PGE 427
PROPERTIES OF PETROLEUM FLUIDS
Fall 2017
Unique Numbers: 19045, 19065
Lectures: MWF 12:00 - 1:00 PM, CPE 2.210
Labs: M 8 – 11 AM or 2 – 5 PM, CPE 1.168

Course Topics:
Principles of organic chemistry, phase behavior of multicomponent mixtures, properties of hydrocarbon gases and liquids and oil field waters, overview of laboratory phase behavior measurements, and material balance calculations.

- Components and phases
- Phase behavior of multicomponent fluids
- Phase diagrams
- Equation of state
- Gas liquid equilibria
- Reservoir fluids
- PVT experiments
- Fluid characterization using an equation of state
- Black-oil concept
- Flow assurance
- Oilfield brines

Prerequisite:
Chemistry 302 and Petroleum and Geosystems Engineering 326 with a grade of at least C- in each.

This course is restricted to students admitted to major sequence in geosystems engineering and hydrogeology or petroleum engineering. Petroleum and Geosystems Engineering 312 and 427 may not both be counted.

Instructor: Ryosuke Okuno
Office: CPE 5.118B
Email: okuno@utexas.edu
Phone: 471-3250
Office hours: 1:30 – 2:30 pm on Tuesday and 11 am – 12 pm on Thursday, or by appointment, or anytime you can find me

Teaching Assistants:
Kai Sheng, ksheng@utexas.edu
Office hour: 1 – 2 on Thursday and 11 – 12 on Friday in the 3rd floor study lounge 3.172D, and during lab sessions on Monday.

Required Textbooks:
The Properties of Petroleum Fluids, 2nd edition, William D. McCain, Jr., PennWell Publishing Co., 1990.
Phase Behavior of Petroleum Reservoir Fluids, 2nd edition, Karen Pedersen et al., CRC Press, 2015.

Reference (not required):
Chemical, Biochemical, and Engineering Thermodynamics, 4th edition, Sandler, S.I., John Wiley & Sons, Inc, 2006.

Lab Schedule (subject to change)
Sep. 11. Molecular weight measurement
Sep. 18. Mixing properties
Oct. 2. Ternary phase behavior
Oct. 16. Emulsion
Oct. 23. Interfacial tension
Nov. 6. Oil filed brine
Nov. 13. Viscosity measurement
Nov. 27. Bubble point measurement with a PVT cell

Website:
https://utexas.instructure.com
I will post course materials on the Canvas website and use it to send communications to the class.

Grading

20%	Midterm, Wednesday, November 8, 2017, 6 – 8 pm, CPE 2.210
30%	Final exam, Thursday, December 14, 2017, 2 – 5 pm, (room TBD)
35%	Lab reports
15%	Homework and unannounced class quizzes

*The final exam will be set by the registrar.

The final numerical grade (0 to 100) of each student will be calculated according to the weighting above. At the end of the semester, the grades will be converted to letter grades (0 to 4.0) according to the scale:

> 92	A (4.0)
90-92	A- (3.66)
88-90	B+ (3.33)
82-88	B (3.0)
80-82	B- (2.66)
78-80	C+ (2.33)
72-78	C (2.0)
70-72	C- (1.66)
60-70	D (1.0)
<60	F (0.0)

The exams might be curved. The curve will be applied by adding a constant number to the numerical grade of everyone in the class.

Exams: The midterm and final are closed book and notes unless otherwise stated. One two-sided letter-size preparation sheet is allowed for each exam.

Special Testing Requirements: Some students may have permission to receive additional time and/or testing conditions. If so, the following must be followed:

- A letter must be provided to the instructor the first week of class
- All exams should be taken at the UT testing center. The testing must be set up **2 weeks** before the exam date. The exam must be taken the same day as the actual exam
- The University of Texas at Austin provides upon request appropriate adjustments for qualified students with disabilities. For more information, contact the Office of the Dean of Students at 471-6259, 471-4241 TDD or the College of Engineering Director of Students with Disabilities at 471-4382.

Course Policies
Any conflicts or problems with the dates and times of evening exams must be reported by the first week of class. The final exam will be at the time indicated in the course schedule.

Unless stated otherwise, homework will be due at the beginning of class on the due date. A homework turned in late will be assessed a 25% penalty. Late homework submissions will be accepted in a box outside my office (5.118) until the end of the next class following the due date (if due date is Monday, homework will be accepted until the end of class on Wednesday). Homeworks submitted after the end of the class following the due date will be assessed a zero. Homework solutions will be posted on Canvas after the class following the due date.

By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

Academic Dishonesty
Discussion of the general approach to a difficult homework problem with fellow students is encouraged; you should solve as much of the work yourself as possible before consulting others. All work turned in (homework, exams and computer problems), however, should be your individual work. Working in teams is not an excuse for duplicate work.

Note the following from University Policies**: Scholastic dishonesty will not be tolerated**, and incidents of dishonesty will be reported. Anyone who copies from a fellow student, former student, copyrighted material, etc. will automatically receive a failing grade and be reported to the Dean of Judicial Affairs.

The following is a list that includes (but not limited to) examples of cheating

- Using cell phone or any other electronic device not permitted by the instructor during an exam. Usually calculators are allowed but they **cannot** be "programmed"
- Using any external material during an exam (e.g books/notes). All tests are closed book/notes unless stated otherwise
- Copying homework, projects, or computer programs from another student or source. Although discussion with classmates is permitted, all homework should be unique and distinguishable from other students.
- Copying homework, projects, or computer programs from previous semesters or published online, in other texts, etc.

Emergency Evacuation
- Occupants of buildings on the University of Texas at Austin campus are required to evacuate buildings when a fire alarm is activated. Alarm activation or announcement requires exiting and assembling outside.
- Familiarize yourself with all exit doors of each classroom and building you may occupy. Remember that the nearest exit door may not be the one you used when entering the building.
- Students requiring assistance in evacuation shall inform their instructor in writing during the first week of class.
- In the event of an evacuation, follow the instruction of faculty or class instructors.
- Do not re-enter a building unless given instructions by the following: Austin Fire Department, The University of Texas at Austin Police Department, or Fire Prevention Services office.