UNSW Course Outline

PTRL6027 Casing Design and Cementing - 2024

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General Course Information

Course Code : PTRL6027
Year : 2024
Term : Term 1
Teaching Period : T1
Is a multi-term course? : No
Faculty : Faculty of Engineering
Academic Unit : School of Minerals & Energy Resources Engineering
Delivery Mode : Online
Delivery Format : Standard
Delivery Location : Distance Education
Campus : Sydney
Study Level : Postgraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

The course covers both the theory and practical applications of casing design and cementing technology. The combined lectures, workshops and laboratory experiments will provide students with a comprehensive understanding of the following aspects:

Casing Design - API properties of casing and casing couplings; performance properties of casing under load conditions; principles of casing design for vertical, deviated and horizontal wells.

Cementing - Cement manufacture, composition and standardisation; cement and slurry properties; cement additives; cement slurry design and calculations; cement placement and post-job evaluation.

Course Aims

This course aims to enable students to acquire fundamental knowledge of casing design and cementing operations and to apply the theory to the design, evaluation and optimization of casing program and cementing operations. The course will reinforce students' understanding of the core aspects of well construction and the inter relationship between wellbore and reservoirs.

Relationship to Other Courses

A drilling technology course following Well Drilling Equipment and operations

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Design and evaluate casing program for specific well conditions
CLO2 : Design and evaluate cementing operations for specific well conditions
CLO3 : Formulate and evaluate cementing slurry according to API standards

Course Learning Outcomes	Assessment Item
CLO1 : Design and evaluate casing program for specific well conditions	• Assignments • Midterm Quiz • Final Exam
CLO2 : Design and evaluate cementing operations for specific well conditions	• Assignments • Midterm Quiz • Final Exam
CLO3 : Formulate and evaluate cementing slurry according to API standards	• Assignments • Midterm Quiz • Final Exam

Learning and Teaching Technologies

Moodle - Learning Management System | Blackboard Collaborate | Microsoft Teams

Learning and Teaching in this course

Teaching is in distance mode. The assessment contains assignments, midterm exam and final exam.

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Assignments Assessment Format: Individual	35%	Due Date: Assignments due on weeks 3, 7 and 10 respectively.
Midterm Quiz Assessment Format: Individual	10%	Due Date: Week 8: 01 April - 07 April
Final Exam Assessment Format: Individual	55%	Due Date: Exam period

Assessment Details

Assignments

Assessment Overview

Three individual assignments are related to casing properties and load calculations, casing setting depth and casing program, design of casing strings, cement properties, cementing calculations and cementing operations. Marking will be against specific criteria in a marking guide and Individual written feedback will be provided within ten days of the relevant submission date through the Learning Management System. Verbal class-wide feedback will be provided during assignment reviews.

Course Learning Outcomes

- CLO1 : Design and evaluate casing program for specific well conditions
- CLO2 : Design and evaluate cementing operations for specific well conditions
- CLO3 : Formulate and evaluate cementing slurry according to API standards

Detailed Assessment Description

3 individual assignments due on weeks3, 7 and 10. The feedback for the first assignment will be provided before 10 March 2024

Assessment Length

N/A

Submission notes

Online Moodle submission

Assignment submission Turnitin type

Not Applicable

Midterm Quiz

Assessment Overview

The midterm quiz covers selected content of casing design and cementing. The duration of the quiz is 1.5 hrs. Marking will be against specific criteria in a marking guide and formal feedback will be provided within ten days of the quiz. Verbal class-wide feedback will be given during the quiz review.

Course Learning Outcomes

- CLO1 : Design and evaluate casing program for specific well conditions
- CLO2 : Design and evaluate cementing operations for specific well conditions
- CLO3 : Formulate and evaluate cementing slurry according to API standards

Detailed Assessment Description

Thw Midterm quiz will test the understanding of the material of the covered topics till date. General format of the quiz will be a combination of multiple-choice questions and short response questions required to be submitted in a pre-defined duration.

Assessment Length

1.5 hrs

Submission notes

Online submission

Assignment submission Turnitin type

Not Applicable

Final Exam

Assessment Overview

Final exam covers all topics. The duration of the exam is 2 hrs. Marking will be done with a rubric. Individual mark will be issued.

