UNSW Course Outline

PTRL6016 Well Completions and Stimulation - 2024

Published on the 17 May 2024

General Course Information

Course Code : PTRL6016
Year : 2024
Term : Term 2
Teaching Period : T2
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

Students enrolled in this course will learn how to develop cost-effective completion designs. Completion design and optimization is taught from a practical, technical, and economic point of view, with consideration of future workover and stimulation options. Students will also learn how

to use the latest tools to design and optimize completion scenarios. Course covers: Interval selection and productivity considerations, effect of producing mechanisms, influence of reservoir heterogeneity, required producing rate, inflow performance relationship, summation of pressure drops, matching completion and reservoir performance, and artificial lift requirements. Inflow performance and multiple tubing performance analyses using the latest optimization tools, well stimulation and workover planning, tubing packer movement and forces calculations. Graphical tubing design and simplified tensional strength design, selection of downhole equipment, tubing accessories and wellhead equipment. Basics of perforation, selection of equipment and procedure for perforating oil and gas wells. Technology of sand control - gravel packing.

Course Aims

The course aims to enable students to acquire fundamental knowledge of well completion and to apply the theory to the design, evaluation and optimization of well completion with consideration of future workover and stimulation options. 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

This is a core course of the program with a prerequisite of PTRL6009.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Choose well completion technology and well completion equipment;
CLO2 : Analyse well and tubing performance, tubing movement and design tubing string;
CLO3 : Design perforation and sand control for specific well conditions.

Course Learning Outcomes	Assessment Item
CLO1 : Choose well completion technology and well completion equipment;	• Assignments • Midterm Quiz • Project • Final Exam
CLO2 : Analyse well and tubing performance, tubing movement and design tubing string;	• Assignments • Midterm Quiz • Project • Final Exam
CLO3 : Design perforation and sand control for specific well conditions.	• Assignments • Project • Final Exam

Learning and Teaching Technologies

Moodle - Learning Management System | Blackboard Collaborate | Echo 360

Learning and Teaching in this course

The course contains weekly lectures, in-class exercises and home works. The assessment includes assignments, project, midterm quiz and final exam.

Other Professional Outcomes

N/A

Additional Course Information

N/A

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Assignments Assessment Format: Individual Short Extension: Yes (7 days)	20%	Due Date: Assignments due at the end of Weeks 3, 7, 8, 10 respectively, practical exercises due weekly.
Midterm Quiz Assessment Format: Individual	20%	Due Date: Week 7
Project Assessment Format: Individual Short Extension: Yes (7 days)	10%	Due Date: Week 10
Final Exam Assessment Format: Individual	50%	Due Date: During the Exam Period

Assessment Details

Assignments

Assessment Overview

There are 4 parts to the assignment which cover lecture topics of previous weeks. 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 in class during assignment reviews.

Course Learning Outcomes

- CLO1 : Choose well completion technology and well completion equipment;
- CLO2 : Analyse well and tubing performance, tubing movement and design tubing string;
- CLO3 : Design perforation and sand control for specific well conditions.

Detailed Assessment Description

The first assignment is due on week 3 and the feedback will be provided before 22 June 2024

Assessment Length

No more than 10 pages

Submission notes

Online submission

Assessment information

The specifications and marking rubrics will be provided at the time of the assignment release.

Assignment submission Turnitin type

This is not a Turnitin assignment

Midterm Quiz

Assessment Overview

The midterm quiz covers lecture topics from W1 to W5. 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 : Choose well completion technology and well completion equipment;
- CLO2 : Analyse well and tubing performance, tubing movement and design tubing string;

Detailed Assessment Description

N/A

Assessment Length

1.5hrs

Assessment information

Guidelines for helping the preparation for the midterm quiz will be released on Moodle prior to the quiz.

Assignment submission Turnitin type

This is not a Turnitin assignment

Project

Assessment Overview

The project focuses on well performance analysis and tubing design. In the project, students are required to carry out literature survey, perform analysis on tubing forces and movements and design tubing string through a case study. Final project report is required. Written and verbal feedback will be provided for each student and an individual mark will be issued against specific criteria in a marking guide.

