

GEOL 862 Resource and Sustainability

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This course addresses the role of mineral exploration and mining industries in providing wellbeing for people and ecosystems; includes discussions of the global distribution of, and demand for, water, energy and mineral resources, and the major geological, technological, economic, environmental, social and governance issues. It culminates with the design of solutions based on sustainable management.

This course aims to provide students with a holistic framework to understand the geological, technological, environmental, economic and social issues related to the provision of earth resources and focusing mainly on the critical metals required for evolving society.

Course Topic Highlights:

- Major global Issues and concepts of sustainability
- UN sustainable goals and the provision of critical minerals/metals
- Role and challenges of the scientists, explorationists, engineers working in the fields related to the mineral resource industry
- Ways forward and possible solutions
 - criteria and indicators to assess the contribution of mining and mineral activities to sustainable development
 - critical analysis of the established policies for global provision of resources

Holistic Framework	Course Learning Outcomes (CLOs)	Aligned Assessment	Grades
Foundational Knowledge	CLO # 1: <i>Identify</i> the relationship among technical issues such as distribution of water, mineral, and energy resources to sustain the global provision of these natural resources with focus on critical metals	Case Study Report: Targeting exploration for specific commodities taken in consideration geological, environmental, technological, economic and social attributes (individual work)	10%
Caring	CLO # 2: <i>Address</i> issues within the context of UN Sustainable Development Goals (e.g., population growth, social justice, wealth distribution, and environmental concerns) by applying the technical knowledge from CLO(1)	Seminar 2: Integration of STEM to address the UN sustainable development goals in the context of the provision of mineral or energy resources (teamwork)	10%
Human Dimension	CLO # 7: <i>Reflect</i> on the role/responsibility of the geologists and engineers in contributing to sustainable provision of mineral resources globally by taking into consideration the geological, technological, social, and political contexts.	Participation: including self-evaluation and feedback discussions	20%
Integration	CLO # 6: <i>Propose</i> innovative approaches for mineral exploration and mining activities using knowledge integrated from CLO(1-3) and research on new technologies.	Seminar 1: New technologies to mitigate environmental impact of mineral exploration and mining (teamwork)	10%
Learning How to Learn	CLO # 3: <i>Evaluate</i> the attributes related to non-renewable character of minerals and mine life-cycle systems (e.g., geological, technological, environmental, social, economic, and human issues) for strategic and sustainable resource planning.	Seminar 2: Integration of STEM to address the UN sustainable development goals in the context of the provision of mineral or energy resources (individual work)	25%
Application	CLO # 4: <i>Examine</i> examples of policies and legislative frameworks that address the complexity of sustainable mineral resource provision within a global context to understand the challenges in mineral exploration worldwide.	Debate: Critical analysis of the established policies and criteria to evaluate global provision of resources (teamwork)	10%
	CLO # 5: <i>Analyze</i> the criteria and indicators used to evaluate the sustainable global provision of resources to identify their limitations and propose new approaches.	Debate: Critical analysis of the established policies and criteria to evaluate global provision of resources (individual work)	15%