GEGN 403: MINERAL EXPLORATION DESIGN

Credit: 3.00  
Instructor: Dr. M. Stephen Enders  
Pre-requisite Knowledge: Satisfactory completion of mineral deposits or relevant experience

GEGN 403 is a senior-level capstone course that may be taken for graduate credit. The course is designed for students who have an interest but no experience working in the exploration business. This course is also designed for early career professionals who may have some experience in exploration or mine geology and want to broaden and deepen their knowledge base about a variety of mineral exploration tools, techniques, methods, and strategies.

The course covers topics in: ethics & responsibilities for exploration geologists; mineral exploration methods – geological, geochemical, geophysical, drilling; exploration approaches and project design; QA/QC, geological and assay database management; geometallurgy and mine planning considerations; resource modeling, and preliminary economic evaluation. Lectures and laboratory exercises are structured around a simulation of the entire exploration sequence from inception and planning through implementation to discovery, with initial resource estimations and preliminary economic evaluation. The course is led by Dr. M. Stephen Enders with lectures from subject matter experts in the Denver area and includes the study of case histories and many representative examples. The course uses current industry news feeds to help the students get a better understanding of the exploration business, and relevant examples of technical, economic, social, political, environmental and legal issues surrounding the industry. The capstone project is based on a dataset from a real-world project, where the objective is to integrate and interpret a variety of datasets ultimately leading to a 3D geological model of the deposit. The course compels students to work both individually and as a member of a team which culminates in a written project report and oral presentation of their project proposal for funding to an external board of directors.

After completing the course, a student will:

1. Know how to develop a mineral deposit target model
2. Know how to rank prospect options based upon target model
3. Know how to apply the target model to the progressive evaluation of a single property
4. Participate in the mineral exploration process through a phased design project
5. Understand the basic principles of exploration technologies: geologic mapping, geophysics, geochemistry, remote sensing and geographic information systems (GIS) and integration of these components in the mineral exploration process
6. Learn how to use Leapfrog software program and complete a preliminary resource estimation
7. Incorporate the significant current non-technical aspects of resource development: political, legal and social issues into a framework for responsible exploration
8. Understand the ethical and regulatory requirements for exploration geologists
9. Have a basic knowledge of the structure of the mineral exploration industry
10. Understand the relationship and necessary input of other science/engineering disciplines (e.g. mine engineering, metallurgy) in the mineral exploration process