School of Minerals & Energy Resources Engineering // UNSW Engineering

PTRL5024

Drilling Fluids and Cementing Techniques

Term Three // 2020

Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
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School Contact Information

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Course Details

Credit Points 6

Summary of the Course

The course covers both the theory and practical applications of drilling fluids and well cementing technology. The main topics include: the functions, composition and additives of drilling fluids; clay and polymer chemistry and applications in drilling fluids; drilling fluid density determination and calculations; drilling fluid filtration and mud caking process; API drilling fluid properties, equipment and testing procedures; chemical analysis; drilling fluid system design for control formation damage and wellbore stability; drilling fluid hydraulics and cuttings transportation; cement manufacture, composition and standardization; cement additives; cement slurry rheology properties; API cementing testing equipment and procedures; cement slurry design and calculations; mud removal by cement; gas migration; cementing equipment and procedures; post-job considerations and evaluation; drilling fluids and cementing laboratory and research project.

Special project: Mud program and cuttings transportation in deviated wells. As part of the project, students are required to carry out a literature survey on latest development in mud program and cuttings transportation in deviated wells; carry out a case study by designing a mud program, drilling hydraulics optimization and cuttings transportation in a deviated well.

Course Aims

This course will enable students to acquire fundamental knowledge of drilling fluids, drilling hydraulics and cementing technique and to apply the theory to the design, evaluation and optimization of drilling fluid program, drilling hydraulics and cementing operations.

Course Learning Outcomes

1. Design and evaluate drilling fluid program and cementing operations under specific well conditions
2. Prepare and test drilling fluids and cementing slurry according to API standards
3. Optimize drilling fluid hydraulics for high rate of penetration and cuttings transportation efficiency

Teaching Strategies

1. Weekly lectures are designed to provide students fundamental understanding through a series of topic on drilling fluids, drilling hydraulics and cementing.
2. The fundamental material covered in the lectures is supported by problem-solving exercises in tutorials and class discussions.
3. Learning during lectures is further supported by group based laboratory practices.
4. Learning on advanced topics is achieved by special designed research projects.
5. Online learning support is also available through Moodle.

Assessment

Assessment Tasks

Assessment task	Weight	Due Date	Student Learning Outcomes Assessed
Assignment 1	5%	4/10/2020	1, 2
Assignment 2			

Submission notes:Online Moodle Quiz

Turnitin setting: This is not a Turnitin assignment

Assessment 4: Assignment 3 (Project)

Details:Project on mud program and cuttings transportation in deviated wells. Specification of the project will be released on Week 5.