Course Learning Outcomes

- CLO1 : Design and evaluate casing program for specific well conditions
- CLO2 : Design and evaluate cementing operations for specific well conditions
- CLO3 : Formulate and evaluate cementing slurry according to API standards

Assessment Length

2 hours

Submission notes

Online submission

Assessment information

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

Assignment submission Turnitin type

Not Applicable

General Assessment Information

Guidelines for helping the preparation for the assessments will be released prior to the assessment dates.

Grading Basis

Standard

Requirements to pass course

Students need to achieve 50 marks to pass the course.

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 12 February - 18 February	Topic	Casing Notes Ch-1: Casing types; Casing Notes Ch-2: Casing physical properties
Week 2 : 19 February - 25 February	Topic	Casing Notes Ch-3: Performance Properties of Casing Under Load Conditions
Week 3 : 26 February - 3 March	Topic	Casing Notes Ch-3: Performance Properties of Casing Under Load Conditions; Casing Notes Ch-4: Principles of Casing Design
	Online Activity	Consultations on Assignment 1
Week 4 : 4 March - 10 March	Topic	Casing Notes Ch-4: Principles of Casing Design
Week 5 : 11 March - 17 March	Topic	Casing Notes Ch-4: Principles of Casing Design
Week 6 : 18 March - 24 March	Online Activity	Consultations on Assignment 2
	Topic	Well Cementing Ch-2: Chemistry and Characterization of Portland Cement; Well Cementing Ch-4: Rheology and Flow of Well Cement Slurries
Week 7 : 25 March - 31 March	Topic	Well Cementing Appendix C: Cementing Calculations
Week 8 : 1 April - 7 April	Topic	Well Cementing Ch-5: Mud removal; Well Cementing Ch-6: Cement – Formation Interactions; Well Cementing Ch-8: Mechanical Properties of Well Cements; WellCementing Ch-9: Annular Formation Fluid Migration
	Assessment	Midterm Quiz
Week 9 : 8 April - 14 April	Topic	Well Cementing Ch-11: Cementing Equipment and Casing Hardware; Well Cementing Ch-13: Primary Cementing Techniques
	Online Activity	Consultations on Assignment 3
Week 10 : 15 April - 21 April	Topic	Well Cementing Ch-14: Remedial Cementing Well Cementing Ch-15: Cement Job Evaluation
	Online Activity	Consultations on Final Exam

Attendance Requirements

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

General Schedule Information

Lectures in Weeks 1-10.

Midterm Exam in Week 8.

Final Exam in Exam Period.

Course 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-Moodlehttp://moodle.telt.unsw.edu.au/.

Recommended Resources

Followings are the recommended books for Casing Design:

- Rahman S.S. and Chilingarian G.V.: Casing Design Theory and Practice. Elsevier Science B.V., Amsterdam, The Netherlands, 1995.
- 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.

The textbook for Cementing is:

Nelson, E.B. and Guillot D., Well Cementing (Second Edition), Schlumberger, 2006.

It is important that you have a copy of the above textbook as there is no separate course manual for Cementing. The book can be available from the following links:

https://www.amazon.com/Well-Cementing-Erik-Nelson/dp/0978853008

Additional Costs

N/A

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.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Zhixi Chen		Office 211, Level 2, TETB	+61 2 9385 5182	Office hours	No	Yes

Other Useful Information

Academic Information

I. Special consideration and supplementary assessment

If you have experienced an illness or misadventure beyond your control that will interfere with your assessment performance, you are eligible to apply for Special Consideration prior to, or within 3 working days of, submitting an assessment or sitting an exam.

Please note that UNSW has a Fit to Sit rule, which means that if you sit an exam, you are declaring yourself fit enough to do so and cannot later apply for Special Consideration.

For details of applying for Special Consideration and conditions for the award of supplementary assessment, please see the information on UNSW's Special Consideration page.

II. Administrative matters and links

All students are expected to read and be familiar with UNSW guidelines and polices. In particular, students should be familiar with the following:

- Attendance
- UNSW Email Address
- Special Consideration
- Exams
- Approved Calculators
- Academic Honesty and Plagiarism
- Equitable Learning Services

III. Equity and diversity

Those students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course convener prior to, or at the commencement of, their course, or with the Equity Officer (Disability) in the Equitable Learning Services. Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional exam and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made.

