Course Syllabus

Course: PNGE-312-001 Drilling Fluid Lab
Class schedule: M 8:00 a.m-10:50 a.m.
Prerequisites: PNGE 310: Drilling Engineering (or concurrent)
Instructor: Fatemeh Belyadi
Office Location: MRB 345A
Office Phone #: 304-293-6243
Office Hours: by appointment
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Course Description

PNGE 312. Drilling Fluids Laboratory. 1 Hour.
PR or Conc: PNGE 310. Topics include clay hydration, viscosity of water-based fluids, mud weight control, filtration studies, thinning agents, chemical contaminants, lime muds, polymer muds, rheological models, and liquid and solid determination.

Course Objectives

To introduce students with the techniques and procedures to evaluate the properties of drilling fluid used in well drilling operations.

Required Textbook

Drilling Fluid Laboratory Manual by Petroleum Engineering, WVU (will be posted in the E-Campus)

Recommended Textbooks

Applied Drilling Engineering by A.D. Bourgoyne Jr., M.E. Chenvert, K.K. Milheim, and F.S. Young Jr., SPE Textbook Series, Vol. 2, (1986).
Fundamentals of Drilling Engineering by R.F. Mitchell and S.Z. Miska, editors., SPE Textbook Series, Vol.12, (2011).

Outcomes

Upon completion of this course the students will be able to:

- ✓ *Apply knowledge of math, sciences and engineering to drilling operations.*
- ✓ *Design and conduct experiment, analyze and interpret data as well as adjusting the properties of drilling fluids.*
- ✓ *Identify, formulate, solve engineering problems, and communicate effectively.*

Course Sessions

Session 1 Description: Pre-test, Safety Training, Introduction to course materials
Session 2 Description: Hydration of Clay Minerals
Session 3 Description: Viscosity of Fresh Water
Session 4 Description: Mud Density Control
Session 5 Description: Filtration Studies
Session 6 Description: Thinning Agents
Session 7 Description: Chemical Contaminants
Session 8 Description: Red Lime Muds
Session 9 Description: Polymer Muds
Session 10 Description: Rheological Models for Drilling Fluids
Session 11 Description: Salt Water Base Muds
Session 12 Description: Volume Fraction of Oil, Water, and Solids
Session 13 Description: Final Exam

Grading Procedures

Lab reports	80 %
Final Test	20 %
90 and above	A
80-89	B
70-79	C
60-69	D
59 and below	F

Attendance

Students are required to attend all scheduled laboratory sessions as scheduled.

Course Expectations

All lab reports should be typed (pdf format) and contain the following materials:

- Title page that states
  - ✓ *Your name*
  - ✓ *Your instructor's name.*
  - ✓ *The date the report was submitted.*
  - ✓ *Experiment number and title*
- Purpose
- Procedure
- Equipment Drawings(no picture)
- Data and Calculation(sample calculation)
- Results an discussion
- Graphs
- Source of errors
- Conclusion
- References

General Rules for All Labs

- ✓ This class is used to demonstrate various drilling fluids (muds) used in the drilling wells. Material used are various clays. No other chemical and gases are used in this lab. Wear safety glasses and dust mask when measuring out fluids
- ✓ Read MSDS for each "mud" before using
- ✓ Read and follow the safety instructors in manuals for each piece of equipment used
- ✓ Read "general lab rules" enclosed.

Do Not!

- ✓ No eating or drinking in the lab.
- ✓ No sandals or open-toed shoes in lab.
- ✓ No horseplay.
- ✓ Do not smell or taste chemicals.
- ✓ Do not use broken glassware.
- ✓ Do not used contact lenses when working with or around the chemicals.
- ✓ Do not pour chemicals down drain.

Do!

- ✓ Wear safety glasses, lab coats, dust mask, etc. When instructed to do so.
- ✓ Read Material Safety Data Sheets (MSDS) for each chemical.
- ✓ Know where eyes station and safety showers located.
- ✓ Know where fire alarms are located.
- ✓ Read materials located in the lab, including.
  - A. Chemical Hygiene plan for this lab
  - B. " Right to know pocket guy"
  - C. Other material provided
- ✓ Clean up your area at the end.
- ✓ Wash hands before leaving lab.

Academic Integrity Statement

The integrity of the classes offered by any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud. Therefore, I will enforce rigorous standards of academic integrity in all aspects and assignments of this course. For the detailed policy of West Virginia University regarding the definitions of acts considered to fall under academic dishonesty and possible ensuing sanctions, please see the Student Conduct Code at http://studentlife.wvu.edu/office_of_student_conduct/student_conduct_code.html. Should you have any questions about possibly improper research citations or references, or any other activity that may be interpreted as an attempt at academic dishonesty, please see me before the assignment is due to discuss the matter.

Social Justice Statement

"The West Virginia University community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with the Office of Accessibility Services (304-293-6700). For more information on West Virginia University's Diversity, Equity, and Inclusion initiatives, please see http://diversity.wvu.edu."