UNSW Course Outline

PTRL5019 Fundamentals of Reservoir Engineering A - 2024

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General Course Information

Course Code : PTRL5019
Year : 2024
Term : Term 3
Teaching Period : T3
Is a multi-term course? : No
Faculty : Faculty of Engineering
Academic Unit : School of Minerals & Energy Resources Engineering
Delivery Mode : In Person
Delivery Format : Standard
Delivery Location : Kensington
Campus : Sydney
Study Level : Postgraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

This fundamental course provides students with a comprehensive understanding of the principles, concepts, and techniques used to quantify subsurface reservoirs. It will cover basic concepts of origin, accumulation and recovery of hydrocarbon fluids, reservoir description,

recovery mechanisms, porous media properties and core analysis procedures, volumetric methods, hydrostatics, PVT behaviour and fluid properties, material balance equations for different subsurface reservoirs, fluid flow in porous media for linear and radial systems, steady-state, pseudo-steady-state and unsteady flows, wellbore productivity, wellbore damage and skin factor.

Course Aims

The aim of this course is to give students insights into porous media and subsurface reservoirs, introduce students to important rock and fluid characteristics, and enable students to answer key questions about subsurface flow processes and reservoir engineering. The course also aims to develop fundamental research skills for postgraduate coursework students in Petroleum Engineering.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Demonstrate understanding and apply fundamental theories and concepts to solve reservoir engineering problems, e.g. initial hydrocarbon in place, basic rock and fluid properties, hydrostatic pressure distribution, water influx and single-phase fluid flow
CLO2 : Analyse the underlying theories, concepts, assumptions and arguments concerning fluid flow under different reservoir conditions.
CLO3 : Analyse drive mechanisms and calculate general material balance equation for subsurface reservoirs
CLO4 : Develop research and communication skills and strategies that would support the Research Project component of the program.

Course Learning Outcomes	Assessment Item
CLO1 : Demonstrate understanding and apply fundamental theories and concepts to solve reservoir engineering problems, e.g. initial hydrocarbon in place, basic rock and fluid properties, hydrostatic pressure distribution, water influx and single-phase fluid flow	• Research Project • Assignment • Mid Term Quizzes • Final Exam
CLO2 : Analyse the underlying theories, concepts, assumptions and arguments concerning fluid flow under different reservoir conditions.	• Research Project • Assignment • Mid Term Quizzes • Final Exam
CLO3 : Analyse drive mechanisms and calculate general material balance equation for subsurface reservoirs	• Research Project • Assignment • Mid Term Quizzes • Final Exam
CLO4 : Develop research and communication skills and strategies that would support the Research Project component of the program.	• Research Project

Learning and Teaching Technologies

Moodle - Learning Management System

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Research Project Assessment Format: Group	20%	Due Date: Please refer to Moodle for further information.
Assignment Assessment Format: Individual	10%	Due Date: Please refer to Moodle for further information.
Mid Term Quizzes Assessment Format: Individual	20%	Due Date: Please refer to Moodle for further information.
Final Exam Assessment Format: Individual	50%	Due Date: Please refer to Moodle for further information.

Assessment Details

Research Project

Assessment Overview

A research project on several topics suggested to students, followed by an oral presentation that will be marked against assessment criteria

Course Learning Outcomes

- CLO1 : Demonstrate understanding and apply fundamental theories and concepts to solve reservoir engineering problems, e.g. initial hydrocarbon in place, basic rock and fluid properties, hydrostatic pressure distribution, water influx and single-phase fluid flow
- CLO2 : Analyse the underlying theories, concepts, assumptions and arguments concerning fluid flow under different reservoir conditions.
- CLO3 : Analyse drive mechanisms and calculate general material balance equation for subsurface reservoirs
- CLO4 : Develop research and communication skills and strategies that would support the Research Project component of the program.

Detailed Assessment Description

Projects to be submitted by 27/Oct.

Please refer to Moodle for further information.

Generative AI Permission Level

No Assistance

This assessment is designed for you to complete without the use of any generative AI. You are not permitted to use any generative AI tools, software or service to search for or generate

information or answers.

For more information on Generative AI and permitted use please see here.

Assignment

Assessment Overview

Assignments during the course; submissions will be marked against assessment criteria and individual written feedback will be provided.

Course Learning Outcomes

- CLO1 : Demonstrate understanding and apply fundamental theories and concepts to solve reservoir engineering problems, e.g. initial hydrocarbon in place, basic rock and fluid properties, hydrostatic pressure distribution, water influx and single-phase fluid flow
- CLO2 : Analyse the underlying theories, concepts, assumptions and arguments concerning fluid flow under different reservoir conditions.
- CLO3 : Analyse drive mechanisms and calculate general material balance equation for subsurface reservoirs

Detailed Assessment Description

Please refer to Moodle for further information.

Generative AI Permission Level

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Mid Term Quizzes

Assessment Overview

Several quizzes throughout the term

Course Learning Outcomes

- CLO1 : Demonstrate understanding and apply fundamental theories and concepts to solve reservoir engineering problems, e.g. initial hydrocarbon in place, basic rock and fluid properties, hydrostatic pressure distribution, water influx and single-phase fluid flow
- CLO2 : Analyse the underlying theories, concepts, assumptions and arguments concerning fluid flow under different reservoir conditions.
- CLO3 : Analyse drive mechanisms and calculate general material balance equation for subsurface reservoirs

Detailed Assessment Description

Quiz 1: 24/Sep 4PM

Quiz 2: 22/Oct 4PM

Quiz 3: 5/Nov 4PM

Please refer to Moodle for further information.

Generative AI Permission Level

No Assistance

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Final Exam

Assessment Overview

Final exam during the exam period

Course Learning Outcomes

- CLO1 : Demonstrate understanding and apply fundamental theories and concepts to solve reservoir engineering problems, e.g. initial hydrocarbon in place, basic rock and fluid properties, hydrostatic pressure distribution, water influx and single-phase fluid flow
- CLO2 : Analyse the underlying theories, concepts, assumptions and arguments concerning fluid flow under different reservoir conditions.
- CLO3 : Analyse drive mechanisms and calculate general material balance equation for subsurface reservoirs

Detailed Assessment Description

Please refer to Moodle for further information.

Generative AI Permission Level

No Assistance

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General Assessment Information

Grading Basis

Standard

Course Schedule

Attendance Requirements

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

General Schedule Information

Please refer to Moodle for further information on Course Schedule.

Course Resources

Recommended Resources

Please refer to Moodle for further information on Course Resources.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
	Peyman Most aghimi					No	Yes
	Wen Xi					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: https://www.student.unsw.edu.au/transitioning-online-learning

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