

**PETE/GEOS 646**  
**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.

Students will be assigned additional readings each week that expand on the topics discussed in class. Students will then use the concepts and techniques discussed in both the class and the readings to research a petroleum topic related to their own area of research. Results will be summarized as a paper and presented to the class as a short presentation.

**Prerequisites:** Graduate standing or permission of the instructor

**Instructor:** Cathy Hanks, NSB 346/Duckering 417, 474-5562 or 2668  
[chanks@gi.alaska.edu](mailto:chanks@gi.alaska.edu)

**Office Hours:** TBD

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

Additional readings will be assigned each week to augment the lectures.

**Class format:**

The class will consist of lectures and homework assignments. Additional readings will be assigned each week to augment the lecture material given in class.

**Grading Policy**

The course grade will be a letter grade (plus, minus) and will be based on:  
2 mid-term exams (20% each)

final exam (20% each)

homeworks (20%)

final project paper & oral presentation (20%)

Students will meet with the instructor during the first 2 weeks of class to

**3** Subsurface geology and maps  
Formation Evaluation

9	Trap types: <ul style="list-style-type: none"> <li>○ Structural Traps.</li> <li>○ Stratigraphic Traps.</li> <li>○ Combination Traps.</li> <li>○ Hydrodynamic Traps.</li> </ul>	<b>Hwk 8: Constructing subsurface structure maps; Identifying play types from subsurface structure maps</b>	
	Salt-related structures		
10	<b><u>Midterm II</u></b>		
	Structural modifications of a reservoir: Fractured reservoirs		
11	Timing of Trap Development Relative to Migration. <b>Petroleum systems &amp; plate tectonic habitat</b> Passive continental margins	<b>Hwk 9: Using seismic data for structural interpretation and timing</b>	<b>Selley, Ch. 8</b>
	Passive continental margins, cont		
12	Convergent margins Strike slip basins	<b>Hwk 10: Plate tectonic setting of modern day basins</b>	
	<b>Reservoir engineering:</b> Reserve calculations	<b>Hwk 11: Simple reserve calculation</b>	<b>Selley, Ch. 6.8-6.9</b>
13	<b>Well Drilling and Completion</b>		
	<b>Non conventional hydrocarbon resources</b> Viscous oil Gas hydrates Coal bed methane		
14	Tight gas Shale resource plays		
	<b>Student presentations</b>		

**Course Policies:** Attendance at class is your responsibility. Students are responsible for making up any missed work. Students are encouraged to arrive to class on time. Make-up examinations will be held only under exceptional circumstances (e.g. illness, family crises, etc.). Medical documentation will be required to confirm illnesses. We follow the university guidelines for plagiarism/academic integrity as outlined in the current UAF catalog (p. 71-72).

**Disability Services:** The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. We will work with the Office of Disabilities Services (208 Whitaker Building, 474-5655) to provide reasonable accommodation to students with disabilities.