IV. Professional Outcomes and Program Design

Students are able to review the relevant professional outcomes and program designs for their streams by going to the following link: https://www.unsw.edu.au/engineering/student-life/student-resources/program-design.

Note: This course outline sets out the description of classes at the date the Course Outline is published. The nature of classes may change during the Term after the Course Outline is published. Moodle or your primary learning management system (LMS) should be consulted for the up-to-date class descriptions. If there is any inconsistency in the description of activities between the University timetable and the Course Outline/Moodle/LMS, the description in the Course Outline/Moodle/LMS applies.

Academic Honesty and Plagarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. *Plagiarism at UNSW is defined as using the words or ideas of others and passing them off 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. UNSW has produced a website with a wealth of resources to support students to understand and avoid plagiarism, visit: student.unsw.edu.au/plagiarism. The Learning Centre assists students with understanding academic integrity and how not to plagiarise. They also hold workshops and can help students one-on-one.

You are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting and the proper referencing of sources in preparing all assessment tasks.

Repeated plagiarism (even in first year), plagiarism after first year, or serious instances, may also be investigated under the Student Misconduct Procedures. The penalties under the procedures can include a reduction in marks, failing a course or for the most serious matters (like plagiarism in an honours thesis or contract cheating) even suspension from the university. The Student Misconduct Procedures are available here:

www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf

Submission of Assessment Tasks

Work submitted late without an approved extension by the course coordinator or delegated authority is subject to a late penalty of five percent (5%) of the maximum mark possible for that assessment item, per calendar day.

The late penalty is applied per calendar day (including weekends and public holidays) that the assessment is overdue. There is no pro-rata of the late penalty for submissions made part way through a day. This is for all assessments where a penalty applies.

Work submitted after five days (120 hours) will not be accepted and a mark of zero will be awarded for that assessment item.

For some assessment items, a late penalty may not be appropriate. These will be clearly indicated in the course outline, and such assessments will receive a mark of zero if not completed by the specified date. Examples include:

- Weekly online tests or laboratory work worth a small proportion of the subject mark;
- Exams, peer feedback and team evaluation surveys;
- Online quizzes where answers are released to students on completion;
- Professional assessment tasks, where the intention is to create an authentic assessment that has an absolute submission date; and,
- Pass/Fail assessment tasks.

Faculty-specific Information

Engineering Student Support Services – The Nucleus - enrolment, progression checks, clash requests, course issues or program-related queries

Engineering Industrial Training – Industrial training questions

UNSW Study Abroad – study abroad student enquiries (for inbound students)

UNSW Exchange – student exchange enquiries (for inbound students)

UNSW Future Students – potential student enquiries e.g. admissions, fees, programs, credit transfer

Phone

(+61 2) 9385 8500 – Nucleus Student Hub

(+61 2) 9385 7661 – Engineering Industrial Training

(+61 2) 9385 3179 – UNSW Study Abroad and UNSW Exchange (for inbound students)

School-specific Information

Course completion

Course completion requires submission of all assessment items. Failure to submit all assessment items may result in the award of an Unsatisfactory Failure (UF) grade for the Course unless special consideration has been submitted and approved.

Submission of Assessment Tasks

We encourage you to retain a copy of every assignment submitted for your own record, either in hardcopy or electronic form. All assessments must have an assessment cover sheet attached.

Student Resources

The School has student resources section, containing useful advice and information to ensure you're able to focus on your studies.

Computing Resources and Internet Access Requirements

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

Note that some specialist engineering software is not available for Mac computers.

- Mining Engineering Students: OMB G48
- Petroleum Engineering Students: TETB LG34 & LG35

For 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

School Contact Information

School of Minerals and Energy Resources
Old Main Building, Level 1, 159 (K15)
UNSW SYDNEY NSW 2052 AUSTRALIA

For current students, all enquiries and assistance relating to enrolment, class registration, progression checks and other administrative matters, please see The Nucleus: Student Hub.

Web & Important Links:

School of Minerals and Energy Resources
The Nucleus: Student Hub
Moodle
UNSW Handbook
UNSW Timetable
Student Wellbeing
Urgent Mental Health & Support
Equitable Learning Services