

# PTRL4021

Petroleum Production Engineering

Term 2, 2023



## Course Overview

### Staff Contact Details

#### Convenors

Name	Email	Availability	Location	Phone
Peyman Mostaghimi	<a href="mailto:peyman@unsw.edu.au">peyman@unsw.edu.au</a>			

#### Lecturers

Name	Email	Availability	Location	Phone
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#### Administrators

Name	Email	Availability	Location	Phone
Ryan Armstrong	<a href="mailto:ryan.armstrong@unsw.edu.au">ryan.armstrong@unsw.edu.au</a>		TETB Rm 224	

### 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](#)



## Course Details

### Units of Credit 6

### Summary of the Course

Components of the petroleum production systems. Well inflow performance and deliverability analysis. Production from both saturated and undersaturated oil reservoirs. Production from two phase reservoirs. Production from gas reservoirs. Pseudo critical properties of natural gases. Gas well deliverability for non-Darcy flow. The near-wellbore condition and wellbore skin characterisation. Well head surface gathering systems. Artificial lift systems. Horizontal well production. Production chemistry basics (wax, scale, corrosion, emulsions).

### Course Aims

The aim of this course is to provide insight on production engineering including the basic physics that governs the process and common problems associated with oil and gas production.

### Course Learning Outcomes

After successfully completing this course, you should be able to:

Learning Outcome	EA Stage 1 Competencies
1. The production flow system from reservoir to surface	PE1.3, PE1.4, PE1.5, PE1.6, PE2.1, PE2.2, PE2.3
2. The mechanical energy balance equation associated with production engineering	PE1.1, PE1.2, PE1.3, PE2.1, PE2.2, PE2.3
3. Artificial lift (gas lift and various pumping methods)	PE1.3, PE1.4, PE1.5, PE1.6, PE2.1, PE2.2, PE2.3
4. Problems associated with production of formation fluids	PE1.3, PE1.4, PE1.5, PE1.6, PE2.1, PE2.2, PE2.3
5. Formation damage/production impairment prediction, prevention and removal	PE1.3, PE1.4, PE1.5, PE1.6, PE2.1, PE2.2, PE2.3
6. Problem Diagnosis and workover	PE1.3, PE1.4, PE1.5, PE1.6, PE2.1, PE2.2, PE2.3

### Teaching Strategies

Please refer to the information in Moodle

## Assessment

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. Quiz 1	20%	24/06/2023 03:00 PM	1, 2, 3
2. Quiz 2	45%	Exam Session	1, 2, 3, 4, 5, 6
3. HW	20%	Not Applicable	4, 5, 6
4. Presentation	15%	Not Applicable	

### Assessment 1: Quiz 1

**Assessment length:** 2 Hours

**Due date:** 24/06/2023 03:00 PM

Quiz pertaining to material covered in the first half of the course.

Specific information about this assessment will be provided on course Moodle.

### Assessment 2: Quiz 2

**Assessment length:** 2 Hours

**Due date:** Exam Session

Quiz pertaining to all material covered in the course.

Specific information about this assessment will be provided on course Moodle.

### Assessment 3: HW

**Submission notes:** Specific information about this assessment will be provided on course Moodle

Flow through pipes focused on mechanical energy balance equation Inflow/outflow performance and nodal analysis Diagnostics of common production problems Well stimulation and workover Design of Artificial lift.

Specific information about this assessment will be provided on course Moodle

### Assessment 4: Presentation

**Assessment length:** 30 minutes

Students need to address and explain one type of problem encountered during production. They should explain the causes of the problem, provide an analysis of the predictive tools available, and explain methods available for mitigation of the problem. Overall, they need to explain the type, cause, prediction and mitigation. Presentations will be 20 minutes plus an additional 10 minutes for questions.

Each presentation will be a group project of 3-5 students. Specific topics will be posted to Moodle.

**Assessment criteria**

Specific topics will be posted to Moodle.

## Attendance Requirements

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

## Course Schedule

[View class timetable](#)

### Timetable

Date	Type	Content
O-Week: 22 May - 26 May		
Week 1: 29 May - 2 June	Lecture	Introduction to Production Engineering
Week 2: 5 June - 9 June	Lecture	Horizontal and Vertical Flow in Pipes
Week 3: 12 June - 16 June	Lecture	Multiphase Flow in Pipes
Week 4: 19 June - 23 June	Lecture	• Inflow and Outflow Performance
Week 5: 26 June - 30 June	Lecture	• Artificial lift: Gas and Beam
Week 6: 3 July - 7 July	Lecture	• Review Materials
Week 7: 10 July - 14 July	Lecture	
Week 8: 17 July - 21 July	Lecture	• Artificial lift: PCP and ESP
Week 9: 24 July - 28 July	Lecture	• Problem well diagnosis and workover • Integrated Design
Week 10: 31 July - 4 August	Lecture	• Common production problems • Review of materials

## Resources

### 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.

## 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.

## Late Submission of an Assignment

Full marks for an assessment are only possible when an assessment is received by the due date. 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. 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 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, or
- Online quizzes where answers are released to students on completion, or Professional assessment tasks, where the intention is to create an authentic assessment that has an absolute submission date, or Pass/Fail assessment tasks.

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.

## Special Consideration

You may be eligible for special consideration, when an illness or other short-term events beyond your control (exceptional circumstances) affect your assessment performance. More details on special consideration can be found at: [www.student.unsw.edu.au/special-consideration](http://www.student.unsw.edu.au/special-consideration)

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.

## 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](http://www.library.unsw.edu.au)
- Academic Skills Support - <https://www.student.unsw.edu.au/skills>
- Psychology and Wellness - [www.counselling.unsw.edu.au](http://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](http://www.student.unsw.edu.au/plagiarism).

All MERE 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 academic skills, please contact the Academic Skills Support or view some of the resources on their website: <https://www.student.unsw.edu.au/skills>. The Academic Skills Team can provide resources, support and assistance to help you improve your academic 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](http://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

### Student Resources

This engineering [student resources](#) section collates 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 on-line Moodle LMS (Learning Management System). Also see - Transitioning to Online Learning: [www.covid19studyonline.unsw.edu.au](http://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](http://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](http://www.moodle.telt.unsw.edu.au)

*This course outline sets out 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 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 (as updated in Moodle), the description in the Course Outline/Moodle applies.*

## 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.microsoftcrmpartals.com/web-forms/>
- Course inquiries should be directed to the Course Convenor

## Image Credit

Synergies in Sound 2016

## 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.

## Appendix: Engineers Australia (EA) Professional Engineer Competency Standard

Program Intended Learning Outcomes	
Knowledge and skill base	
PE1.1 Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline	✓
PE1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline	✓
PE1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline	✓
PE1.4 Discernment of knowledge development and research directions within the engineering discipline	✓
PE1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline	✓
PE1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline	✓
Engineering application ability	
PE2.1 Application of established engineering methods to complex engineering problem solving	✓
PE2.2 Fluent application of engineering techniques, tools and resources	✓
PE2.3 Application of systematic engineering synthesis and design processes	✓
PE2.4 Application of systematic approaches to the conduct and management of engineering projects	
Professional and personal attributes	
PE3.1 Ethical conduct and professional accountability	
PE3.2 Effective oral and written communication in professional and lay domains	
PE3.3 Creative, innovative and pro-active demeanour	
PE3.4 Professional use and management of information	
PE3.5 Orderly management of self, and professional conduct	
PE3.6 Effective team membership and team leadership	