Mining – 343
Coal Mine Development and Production

Summer Semester 2011
Instructor: Jerry C. Tien

Course Description

An in-depth study of all aspects of coal mining, including an overview of the coal industry, reserves and geology, planning and development of coal mines, surface and underground mechanized methods of face preparation, equipment, coal extraction, handling and preparation as practiced in the United States.

Course Objectives

This course is designed to give students a comprehensive understanding of 1) the coal industry; 2) coal mining methods, mine planning, mine support systems and equipment; and 3) other important issues and topics concerning the mining and use of coal.

Textbook and References

Min-343 text (selected chapters from "***Coal Mining Technology: Theory and Practice***" by Robert Stefanko, SME, Littleton, CO; 1983) is available at $35 per copy, other relevant reference materials from professional and trade magazines will be provided as appropriate. Useful information can also be obtained from the following two books, both from SME:

1) ***SME Mining Engineering Handbook***, 2nd edition (Howard L. Hartman, editor, 1992)
2) ***Surface Mining,*** 2nd edition (Bruce Kennedy, Editor, 1990). Copyright permission has already been granted by SME.

Design Project

Depending on student's particular interest and/or background, student can choose to (1) work on a mine with specific mine property boundary and coreholes across the property to design either a surface or underground mine operating on the property to meet selected sales contract over a five-year period, or (2) other relevant coal design project: a ventilation system, roof control plan, or a feasibility study.

Grading

One-hour exams (3)	30%
Homework Assignments (4-5)	50%
Design project	20%

A: 90% – 100%
B: 80% - 89%
C: 70% - 79%
D: 60% - 69%
F: < 60%

Schedule of Classes

No. Topic

Introduction and General

1. State of the coal industry, current issues; historical production, employment, productivity, technology, health and safety
2. Coal geology, rank, and occurrences; coal properties, characteristics, and analyses
3. Distribution of coal deposit; quality and reserves
4. Exploration and modeling; economics and valuation
5. General mine design process; permitting process

Exam 1

Underground Mining:

6. Access methods and equipment; *room-and-pillar mining:* mine and panel design and development
7. Conventional mining: unit operations, cycle, auxiliary operations, manpower
8. Continuous mining: unit operations, cycle, auxiliary operations, manpower, types (standard, double-unit, supersection)
9. Pillar extraction: full and partial retreat; design; extraction sequences; equipment

Longwall Mining

10. Panel design, development, and set-up
11. Unit operations, cycle, auxiliary operations
12. Equipment and manpower
13. Longwall moves; continuing development, market survey

Surface Mining

14. Strip mining
15. Dragline basics, mining operations, range diagram
16. Shovel basics, operations and equipment
17. Other mining methods: continuous, contour mining, mountaintop removal; highwall mining, Mining coal in Appalachia;

Coal Preparation and Transport

19. Objectives, layout, unit operations
20. Washability analysis, circuit specifics
21. Storage, stockpiling, loadout facilities; transportation
22. Reclamation, permitting/bonding
23. Government policies, environmental issues,

Exam 3