School of Minerals & Energy Resources Engineering // UNSW Engineering

PTRL6028

Practical Aspects of Well Planning and Drilling Cost Estimates

Term Three // 2020

Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
Zhixi Chen	zhixic@unsw.edu.au	Office hours	Office 211. Lavel 2, TETB	+61 2 9385 5182

School Contact Information

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Course Details

Credit Points 6

Summary of the Course

Students will learn a technical and analytic approach to cost-effective well planning from site selection to casing landing and cementing with an emphasis on trajectory analysis based on borehole stability, torque and drag of tubulars, and hole cleaning. This course binds together key concepts from mud design, cementing and casing design, and directional and ERD well design. Students will learn how to use these concepts to plan and optimize well trajectories in a systematic and practical manner. The course objectives are reinforced by practical examples and a case study.

Course covers: Data acquisition, pore pressure prediction, in-situ stress determination, wellbore stability analysis, casing program design, BHA selection and design, torque and drag analysis, drilling hydraulics optimisation and cuttings transportation analysis.

As part of the course, students will study additional topics through a project. The topic of the project varies each year. As an example, in the in-situ stress characterization and wellbore stability analysis projet, students are required to carry out literature survey, build up geomechanical model for wellbore stability analysis and conduct numerical simulation to determine safe mud weight window for a deviated and horizontal well. Final project report and presentation is required.

Course Aims

This course will enable students to acquire fundamental knowledge on formation pressure, in-situ stresses, wellbore stability, drilling hydraulics, torque and drag and to apply the theory to the design, evaluation and optimization of well trajectory, casing program, and drilling program.

Course Learning Outcomes

1. Characterize formation pore pressure and in-situ stress profiles;
2. Perform wellbore stability analysis and determine safe mud weight;
3. Optimize casing program, drilling hydraulics, drill string and bottom hole assembly.

Teaching Strategies

Please refer to the information in Moodle

Assessment

Assessment Tasks

Assessment task	Weight	Due Date	Student Learning Outcomes Assessed
Assignment 1	10%	Week 4	1
Online Quiz	10%	Week 7	1, 2
Assignment 2	10%	Week 8	2
Assignment 3	10%	Week 10	3
Project	10%	Week 10	1, 2, 3
Final Exam	50%	During the exam period	1, 2, 3

Assessment Details

Assessment 1: Assignment 1

Details: Formation pore pressure and in-situ stresses

Submission notes: Moodle online submission

Turnitin setting: This is not a Turnitin assignment

Assessment 2: Online Quiz

Details: Contents from week 1 to week 5

Submission notes: Moodle quiz

Assessment 3: Assignment 2

Details: Wellbore stability and drilling hydraulics.

Submission notes: Moodle online submission

Turnitin setting: This is not a Turnitin assignment

Assessment 4: Assignment 3

Details: Torque, drag and drill string

Submission notes: Moodle online submission

Turnitin setting: This is not a Turnitin assignment

Assessment 5: Project

Details: The specification of the project will be released on Week 5.

Submission notes: Moodle online submission

Assessment 6: Final Exam

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

Submission notes: Moodle quiz

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

Course Schedule

View class timetable

Timetable

Date	Type	Content
Week 1: 14 September - 18 September	Topic	**Ch-1** Introduction to Well Planning; **Ch-2** Prediction of Formation Pressure
Week 2: 21 September - 25 September	Topic	**Ch-2** Prediction of Formation Pressure; Ch-3 Determination of In-Situ Stresses
Week 3: 28 September - 2 October	Topic	Ch-3 Determination of In-Situ Stresses
Week 4: 5 October - 9 October	Topic	**Ch-4** Wellbore Stability Analysis
Week 5: 12 October - 16 October	Topic	**Ch-4** Wellbore Stability Analysis
Week 6: 19 October - 23 October	Online Activity	Project consultancy
Week 7: 26 October - 30 October	Topic	**Ch-5** Hydraulic of Drilling Fluid Circulating System
Week 8: 2 November - 6 November	Topic	**Ch-5** Hydraulic of Drilling Fluid Circulating System
Week 9: 9 November - 13 November	Topic	**Ch-6** Torque & Drag Analysis
Week 10: 16 November - 20 November	Topic	**Ch-6** Torque & Drag Analysis; **Ch-7 Drill string Considerations**

Resources

Prescribed Resources

Support material for this course including, whenever available, copies of lecture notes, video clips, lecture recordings, recommended readings, etc. can be found on Moodle.

The lecture note may be viewed and downloaded from the UNSW-Moodle http://moodle.telt.unsw.edu.au/.

Recommended Resources

Followings are the recommended books for this course:

- Bernt S. Aadnoy: Modern Well Design, 2nd Edition, Taylor & Francis, 2010.
- Bourgoyne A.T. Jr., Millheim K.K., Chenevert M.E. and Young F.S. Jr.: **Applied Drilling Engineering**, SPE Textbook Series, Vol. 2, Richardson, TX, USA, 1991.

Course Evaluation and Development

At the end of each course, all students will have the opportunity to complete a course evaluation form. These anonymous surveys help us understand your views of the course, your lecturers and the course materials. We are continuously improving our courses based on student feedback, and your perspective is valuable.

Feedback is given via https://student.unsw.edu.au/myexperience and you will be notified when this is available for you to complete.

We also encourage all students to share any feedback they have any time during the course – if you have a concern, please contact us immediately.

