the University of Arizona has been challenging the notion of “business as usual.” Our first graduating class, for example, consisted of two women and one male. We are driven by our history and stand as a national leader in practical education that helps students achieve incredible things. As one of the premier engineering schools in the country, our mission is to graduate students who are sought after by employers and prepared with a modernized skillset to embark on engaging, fulfilling careers.

We only see opportunity. Equipped with skills, knowledge, experience, and the entrepreneurial spirit they gain at the UA, our students become highly skilled members of society who bring diverse perspectives, lead with determination, innovate without limits and benefit our community, our state, our nation, and the world in boundless ways.

No matter where distance learners are, each student is a vital part of the UA community.

The learning materials provided through our online platform are diverse, dynamic, and engaging. Every piece of learning content is shaped by expert faculty and based on our proven on-campus programs. In fact, as an online student, you’ll have access to lectures and presentations that were recorded live during a relevant on-campus class session, allowing you to attend class without ever stepping foot in a classroom.

If you have any further questions or would like to begin the application process, please contact an Admissions Counselor:

Phone: (888) 658-2042
Email: onlineengineering@arizona.edu

Or visit: online.engineering.arizona.edu
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College of Engineering
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