MinE 306
Mining Exploration and Evaluation
Fall Semester, 2006

Instructor: Dan W. Alexander, PE, PhD
Lecture Hours: Wednesday & Friday, 11:00 am – 12:15 pm
Office Hours: Tuesday & Thursday 10:00 am – noon or By Appointment
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Credit Hours: 3

Prerequisites by topic:
1. Knowledge of basic geological features, terms, and definitions (GEOL 101 & 102)
2. Knowledge of structural geology (GEOL 342 Structural Geology for Engineers)
3. Basic statistics -- sampling, t-tests, and confidence intervals (STAT 211 Elementary Statistical Inference)

Textbooks:

Suggested additional references:

All texts are available at the Evansdale Library. The ME Handbook and Gentry & O’Neil are both available only through the Society for Mining, Metallurgy and Exploration (SME). Go to www.smenet.org or call 1-800-763-3132, have your student member # available for the discount price. Other reading assignments will be made from the general literature, Internet sources and current event reports.

Objectives:
1. Study geologic properties of coal and mineral deposits
2. Study exploration procedures
3. Study methods for collecting and interpreting geologic and quality data
4. Study resource estimation and evaluation procedures
5. Study basic engineering economic methods, time value of money and reserve valuation.
6. Practice finding information outside of class.
Topics:
1. **Geology and Geological Characteristics of Mineral Deposits.** Types of deposits, geometry of deposits, structural geology, heritage, mineral associations, paragenetic sequence, zoning patterns, and metallogenic provinces.
2. **Reconnaissance and Exploration:** Review of existing data and information, preliminary studies, aerial photography, satellite imagery, mapping, identifying targets, and investigating targets.
3. **Gathering Geologic Data.** Strike and dip of deposit, sampling procedures, statistical analysis of samples, drilling, geophysical methods, geochemical methods, and geobotanical methods.
5. **Engineering Economy.** Interest formulas, economic equivalence, evaluation of alternatives, and rate of return analysis. Some classes will be held in the computer lab.
6. **Mineral Deposit Valuation and Evaluation.** Life cycle, unit value, location value, contracts, recovery, dilution, preparation and processing, leases, estimating costs, taxes, depletion, present value, and rate of return on investment.

**Design Project:** Each student will be given adequate information for a specific property to estimate the mineral reserve, construct required maps showing different information, and perform an economic analysis of the property. This analysis will be summarized in a written report, with recommendations for or against investment.

**Grading:**
- Homework: 20%
- Project: 20%
- Quizzes: 10%
- Exams (20%, 30%): 50%

**Class Policies**

**Attendance:** Attendance and class participation are mandatory. Poor attendance and lack of participation can result in a 5% reduction in grade. When meetings with special topics speakers or tours are scheduled students are expected to attend and are responsible for the information discussed whether they attend or not. 

*WVU recognizes the diversity of its students, many of whom must be absent from class to participate in religious observances. Students must notify their instructors by the end of the third class meeting regarding religious observances that will affect their attendance. Further, students must abide by the attendance policy of their instructors as stated on their syllabi. Faculty will make reasonable accommodation for tests or field trips that a student misses as a result of religious observance.*

**Homework and Quizzes:** Homework will be accepted for full credit on the date due at the beginning of class. Homework will be accepted up to the following class with a one-grade-level penalty. No homework will be accepted more than one class late. If there are extenuating circumstances, contact me in advance of class. Approximately four Quizzes will be given unannounced on assigned reading and class material.

**Plagiarism** - There will be no excuses for plagiarism in the mapping or written assignments. Short quotes from reference material and the use of other’s illustrations are acceptable if the source is
Social Justice Statement - West Virginia University is committed to social justice. We concur with that commitment and will foster a nurturing learning environment based upon open communication, mutual respect, and non-discrimination. Our University does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color or national origin. Any suggestions as to how to further such a positive and open environment in this class will be appreciated and given serious consideration. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise us and make appropriate arrangements with Disability Services at 293-6700.
Homework and Report Formats

All assignments:
♦ No perforated notebook paper.
♦ Show all equations and calculations. Note that spreadsheet algorithms are not equations, they are mini-programs. Be sure to show both the theoretical and applied equations.
♦ All assignments must include a cover page similar to this:

(Please note that the word “Homework” is not adequate identification of a particular assignment.)
♦ All pages must be numbered, and include the student’s last name, in the upper right corner. One example: Jones - 1/7

(Means page 1 out of 7 total pages)

Problem assignments:
♦ Mark answers clearly and box them in.
♦ Show all steps in the calculation.
♦ If hand written, use engineering paper.
♦ Neatness counts.

Written Assignments: All writing assignments will be submitted typed on clean white 8.5" x 11" paper with exhibits and maps larger than 11" x 17" attached in clear pocket folders. Neatness and understandable organization are important.
♦ Illustrations and graphs, if neatly produced, may be hand-drawn.
♦ Do not use dot-matrix printers.
♦ All papers are to be either double-spaced or 1-1/2 spaced.
♦ Fonts must be a standard type-face. Good fonts are Arial, Times New Roman, Goudy, and Helvetica. Under no circumstances are Courier fonts, script fonts, or informal fonts acceptable. If unsure, bring me a sample for pre-approval.
♦ Font sizes are limited to 10-, 11-, and 12-points, except for titles and headings.
♦ RUN SPELL CHECK
♦ All margins are to be 1” wide
♦ Long reports require:
  — Title page
  — Abstract
  — Table of contents
  — Lists of figures and illustrations (if used)
  — Lists of tables (if used)
  — Report Body
  — Bibliography (if needed)
  — Appendix (if needed)

Remember, as an engineer, you are severely limited in your value to an employer or client, if you cannot communicate your findings or designs, clearly, precisely, and with minimum room for others to misinterpret the work. Conciseness is also essential since many who will read your work will be executives who are too busy to read the details. Writing practice in your assignments will improve your style, grammar and even spelling.