

TEXT: *Elements of Petroleum Geology*, R. C. Selley, 2nd ed, 1998
+ many other readings (p. 3) will be made available from a variety of sources due to the multidisciplinary nature of the course.

INSTRUCTOR: Dr. Ronald L. Martino
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COURSE DESCRIPTION: GLY 427/527 Fossil Fuels 4 hours

Origin and distribution of coal, oil, and gas and methods of exploration and reserve evaluation.

Prerequisite Courses (or permission):
GLY 313-Structural Geology and
GLY 325-Stratigraphy & Sedimentation

COURSE OBJECTIVES

To develop an understanding of :

- 1) the composition of coal, coal quality parameters, and coal-forming depositional environments
- 2) coal mining methods, reserve estimates, causes and nature of coal seam discontinuities, roof rock quality and problems
- 3) the composition of petroleum and natural gas, the nature of precursors and necessary depositional and diagenetic conditions for their preservation and maturation
- 4) hydrocarbon migration, and various structural, stratigraphic and combination trapping mechanisms
- 5) primary, secondary and tertiary recovery methods
- 6) exploration methods including subsurface stratigraphic and structural analysis
- 7) the basic elements of well logging; determination of rock type and fluid content from borehole data
- 8) economic factors controlling petroleum development
- 9) petroleum and coal geology of West Virginia and vicinity

ATTENDANCE POLICY

A daily record of class and lab attendance will be maintained by calling roll. If a student is late, it is their responsibility to notify instructor at end of class that they were present. Excessive unexcused lateness or absences will have a negative impact on attendance/participation component of grade calculation.

Attendance during exams is mandatory. Only serious personal illness, death in the immediate family, military service, or university activities excused by the academic deans will be considered as acceptable reasons for missing a test; all excuses must be verifiable.

Any form of academic dishonesty that occurs will result in dismissal from the course up until March 16, and an automatic final grade of "F" after this date. In both cases, a letter outlining the offense will be forwarded to the academic dean for consideration of further action. (see p. 105-109, 2005-2007 Undergraduate Catalog).

GRADING

	<u>427</u>	<u>527</u>		
Exam # 1	15 %	15	Final Average/Grade	
Exam # 2	15 %	15	90-100	A
Exam # 3	15 %	15	80-89	B
Lab Av	25 %	20	70-79	C
Att/Part	10 %	10	60-69	D
Res Paper Or Project	20 %	25	less than 60	F

COURSE OUTLINE

<u>Week</u>	<u>Lecture Topic</u>	<u>Reading Assignment</u>
1-2	Coal Occurrence and Composition	TBA
3	Pennsylvanian Coal Formation: Appalachian Basin	"
4	Coal Exploration Models	"
5	Coal Mining Techniques and Hazards	"
EXAM # 1 _____		
6	Introduction to Petroleum Geology	C. 1
7	Properties of Oil and Gas	C. 2
8	Exploration Methods	C. 3
9-10	Origin, Migration, and Accumulation	C. 5
EXAM # 2 _____		
11-12	The Reservoir	C. 6
12-13	The Trap	C. 7
14-15	Enhanced Recovery	TBA
EXAM # 3 (Final Exam) 5/1/07 10:15 AM _____		

Lab Topics:

- Coal Lithotypes, Coal Petrology
- Proximate Analysis, Reserve Estimates
- Coal Geology of Southern WV Field Trips:
 - 1) Mining Techniques, Reclamation
 - 2) Pennsylvanian Coals: stratigraphy and depositional context
- Oil Game Project: Basin Analysis, Exploration, Economics

References (Partial listing):

Levorsen, A. I., 1967, *Geology of Petroleum* 2nd ed., 724 p.

Ward, C. R., 1984, *Coal Geology and Coal Technology*, Blackwell Scientific Publications

Ch. 7 (p. 220-261) *Coal Mining Geology*

Ch. 9 (p. 294-313) *Coal and the Environment*

Williamson, I. A., 1967, *Coal Mining Geology*, Oxford University Press.

Ch. 18 (p. 218-235) *Origin and Properties of Coal*

Ch. 19 (p. 236-255) *Rank and Classification of Carbonaceous Sediments*

CD – *Atlas of Coal Geology* (editors A. R. Papp, J. C. Hower, and D. C. Peters)

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V. 1 *Coal Geology*

V. 2 *Coal Petrology*