Petroleum Engineering 225: Introduction to Drilling Systems
Credit 2: (1-3) (required for PETE sophomores)
Fall 2015 Syllabus

Catalog Description: Introduction to petroleum drilling systems, including fundamental petroleum engineering concepts, quantities and unit systems, drilling rig components, drilling fluids, pressure loss calculations, casing, well cementing, and directional drilling.

Prerequisites(s): ENGR 112; MATH 152; PHYS 218

Instructor: Jerome Schubert
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Office hours: Tuesday, Thursday 10:00 – 11:00 AM **or by appointment .**

Class/Laboratory Schedule:
2.5 hour lab session per week
(Detailed lab and lecture topic, reading and assignment schedules available online at ecampus.tamu.edu)

Textbooks & Materials:
- ***Nontechnical Guide to Petroleum Geology, Exploration, Drilling, and Production. By Norman J. Hyne, Ph.D***
- Halliburton Redbook, available on Halliburton website or Richardson computer labs.
- Schlumberger iHandbook, available on Schlumberger website or Richardson computer labs.
- Scientific calculator – **programmable/graphing calculators are NOT allowed during exams. A simple scientific calculator is allowed.**

Method of Evaluation:

Midterm Exam	25%
Exam II or Final Exam*	25%
Homework/Quizzes	25%
Laboratory	25%
Total	100%

**Final Exam or Exam II: Instructor prerogative.*

Missed or late work: All exams and lecture quizzes may only be made up with a university approved absence.

Topics Covered:

Hours

1. Introduction to the course, Petroleum engineering units
2. Drilling geology, and reservoir properties
3. Rig components and drilling operations overview
4. Drilling fluids
5. Drillstring: main components and basic design
6. Drill bits: terminology, types, dull grading and selection
7. Drilling hydraulics: basic friction losses calculation
8. Casing: Introduction and basic casing design
9. Cementing: introduction, operational issues and basic primary cementing design.
10. Directional drilling: basic calculations and operational considerations
11. Well control: introduction and simple kill procedures
12. Hole problems

Contributions to Professional Component:

Math and Science	None
Petroleum Engineering	Provides students with the vocabulary and hand-on equipment experience to function in the modern drilling industry. Develops basic skills needed for more advanced senior level drilling and other design classes.
General Education	Equips students with laboratory skills and decision process of selecting from competing technologies.

Course Learning Outcomes and Relationship to Program Outcomes:

Course Learning Outcome: At the end of the course, students will	**Program Outcomes**
Know oil field vocabulary and demonstrate familiarity with methods and materials used in drilling, oil and gas wells.	1,7,11
Demonstrate hands-on testing skills with drilling and completion fluid.	2, 4, 7
Calculate fluid pressure losses through basic drilling systems.	1
Identify and define the components of a drilling rig and to group them into their various systems (e.g. rotating, hoisting, circulating, etc.).	7
Write concise engineering lab reports.	7
Demonstrate and practice proper lab safety practices.	3

Related Program Outcomes:

No.	**PETE graduates must have…**
1	An ability to apply knowledge of mathematics, science, and engineering
2	An ability to design and conduct experiments, as well as to analyze and interpret data.
3	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
4	Ability to an function on multi-disciplinary teams.
7	An ability to communicate effectively.
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Lab Safety:

The lab for this course covers water-based drilling fluids (mud). The fluids used do not contain any hazardous chemicals or materials that will require special handling procedures. HOWEVER, you are still required to wear the proper personal protection equipment (PPE) which is primarily **lab safety goggles, long pants and closed-toe shoes**. This will prevent any splashed fluid from getting in your eyes as well as protect you from dropped equipment. In addition, it is recommended that you wear clothes you do not mind getting dirty as mud can splash on you during the lab.

Failure to use PPE noted here will result in your dismissal from that lab and loss of points on your lab grade.

Americans with Disabilities Act (ADA) Policy Statement

The Americans with Disabilities Act (ADA) is a federal antidiscrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe that you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities in Room 126 of the Koldus Building, or call 845-1637.