Course Learning Outcomes

- CLO1 : Choose well completion technology and well completion equipment;
- CLO2 : Analyse well and tubing performance, tubing movement and design tubing string;
- CLO3 : Design perforation and sand control for specific well conditions.

Detailed Assessment Description

N/A

Assessment Length

No more than 10 pages

Submission notes

Online submission

Assessment information

The specification of the project will be released on Week 6.

Assignment submission Turnitin type

This assignment is submitted through Turnitin and students can see Turnitin similarity reports.

Final Exam

Assessment Overview

Final exam covers all topics. Marking will be done with a rubric. Individual mark will be issued.

Course Learning Outcomes

- CLO1 : Choose well completion technology and well completion equipment;
- CLO2 : Analyse well and tubing performance, tubing movement and design tubing string;
- CLO3 : Design perforation and sand control for specific well conditions.

Detailed Assessment Description

N/A

Assessment Length

2 hrs

Assessment information

Guidelines for helping the preparation for the final exam will be released on Moodle prior to the exam.

Assignment submission Turnitin type

Not Applicable

General Assessment Information

The assessment includes assignments, project, midterm quiz and final exam.

Grading Basis

Standard

Requirements to pass course

Students need to achieve at least 50 marks to pass the course.

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 0 : 20 May - 26 May	Reading	Self-study: Course outline
Week 1 : 27 May - 2 June	Lecture	Course Introduction Well Completion Design, Well Performance Analysis
	Workshop	Well Performance Analysis
Week 2 : 3 June - 9 June	Lecture	Well Performance Analysis
	Workshop	IPR curve for oil reservoir
Week 3 : 10 June - 16 June	Lecture	Well Performance Analysis
	Workshop	Production index, IPR curve for gas reservoir
Week 4 : 17 June - 23 June	Lecture	Tubing Performance Analysis, Pressure Gradient Analysis
	Workshop	Pressure gradient calculation
Week 5 : 24 June - 30 June	Lecture	Tubing Performance Analysis, Pressure Gradient Analysis
	Workshop	Pressure Gradient calculation, Review on Well and Tubing performance Analysis
Week 6 : 1 July - 7 July	Other	Flexibility week. Self-study: review for midterm quiz.
Week 7 : 8 July - 14 July	Lecture	Tubing Movement & Tubing Design
	Assessment	Midterm Exam: 2 hours
Week 8 : 15 July - 21 July	Lecture	Tubing Movement & Tubing Design; Well completion Equipment
	Workshop	Tubing movement calculation
Week 9 : 22 July - 28 July	Lecture	Perforation of Oil and Gas Wells
	Workshop	Perforation Design
Week 10 : 29 July - 4 August	Lecture	Sand Control
	Workshop	Determination of Gravel and Liner Slot Size, Final Review

Attendance Requirements

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

General Schedule Information

The course has weekly lectures; midterm quiz in Week 7 and final exam in the exam period. Assignments are due in Week 3, 7, 8 and 10 respectively, project due in Week 10.

Course 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/.

Recommended Resources

Followings are the recommended books for this course:

- Buzarde L.E. Jr., R.L. Kastro, W.T. Bell and C.L. DePriester: Production operations, Course 1, Well Completions SPE Publications, 1972
- Allen T.O. and A.P. Roberts: Production Operations, Volumes I and II, Oil and Gas Consultants International Inc, 1989
- Reservoir Engineering Hand Book, Tarek Ahmed Gulf Publishing Company, 2000
- Michael J Economides, A Daniel Hill, Christine Ehlig Economides and Englewood Cliffs NJ.: Petroleum Production Systems, Prentice Hall 1994.

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		211 Level 2, TETB	402962708	Office hours	No	Yes
Lecturer	Sheik Rahman		212 Level 2, TETB	02 9385 5659	Office hours	No	No

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 (if required).

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 Engineering
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