PTRL5005

Design Project for Petroleum Engineers

Term 3, 2022

Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
Habib Zughbi	h.zughbi@unsw.edu.au	Lecture: Mon 6-8pm, Wed 6-8 pm, New South Global Theatre Tutorial: Wed 8-9pm, New South Global Theatre	School of Minerals and Energy Resources Engineering TETB	+61 043 174 62 78

School Contact Information

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

Engineering Student Services
E: mere.teaching@unsw.edu.au
W: www.engineering.unsw.edu.au/minerals-energy-resources

Course Details

Units of Credit 6

Summary of the Course

This course covers front-end engineering design of new production facilities for a potentially viable oil/gas field. Common offshore and onshore field development modes are first reviewed. Various oil/gas processing systems are studied, including gas dehydration, condensate handling, acid gas removal, LPG extraction, and crude oil stabilisation. Design tasks studied include process simulation, preparation of process flow diagrams/piping & instrument diagrams, HAZOP studies, and project management arrangements. Students will make extensive use of a commercial process simulation software package during tutorials. Each student shall carry out an example facilities scoping study and submit this as their final design report. Special Project. (Ref: PTRL3021)

Course Aims

The development of engineering skills and judgment needed in the solution of open-ended problems from a technical-economic viewpoint are the major goals of this course. These skills are essential for any practicing graduate. Researching challenges and risks facing the oil and gas industries and focussing on one major activity used to mitigate these risks, hydrogen production is also an aim of this course.

Each project will be designed from conception to implementation including

- Preliminary feasibility study
- Preparation of process flow diagram,
- Process design & equipment sizing,
- A vary brief cost estimate and a reasonable analysis of project.

Applications will be in areas related to the petroleum industries. Environmental aspects are included in the project

The technical aspects of Integrated Design are covered throughout the Petroleum Engineering Program as part of other natural gas engineering, fluid flow, thermodynamics and heat transfer. This course complements these other courses by aiming to:

1. Combine students existing knowledge of fluid flow, mass and energy conservation, thermodynamics with a thorough grounding in the analysis and prediction of the VLE of oil/gas through the application of a widely used industrially process simulation package and by applying these concepts to selected unit operations,
2. Introduce students to ways of optimizing resources from an oil/gas fields and the environmental and economic context of the development of production facilities.

Course Learning Outcomes

1. Apply mass and energy conservation principles, fluid flow, thermodynamics and separation theories to separate oil/water/gas streams into constituent phases, stabilize the crude oil, recover the individual components from the gas stream in a well-designed gas plant in order to optimize available
2. Perform preliminary design/analysis calculations for common unit operations in gas-oil

separation.
3. Apply integrated approach principles to maximize usage and minimize waste/rejected resources.
4. Gain an understanding of the challenges and risks facing the oil industry and actions taken by the industry including use of renewables and production of hydrogen.

Teaching Strategies

Please refer to the information in Moodle

Assessment

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. Class Quiz 1	20%	12/10/2022 08:00 PM	1, 2, 3
2. Class Quiz 2	20%	09/11/2022 08:00 PM	1, 2, 3
3. Final Brief Report	20%	Study Week	1, 2, 3
4. Final Exam	40%	During Exam Period	1, 2, 3

Assessment 1: Class Quiz 1

Start date: 12/10/2022 06:00 PM
Due date: 12/10/2022 08:00 PM

Two hour class quiz in week 5.

Assessment 2: Class Quiz 2

Start date: 09/11/2022 06:00 PM
Due date: 09/11/2022 08:00 PM

Two hour class quiz in week 9.

This is not a Turnitin assignment

Assessment 3: Final Brief Report

Submission notes: Assignments (if any) related details/submission-box will be available online through Moodle.
Due date: Study Week

Documentation of the design project.

Assessment 4: Final Exam

Due date: During Exam Period

A 2 hour, exam covering the entire course.

This is not a Turnitin assignment

Attendance Requirements

To pass this course it is expected that you will attend at least 80% of tutorials and lectures. Failure to meet the specified attendance requirements of the course may result in in the award of an Unsatisfactory Failure (UF) grade for the Course.

Attendance will be recorded when applicable. Normally, there is no make-up work for poor attendance. If you have misadventure or ill-health, please contact your course coordinator soon as possible. The attendance requirement is not meant to be punitive. It is included because participation is an important part of achieving the course outcomes.

Course Schedule

View class timetable

Timetable

Date	Type	Content
Week 1: 12 September - 16 September	Lecture	Course introduction; discussion of the trend of worldwide oil and gas production, challenges and risks facing the industry, Fossil fuels vs renewables, H2 economy, discussion of design problem statement, introduction to gas oil separation.
Week 2: 19 September - 23 September	Lecture	Introduction to mass conservation/balance.
Week 3: 26 September - 30 September	Lecture	Introduction to energy conservation/balances; Vapour liquid equilibrium; flash calculations.
Week 4: 3 October - 7 October		Monday (Public Holiday)
	Lecture	Vapour liquid equilibrium; flash calculations (continued).
Week 5: 10 October - 14 October	Lecture	Applications to mass, energy and separation principles.
	Assessment	Class Quiz 1
Week 6: 17 October - 21 October	Reading	Flex Week
Week 7: 24 October - 28 October	Lecture	Introduction to process simulation, components list, thermodynamic models, introduction to simple unit operations.
Week 8: 31 October - 4 November	Lecture	Process simulation – Oil manager – Characterization/cutting/installing of crude oil.

Week 9: 7 November - 11 November	Lecture	Process simulation: Gas separation; gas dehydration, Convergence issues, renewables, hydrogen production.
	Assessment	Class Quiz 2
Week 10: 14 November - 18 November	Lecture	Process simulation: Convergence issues, Gas sweetening, Energy integration, optimization of resources.
Study Week: 21 November - 24 November	Assessment	Final Brief Report: Assignments (if any) related details/submission-box will be available online through Moodle.

Resources

Recommended Resources

1. Plant Design and Economics for Chemical Engineers (4th edition) by M. S .Peters and K. D. Timmerhaus, McGraw-Hill, 1991.
2. Applied Process Design for Chemical and Petroleum Plants (2ndedition) by Ernest E. Ludwig, 1983, Gulf Publishing Company, Book Div., vols1, 2 &3

Students will be suggested additional handbooks and texts related to particular topics covered in the course.
There is no recommended book for this course.

There are numerous articles / information sources on Process Design, Design strategies, process integration, renewable energy and H2 production. Be very careful in your choice of web sources. Remember, UNSW librarians are usually happy to help you locate articles or make suggestions regarding possible material to help you in your academic work. You can also access basic online help at http://www.library.unsw.edu.au/

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 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 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 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

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.microsoftcrmportals.com/web-forms/
- Course inquiries should be directed to the Course Convenor

Image Credit

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CRICOS

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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.