Coursework Copyright Statement

The handouts used in this course are copyrighted. By "handouts," this means all materials generated for this class, which include but are not limited to syllabi, quizzes, exams, lab problems, in-class materials, review sheets, and additional problem sets. Because these materials are copy-righted, you do not have the right to copy them, unless you are expressly granted permission.

As commonly defined, plagiarism consists of passing off as one's own the ideas, words, writings, etc., that belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated.

If you have any questions about plagiarism and/or copying, please consult the latest issue of the *Texas A&M University Student Rules*, under the section "Scholastic Dishonesty."

Aggie Code of Honor

An Aggie does not lie, cheat, or steal or tolerate those who do.

For more information: http://www.tamu.edu/aggiehonor

For my policies on how I handle Honor Code violations, see the notes on academic dishonesty on the following page.

Note that beyond the sharing or stealing of answers during exams, quizzes or on homework; this includes the iClicker units. Using another student's iClicker in an attempt to earn points for that student, or allowing another student to use your iClicker response pad in an attempt to earn points for you is considered cheating.

My responsibility based on the Aggie Honor Code:

As a Texas A&M University faculty member, I must follow the Aggie Honor Code. This means that I will not tolerate those who cheat. In addition, as an instructor I must be fair. If I overlook cheating, it is not fair to those who DIDN'T cheat.

I know I can't create a fool-proof system, but I will try to make the quantitative portion of this class as immune from OPPORTUNITIES to cheat as possible. If someone does cheat or assist in cheating, I will follow the procedure shown.

Departmental Reputation:

As a member of this department, I am charged with assisting in developing future petroleum engineers. Aggies have a reputation in the industry of being technically competent as well as ethical and honest in their business dealings. As a fellow Aggie, I feel very strongly about upholding and continuing this reputation.

Industry Application:

There will be many times in your career during which you will not have someone working with you who can provide technical assistance. In these instances, you will have to perform as an individual in order to make operational and business decisions for you and your company. If you are not able to perform as an individual now, how to do you expect to perform under pressure with millions of dollars and possibly people's actual lives on the line?

It may seem minor to sneak a look at someone's exam, however if you are willing to do this, where does it stop? I for one do not want to see or hear of Aggies involved in unethical dealings. Unfortunately, I have been involved in deals in which Aggies on the other side of the table where not ethical. I can personally say that the damage to Texas A&M University's and our department's reputation was shameful and irreparable from the viewpoint of the non-Aggies involved.

What constitutes dishonesty:

- Looking at another student's exam
- Allowing another student to look at YOUR exam
- Allowing someone else to use your iClicker to take a quiz/attendance for you.
- Using non-authorized aids or sources during a test (phones, texts, notes in calculator, etc)
- Collaborating on assigned work without instructor approval
- Plagiarism – just because you got it off of the internet, it doesn't mean you didn't plagiarize. Most plagiarism cases today begin with a Google search.
- More examples available at http://aggiehonor.tamu.edu/descriptions

If an incident occurs:

- I will report the violation to the AHSO, regardless of the magnitude of the violation.
  - The report is submitted online and includes the details of the violation, specification of sanction and student acknowledgement of acceptance/rejection of violation and/or sanction.
- I will usually handle the first offense autonomously meaning I decide the sanction. My minimum sanction will usually be a one-letter-grade reduction in your **course grade**. The maximum sanction I can give is an F* (failure of the course and notation of "FAILURE DUE TO ACADEMIC DISHONESTY" on transcript until cleared by taking the Academic Honesty Remediation Course).
- If the violation is egregious enough, I can refer the incident to the Honor Council for further action.
- I will also typically include taking the Academic Honesty Remediation Course as part of the sanction. This is a three-class, one-month course on academic integrity. I will usually give you one semester to take the course. If you do not take the course by this time your grade will be changed to an F*.
- After I file a report, you are now in the AHSO system. If there is a second violation, in any course, you will automatically go before the Honor Council, and you will likely be expelled from the university.
- Note that upper division students found guilty of a violation are ineligible to graduate with honors.
- In all cases, you have the right to appeal to the AHSO.

It is my sincerest hope that this policy is never referenced or used. In the unfortunate event you do decide that cheating is the course you will take, you are now aware of the consequences. As a final and important note: **Remember that I will treat students giving unauthorized help the same as students receiving unauthorized help.**