

GEOS 446
Petroleum Geology
3 credits

Hydrocarbons fuel today's economy, but remain a relatively rare natural resource. The objective of this course is to review the geologic controls on the distribution and accumulation of hydrocarbons, how those hydrocarbons are found, and how they are subsequently extracted. At the end of the course, students should be able to explain:

- the subsurface environment
- the origin and nature of hydrocarbons
- how and where hydrocarbons accumulate
- methods of hydrocarbon exploration and exploitation
- unconventional hydrocarbon resources
- basic reservoir engineering techniques

Examples from classic hydrocarbon-producing regions will be used to illustrate the principles and techniques discussed in class.

Prerequisites: Geos 314 and 322 or equivalent

Instructor: Cathy Hanks, NSB 346/Duckering 417, 474-5562 or 2668
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Office Hours: TBD

Text: Selley, 1999, Elements of Petroleum Geology. Academic Press, 470 p.

Class format:

The class will consist of lectures and homework assignments.

Grading Policy

The course grade will be a letter grade (plus, minus) and will be based on:

- 2 mid-term exams (25% each)
- final exam (25% each)
- homeworks (25%)

Grades will be assigned as follows:

A+ = 97-100%

A = 93-96
 A- = 90-92
 B+ = 87 - 89
 B = 83-86%
 B- = 80-82
 C+ = 77-79
 C = 73 - 76%
 C- = 70 - 72
 D+ = 65-69
 D = 55-64%
 D- = 50 - 54
 F = <55%

The instructor reserves the right to curve the grades where appropriate.

Late homeworks will not be accepted.

COURSE OUTLINE: (28 CLASS DAYS)

1	Intro—Why petroleum?		
	What is Petroleum? Organic vs. inorganic origin of petroleum Chemical Properties Physical Properties		Selley Ch. 2
2	The subsurface environment Temperature within the earth Pressure Subsurface waters	Hwk 1: Calculating geothermal gradients	Selley, Ch. 4
	Methods of Exploration Drilling a well Well logging	Hwk 2: Rock id	Selley, Ch. 3.1, 3.2, 3.5
3	Subsurface geology and maps Formation Evaluation	Hwk 3: Examining well cuttings and well logs	
	Gravity and Magnetics		
4	Geophysical methods—Reflection Seismic--acquisition	Hwk 4: Interpreting seismic	Selley, Ch. 3.3
	Seismic interpretation, 3 D, 4D		
5	The source: How oil forms Source rock characteristics Productivity and Preservation of Organic Matter. Hydrocarbon Maturation		Selley, Ch. 5

	Hydrocarbon Migration		
	<u>Midterm I</u>		

6 **The Reservoir:**

