

Mining and Geological Engineers

SOC: 17-2151 • Career Profile Report

■ Key Facts

\$101,020

Median Salary

7,000

Employment

+1.0%

Growth Rate

■ Requirements & Salary Range

Education: Bachelor's degree

■ Automation Risk Assessment

Low Risk - 17.0% probability of being automated in the next 10-20 years.

This job is relatively safe from automation due to its creative, social, or complex problem-solving requirements.

■■ Work-Life Balance

6.0/10 - Good work-life balance

■ Personality Fit (RIASEC)

Higher scores indicate better personality fit for this career type.

Realistic	8.2/10	Investigative	8.8/10
Artistic	6.4/10	Social	5.2/10
Enterprising	5.8/10	Conventional	6.6/10

■ Top Skills Required

Analytical skills, Decision-making skills, Logical-thinking skills, Math skills, Problem-solving skills, Writing skills

✓ Strengths

- High Demand
- Flexible Work
- Continuous Learning

■ Challenges

- Burnout Risk
- Rapid Technological Change

■ What They Do

Mining and Geological Engineers design, develop, and supervise **mining operations and geological projects**. They plan safe and efficient extraction of minerals, evaluate geological data, and ensure compliance with environmental and safety regulations. Their work is critical in mining, natural resource management, and industrial operations.

This career is well suited for individuals who enjoy engineering, geology, problem-solving, and project management.

What Do Mining and Geological Engineers Do?

These professionals analyze mineral deposits, design extraction methods, and oversee mining projects to maximize efficiency and safety.

Common responsibilities include:

- Conducting geological surveys and analyzing mineral samples
- Designing mines, tunnels, and extraction plans
- Monitoring mining operations for safety and efficiency
- Evaluating environmental impact and compliance with regulations
- Collaborating with geologists, surveyors, and construction teams
- Preparing technical reports, project plans, and cost estimates
- Researching new technologies and methods for mining and resource extraction

Key Areas of Mining and Geological Engineering

Engineers may specialize in particular materials, extraction methods, or operational areas:

- Mineral Exploration: Identifying and evaluating new mineral deposits
- Mine Design and Planning: Creating safe and efficient layouts for extraction
- Environmental and Safety Compliance: Ensuring operations meet regulatory standards
- Resource Management: Optimizing extraction while conserving resources
- Research and Development: Developing innovative mining techniques and technologies

Skills and Abilities Needed

Mining and geological engineers combine technical, analytical, and problem-solving skills.

Core Professional Skills

Personal Qualities That Matter

Education and Career Pathway

This role typically requires formal education and practical training:

- Bachelor's Degree (minimum): Mining engineering, geological engineering, or related field
- Internships or Co-op Programs: Hands-on experience in mining operations or geological projects
- Professional Licensure (optional for advanced roles): Engineer-in-Training (EIT) or Professional Engineer (PE) certification
- On-the-Job Training: Developing expertise in mine operations, safety protocols, and geological assessment
- Continuous Learning: Staying updated on mining technology, environmental regulations, and engineering advancements

Where Do Mining and Geological Engineers Work?

They are employed in organizations involved in mining, natural resources, and environmental management:

- Mining and Mineral Extraction Companies
- Engineering and Consulting Firms
- Government and Regulatory Agencies
- Research Institutions and Universities

- Environmental and Resource Management Organizations

Work environments include mines, industrial sites, laboratories, offices, and field locations.

Is This Career Difficult?

This career requires technical expertise, problem-solving, and project management skills. Engineers must design safe and efficient operations while addressing environmental, regulatory, and logistical challenges.

Who Should Consider This Career?

This career may be a strong fit if you:

- Enjoy engineering, geology, and applied science
- Are analytical and detail-oriented
- Can manage projects and collaborate with teams
- Are committed to safety and environmental responsibility
- Want a career designing and managing mining and resource operations

How to Prepare Early

- Take courses in mathematics, physics, geology, and engineering
- Participate in internships, research projects, or volunteer work related to mining or geology
- Develop skills in data analysis, modeling, and technical software
- Learn about environmental regulations, safety protocols, and mining technologies
- Explore professional certifications and engineering licensure pathways

Mining and geological engineers plan, design, and oversee mining operations, ensuring efficient, safe, and environmentally responsible extraction of natural resources.

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Source: <https://www.bls.gov/ooh/architecture-and-engineering/mining-and-geological-engineers.htm>