Sustainable Mineral Resources Minor

Study the interconnected environmental, social, technical, and economic issues surrounding the sustainable and responsible production and use of non-renewable mineral resources. Learn to work with people and value beliefs across disciplines, cultures, and national borders from diverse faculty. Implement critical thinking, effective communication, and data-driven decision making to bridge the gap between humans' ever-increasing demand for minerals and societies' changing priorities toward the environment and communities.

- Minimum of 9 units from one or two tracks
- At least 6 units must be upper division units
- Encouraged, but not required, to take courses from outside student's major and other minors
- Elective tracks are not officially notated on student transcripts/diplomas

All courses are 3 units unless a different number of units is shown in parenthesis.
All courses with * receive Gen Ed credit with the attribute shown in parenthesis.

Customize your track!

Mining & Recycling

- GEOS 251 Physical Geology (4 units)
- GEOS 346: Mineral & Energy Resources
- GEOS 446 Economic Mineral Deposits
- MNE 205 Introduction to Mining Engineering
- MNE/GEN 210 Minerology and Petrology for Engineers
- MNE/MSE 411 Mineral Processing
- MNE 427 Geomechanics (3-4 units)
- MSE 450 Materials Selection for the Environment

Leadership & Communication

- BNAD 302 Human Side of Organizations
- COMM 117 Culture and Communications
- COMM/PR 201 Introduction to Public Relations
- COMM 312 Applied Organizational Communications
- COMM 404 Communications and Leadership
- ENVS 415 Translating Environmental Science
- PR 423 Crisis Communication and Public Relations

Business & Economics

- ACCT 250 Survey of Accounting or BNAD 304 Survey of Finance
- GEOG 305 Economic Geography
- GEOG/EVS 362 Environment and Development
- MNE 205 Introduction to Mining Engineering
- MNE 430 Mine Examination and Valuation
- MGMT 202 Ethical Issues in Business or PHIL/LAW 322 Business Ethics
- SIE/ENGR 265 Engineering Management I
- SIE 422 Engineering Decision Making Under Uncertainty

Data Analytics & Automation

- ESOC 214 Introduction to Data Science
- *GEOG 222 Working with Numeric, Spatial, and Visual Data Fundamental Geographic Techniques (Exploring Perspectives: Social Scientist)
- GEOS 280 Programming and Data Analysis in the Earth Sciences
- RNR/GEOG 403 Application of Geographic Information Systems
- ISTA 131 Dealing with Data (4 units)
- ISTA 321 Data Mining and Discovery
- ISTA 322 Data Engineering

Environmental

- ENVS 305 Pollution Science
- EHS 426 Topics in Environmental Justice or *ENVS 310 Ecosystem Health and Justice (Diversity Emphasis; Tier 2 Individuals and Societies; Building Connections)
- ENVS/GEOS/HWRS 340 Environmental Chemistry
- GEOS 346: Mineral & Energy Resources
- ENVS 482 Reclamation and Redevelopment of Impacted Lands
- *HWRS 201 Water science and the Environment (Tier 2 Natural Sciences)
- HWRS 350 Principles of Hydrology
- PA 484 Environmental Management
- SIE 466 Life Cycle Analysis for Sustainable Design & Engineering

Health & Safety

- EHS 375 Introduction to Environmental & Occupational Health or EHS/MNE/NSC/PCOL 484 Fundamentals of Industrial and Environmental Health
- EHS/ENVS 418 Introduction to Human Risk Assessment
- MNE 297A Underground Mine Safety (1 unit)
- MNE 297B Operation and Maintenance of Heavy Mining Equipment (1 unit)
- MNE 297C Fundamentals of Mine Rescue (1 unit)
- MNE 423 Historic and Contemporary Role of US Regulatory Agencies (OSHA, MSHA, EPA) or PHP 421 Introduction to Public Health Law and Ethics
- MNE 424 Miner Health: Fitness-for-Duty, Mitigating Exposures, and Managing Disease Risk
- MNE 425 Mine Emergencies and Disasters: Prevention, Response, and Recovery
- MNE/GEN 426/426A Health and Safety in Mining

Society & Policy

- *AIS 220 Contemporary American Indian Issues (Diversity Emphasis; Tier 2 Individuals and Societies) or *GEOG 250 Environment and Society in the Southwest Borderlands (Exploring Perspectives: Social Scientist; Tier 2 Individuals and Societies)
- AIS/ANTH/ARL/ENVS/RAM/RNR/WFSC/WSM 441A Natural Resource Management in Native Communities or ANTH/LAS 331 Anthropology and Development
- SWES/WFSC/WSM 441A Natural Resource Management in Native Communities or ANTH/LAS 331 Anthropology and Development
- GEOG/EVS 462 Environmental Law, Geography, and Society or RNR 480 Natural Resources Policy and Law
- PA/PPEL 482 Environmental Governance
- *PHIL/PA/PPEL 323 Environmental Ethics (Tier 2 Individuals and Societies; Building Connections)
- RNR/PA 485 The Economics & Social Connections to Natural Resources
- SBE 201 Sustainable Design and Planning
- SOC 307 Environmental Sociology

Core Courses

Minimum of 6 units of core coursework | Core courses do not need to be completed before starting electives, but do need to be completed before starting the capstone.

- *MNE/ANTH/GEOS 201 Nonrenewable Resources and World Civilizations (Building Connections; Diversity Emphasis/Tier 2 Natural Sciences)
- *MNE/ENGR 422 Engineering Sustainable Development (Building Connections/Writing starting Fall 2025)
- MIN/GEOS/HWRS/MSE 236 Materials, Societies, & Choices (Exploring Perspectives/Diversity & Equity/Quantitative Reasoning)
- MIN/MNE/GEOS/ENVS 226: A Balanced Future: Sustainability and Minerals (Building Connections/Quantitative Reasoning)

Capstone Experience

Minimum 3 upper division units (at least one unit completed in final semester)

Two pathway options:

Option 1: Complete MIN 498: Senior Capstone course

Option 2: Complete a combination of an internship, seminars, and/or research project.

- MIN 396/496: Special Topics in Mining and Mineral Resources Seminar (1 unit each; can be repeated for 3 units total)
- MIN 392/492: Directed Research (1 unit)
- MIN 393/493: Internship (1-2 units)

For Directed Research & Internships

- Requires alignment with interdisciplinary goal of School
- Encouraged to be outside major
- Requires approval by School advisor

THE UNIVERSITY OF ARIZONA
School of Mining & Mineral Resources

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