

CASPER COLLEGE COURSE SYLLABUS

GEOL 2320 Petroleum Geology

Semester/Year: Fall 2015

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Class Time: 3:00-4:30pm

Days: MW

Room: GW210

Instructor's Name: Ken Kreckel

Instructor's Contact

Office Phone: 268 3457

Email:

Information: 307 251 1370

kkreckel@caspercollege.edu

Email preferred.

Office Hours: 12:30-1:30pm PS115 MW [may conduct office hours in GW210]

Course Description: An introduction to the geologic and petroleum engineering factors associated with the discovery and production of oil and gas. Topics will include how oil and gas are formed and trapped, and how economic accumulations are found and produced. The course will concentrate on exploration and development of oil and gas.

Statement of Prerequisites: completion of EXTR1500 or permission of instructor

Goal: Upon completion of this course, the student will:

- Be familiar with basics of petroleum exploration.
- Understand how a reservoir is found and produced, and how that reservoir can change over time.
- Understand methods to extend and enhance field production.

Outcomes: The student will:

1. Know how oil and gas are formed and trapped.
2. Know how geological techniques locate potential reservoirs.
3. Know how to do a basic appraisal of economic potential for a well.
4. Understand reservoir depletion and methods to extend/enhance reservoir performance.
5. Understand the use of geologic and engineering data to evaluate wells and reservoirs.
6. Understand the potential value of unconventional reservoirs.

Course Objectives: as above

Methodology: The course is divided into weeks which correspond to the major topics on the syllabus. Each week will have some combination of the following:

1. Reading assignment
2. Power point presentation [.pdf]
3. Online activity: either a learning site, enrichment, or other relevant site. Use of modern computer methods will be utilized whenever possible.
4. Other activity: problem solving, mapping or chart example, etc.
5. Discussion forum [online]: On some weeks I will post a series of questions on the forum covering the major points for that week. Participation is mandatory and a portion of your grade will be based on the quality of your participation [see Forum Rubric example]
6. Two major tests

Evaluation Criteria: There will be one midterm exam and one final project or exam, which will comprise the majority of the grade. Quizzes and weekly work equal a portion of the course grade. However it is essential the student complete all assignments in order to perform well on the tests.

Casper College may collect samples of student work demonstrating achievement of the above outcomes. Any personally identifying information will be removed from student work.

Required Text, Readings, and Materials: Selley, Richard. Elements of Petroleum Geology, 2nd ed. Resources from Schlumberger and others will be utilized, including various computer software packages including PETRA and Jason.

Class Policies: Last Date to Change to Audit Status or to Withdraw with a W Grade: as per Casper College policies (withdrawal deadline; see: “Admission and Registration – Schedule Changes” in the catalog)

Student Rights and Responsibilities: Please refer to the Casper College Student Conduct and Judicial Code for information concerning your rights and responsibilities as a Casper College Student.

Chain of Command: If you have any problems with this class, you should first contact the instructor to attempt to solve the problem. If you are not satisfied with the solution offered by the instructor, you should then take the matter through the appropriate chain of command starting with the Department Head/Program Director, the Dean, and lastly the Vice President for Academic Affairs.

Academic Dishonesty: (Cheating & Plagiarism) Casper College demands intellectual honesty. Proven plagiarism or any form of dishonesty associated with the academic process can result in the offender failing the course in which the offense was committed or expulsion from school. See the Casper College Student Code of Conduct for more information on this topic.

Official Means of Communication: Casper College faculty and staff will employ the student's assigned Casper College email account as a primary method of communication. Students are responsible to check their account regularly. This is also, where you will find course evaluation links during course evaluation periods.

ADA Accommodations Policy: If you need academic accommodations because of a disability, please inform me as soon as possible. See me privately after class, or during my office hours. To request academic accommodations, students must first consult with the college's Disability Services Counselor located in the Gateway Building, Room 344, (307) 268-2557, bheuer@caspercollege.edu. The Disability Services Counselor is responsible for reviewing documentation provided by students requesting accommodations, determining eligibility for accommodations, and helping students request and use appropriate accommodations.

Calendar or schedule indicating course content:

The course Moodle page will serve as a constantly updated detailed course summary. Here's a brief summary:

Basic Petroleum Geology
Course Schedule

| Week | Topics | Exercises/Reading |
|------|--|--|
| 1 | What a petroleum geologist does | Basic skills Compiling data; locating wells Selley Ch 1& part of 8 |
| 2 | Hydrocarbon Generation and Migration Petroleum Properties; subsurface environment | Selley Ch 4 & 5 Activity: PVT diagrams |
| 3 | Traps and Seals | Selley Ch 7 Recognizing traps, mapping a trap |
| 4 | Reservoirs | Selley Ch 6 Distinguishing reservoir from seal, source |
| 5 | Basins and structure | Selley Ch 8 Petroleum system event chart |
| 6 | Basin analysis Mid term test | Basin Analysis |
| 7 | Geologic Exploration: well logs | Selley Ch 3 & handouts Activity: correlating logs & mapping |
| 8 | Wellsite Geology: Log evaluation SP and GR | Selley Ch 3 Activity: Log analysis |
| 9 | Geologic Exploration: Mapping | Activity: Mapping and Cross-sections |
| 10 | Computer geology | Activity: computer mapping |

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| 11 | Geophysical Techniques | Selley Ch 3 & handouts Dutch North Sea interpretation |
| 12 | Can you find Oil & Gas? | 3D seismic interpretation |
| 13 | Exploration & development | Wildcat Canyon exercise |
| 14 | Economics and risk | Propsect evaluation |
| 15 | Unconventional HCs Shaly sands Coalbed methane Gas hydrates Oil shale | Selley Ch 9 Niobrara and Bakken |
| 16 | Review | COMPREHENSIVE FINAL |

- 1 Log Interpretation Reading log data working with raster and digital log data [PW2]
AAPG Ch1 PW1-3
- 2 SP and Gamma Ray
AAPG Ch1 & 2 PW5 & 6
- 3 Resistivity Logs
AAPG 5 PW5
- 4 Porosity Logs
AAPG Ch 4
- 5 Cross plots and working with Digital logs
- 6 Water saturations & Mudlogging
PW4
- 7 Midterm
- 8 Log analysis of a development well
- 9 Digital Log interpretation
Echo Springs log
- 10 Case Histories & exercises
- 11 Case Histories & exercises
- 12 Case Histories & exercises
- 13 Unconventional and horizontal
- 14 Final project
- 15 Complete final project