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:

- Library training and support services - www.library.unsw.edu.au
- UNSW Learning Centre - www.lc.unsw.edu.au
- Counselling support - www.counselling.unsw.edu.au

Equitable Learning Services aims to provide all students with a free and confidential service that provides practical support to ensure that your health condition doesn't adversely affect your studies. https://student.unsw.edu.au/els

Academic Honesty and Plagiarism

Your lecturer and the University will expect your submitted assignments are truly your own work. UNSW has very clear guidelines on what plagiarism is and how to avoid it. Plagiarism is using the words or ideas of others and presenting them as your own. Plagiarism is a type of intellectual theft. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement. The University has adopted an educative approach to plagiarism and has developed a range of resources to support students. All the details on plagiarism, including some useful resources, can be found at www.student.unsw.edu.au/plagiarism.

All Mining Engineering students are required to complete a student declaration for academic integrity which is outlined in the assignment cover sheets. By signing this declaration, you agree that your work is your own original work.

If you need some additional support with your writing skills, please contact the Learning Centre or view some of the resources on their website: www.lc.unsw.edu.au. The Learning Centre is designed to help you improve your academic writing and communication skills. Some students use the Centre services because they are finding their assignments a challenge, others because they want to improve an already successful academic performance.

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
- WD – indicates there is an issue with one or more assignment; or
- WC – which indicates you have applied for Special Consideration due to illness or misadventure and the course results have not been finalised.

In either event it would be your responsibility to contact the Course Convener as soon as practicable but no later than five (5) days after release of the course result. If you don't contact the convener on time, you may be required to re-submit an assignment or re-sit the final exam and may result in you failing the course. You would also have a NC (course not completed) mark on your transcript and would need to re-enroll in the course.

Studying a course in the School of Minerals and Energy Resources Engineering at UNSW

Report writing guide

The School has a Report Writing Guide (RWG) available. A copy of this is available on the course Moodle site.

Computing Resources and Internet Access Requirements

UNSW Minerals and Energy Resources Engineering provides blended learning using the on-line Moodle LMS (Learning Management System). Also see - Transitioning to Online Learning: www.covid19studyonline.unsw.edu.au

It is essential that you have access to a PC or notebook computer. Mobile devices such as smart phones and tablets may compliment learning, but access to a PC or notebook computer is also required. Note that some specialist engineering software is not available for Mac computers.

- Mining Engineering Students: OMB G48
- Petroleum Engineering Students: TETB LG34 & LG 35

It is recommended that you have regular internet access to participate in forum discussion and group work. To run Moodle most effectively, you should have:

- broadband connection (256 kbit/sec or faster)
- ability to view streaming video (high or low definition UNSW TV options)

More information about system requirements is available at www.student.unsw.edu.au/moodle-system-requirements

Accessing Course Materials Through Moodle

Course outlines, support materials are uploaded to Moodle, the university standard Learning Management System (**LMS**). In addition, on-line assignment submissions are made using the assignment dropbox facility provided in Moodle. All enrolled students are automatically included in Moodle for each course. To access these documents and other course resources, please visit: www.moodle.telt.unsw.edu.au

How We Contact You

At times, the School or your course convenors may need to contact you about your course or your enrolment. Your course convenors will use the email function within Moodle or we will contact you on your @student.unsw.edu.au email address.

We understand that you may have an existing email account and would prefer for your UNSW emails to be redirected to your preferred account. Please see instructions on how to redirect your UNSW emails: "How can I forward my emails to another account?"

How You Can Contact Us

We are always ready to assist you with your inquiries. To ensure your question is directed to the correct person, please use the email address below for:

- Enrolment or other admin questions regarding your program: https://unswinsight.microsoftcrmportals.com/web-forms/
- Course inquiries should be directed to the Course Convenor

Image Credit

UNSW SYDNEY

CRICOS

CRICOS Provider Code: 00098G

Acknowledgement of Country

We acknowledge the Bedegal people who are the traditional custodians of the lands on which UNSW Kensington campus is located.

School of Minerals and Energy Resources Engineering

Assessment Cover Sheet

Course Convenor: _____

Course Code: _____ Course Title: _____

Assignment: _____

Due Date: _____

Student Name: _____ Student ID: _____

ACADEMIC REQUIREMENTS

Before submitting this assignment, the student is advised to review:

- the assessment requirements contained in the briefing document for the assignment;
- the various matters related to assessment in the relevant Course Outline; and
- the *Plagiarism and Academic Integrity* website at < http:/www.lc.unsw.edu.au/plagiarism/pintro.html > to ensure they are familiar with the requirements to provide appropriate acknowledgement of source materials.

If after reviewing this material there is any doubt about assessment requirements, then in the first instance the student should consult with the Course Convenor and then if necessary with the Director – Undergraduate Studies.

While students are generally encouraged to work with other students to enhance learning, all assignments submitted for assessment must be their entire own work and duly acknowledge the use of other person's work or material. The student may be required to explain any or all parts of the assignment to the Course Convenor or other authorised persons. *Plagiarism* is using the work of others in whole or part without appropriate acknowledgement within the assignment in the required form. *Collusion* is where another person(s) assists in the preparation of a student's assignment without the consent or knowledge of the Course Convenor.

Plagiarism and *Collusion* are considered as Academic Misconduct and will be dealt with according to University Policy.

STUDENT DECLARATION OF ACADEMIC INTEGRITY

I declare that:

- This assessment item is entirely my own original work, except where I have acknowledged use of source material [such as books, journal articles, other published material, the Internet, and the work of other student/s or any other person/s].
- This assessment item has not been submitted for assessment for academic credit in this, or any other course, at UNSW or elsewhere.

I understand that:

- The assessor of this assessment item may, for the purpose of assessing this item, reproduce this assessment item and provide a copy to another member of the University.
- The assessor may communicate a copy of this assessment item to a plagiarism checking service (which may then retain a copy of the assessment item on its database for the purpose of future plagiarism checking).

Student Signature: Date:

Students are advised to retain a copy of this assessment for their records and submission should be made in accordance to the assessment details available on the course Moodle site.