Assessment 5: Assignment 4

Details:Cementing calculations

Submission notes:Online Moodle Submission

Assessment 6: Laboratory

Details:Drilling Fluid and Cementing Laboratory

Submission notes:Online Moodle submission

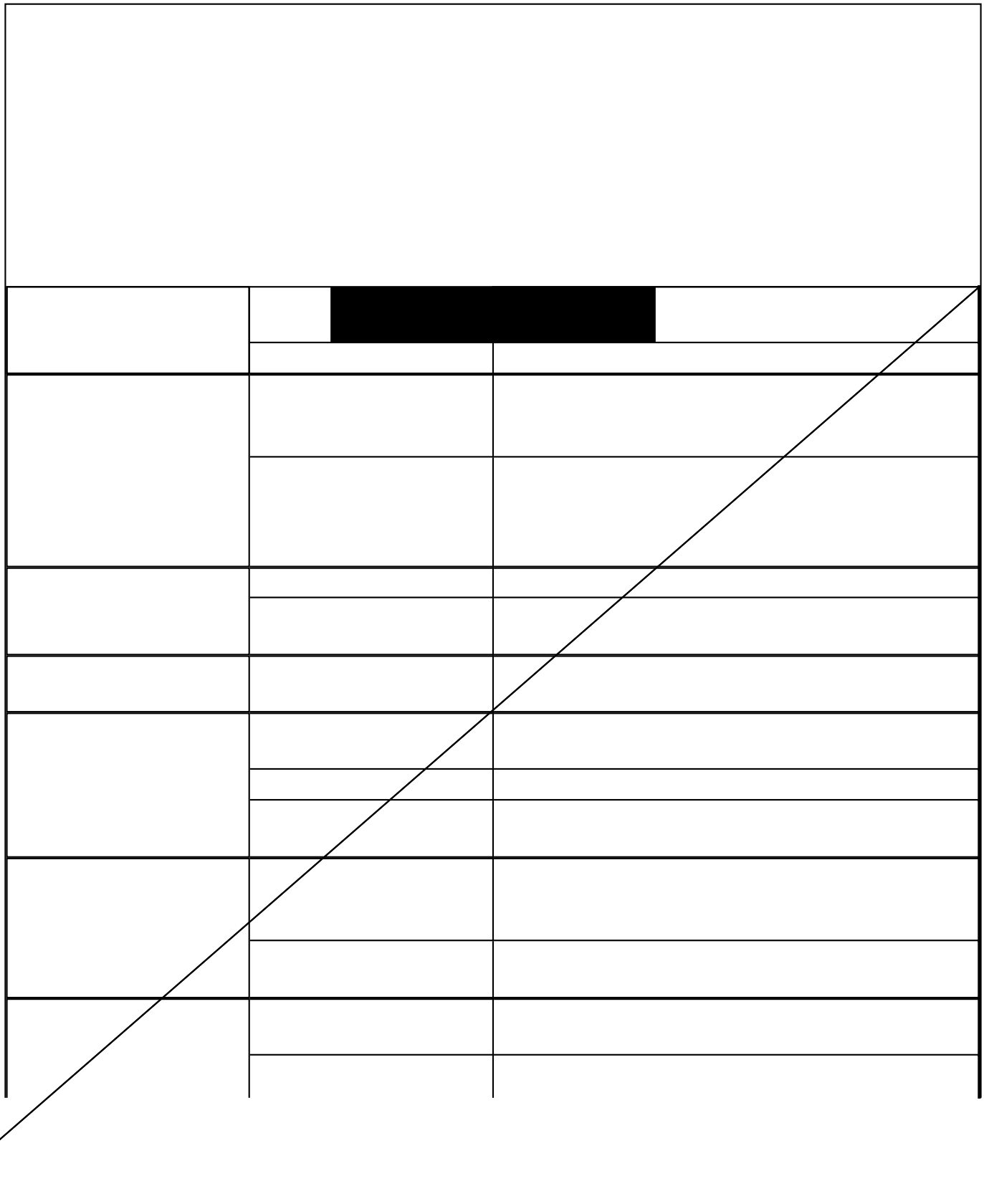
Turnitin setting: This is not a Turnitin assignment

Assessment 7: Tutorial Participation

Details:Tutorial and in class exercises

Assessment 8: Final Exam

Details:A two hours online quiz will be hold within the exam period. Guidelines for helping the preparation for the final exam will be released prior to the exam.



		Lab (TETB LG29 and online): Lab 4 - Mud Chemical Analysis B
Week 10: 16 November - 20 November	Lecture	Lecture (Online): Gas migration, Cementing equipment; Cement placement and post job evaluation.
	Tutorial	Tutorial (Online): Final Review.

Resources

Prescribed Resources

Support material for this course including, whenever available, copies of lecture notes, lecture slides, recommended readings, etc. can be found on Moodle.
The lecture notes/slides may be viewed and downloaded from the UNSW-Moodle: http://moodle.telt.unsw.edu.au/

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Recommended Resources

Followings are the recommended books for this course:
• Ryen Caenn, HCH Darley, George R. Gray: Composition and Properties of Drilling and Completion Fluids, 7th edition, Gulf Professional Publishing, Elsevier, 2016.
• Bourgoyne A.T. Jr., Millheim K.K., Chenevert M.E. and Young F.S. Jr.: Applied Drilling Engine. in

Submission of Assessment Tasks

The School has developed a guideline to help you when submitting a course assignment.

We encourage you to retain a copy of every assignment submitted for assessment for your own record either in hardcopy or electronic form.

All assessments must have an assessment cover sheet attached.

Late Submission of an Assignment

Full marks for an assignment are only possible when an assignment is received by the due date.

We understand that at times you may not be able to submit an assignment on time, and the School will accommodate any fair and reasonable extension. We would recommend you review the UNSW Special Consideration guidelines – see section below.

Late submission will not be accepted and will be considered as no submission.

Special Consideration

You can apply for special consideration through The Nucleus Student Hub when illness or other circumstances interfere with your assessment performance. Sickness, misadventure or other circumstances beyond your control may:

- Prevent you from completing a course requirement
- Keep you from attending an assessable activity
- Stop you submitting assessable work for a course
- Significantly affect your performance in assessable work, be it a formal end-of-semester examination, a class test, a laboratory test, a seminar presentation or any other form of assessment

We ask that you please contact the Course Convenor immediately once you have completed the special consideration application, no later than one week from submission.

More details on special consideration can be found at: www.student.unsw.edu.au/special-consideration

Student Support

The University and the Faculty provide a wide range of support services for students, including:

Academic Information

Course Results

For details on UNSW assessment policy, please visit: www.student.unsw.edu.au/assessment

In some instances your final course result may be withheld and not released on the UNSW planned date. This is indicated by a course grade result of either:

- LE – indicates you have not completed one or more items of assessment; or