UNSW Course Outline

CEIC3007 Chemical Engineering Lab B - 2024

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General Course Information

Course Code : CEIC3007
Year : 2024
Term : Term 2
Teaching Period : T2
Is a multi-term course? : No
Faculty : Faculty of Engineering
Academic Unit : School of Chemical Engineering
Delivery Mode : In Person
Delivery Format : Standard
Delivery Location : Kensington
Campus : Sydney
Study Level : Undergraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

A key part of the professional practice of chemical engineering is the ability to investigate problems. Sometimes these investigations occur on the desktop (e.g. researching design options, simulating processes or developing techno-economic models). Other investigations

involve the collection and analysis of data from natural phenomena, equipment or product testing, or process operations. As professional chemical engineers you will be called upon to lead, plan and execute engineering projects that investigate opportunities for process development and improvement.

Building on your learning in CEIC2007, this course will further develop your skills in analysis, critical thinking, communication, project management and teamwork. You will develop and extend your skills in designing and executing experimental investigations of chemical engineering problems using small pilot-scale unit operations and analytical equipment. You will work in a team and individually to plan, conduct and document three open-ended experimental projects, and to reflect on your learning throughout the course.

Course Aims

Building on CEIC2007, this course aims to extend students' ability to design and execute experimental investigations in accordance with applicable safety and ethical standards, further develop their professional skills in analysis, critical thinking, communication and teamwork, and to prepare them for their capstone design and thesis courses.

Relationship to Other Courses

This course builds on content you studied in other courses within the chemical engineering specialisation, in particular the following pre-requisite courses:

- CEIC2007 – experience of conducting structured experimental enquiries,
- CEIC3001 – particularly, the content on separation processes,
- CEIC3005 – documentation, safety and simulation, and
- MATH2089 – statistics.

In addition, you are expected to be studying or have studied

- CEIC3006 – your third experiment will involve some aspects of process control.

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CEIC3007 builds on the experimental and data analysis skills you developed in your first-year science courses and in CEIC2007. This course also builds on your teamwork, project

management and communication skills developed in your design courses.

This course also provides practical experience with the technologies studied from a theoretical and design perspective in other courses. For example, some of the experiments involve a distillation column for which you have studied the principles of operation in CEIC3001 and will study the design of in CEIC3004. There will also be opportunity to compare the performance of a real-world unit with the predictions of a process model or simulation, as you developed in CEIC3000 and CEIC3005. Finally, the final experiment in the course will give you some practical experience of process dynamics and control and will apply some of your early learning in CEIC3006. This course also allows you to develop your professional skills in communication, teamwork and project management.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Integrate and apply knowledge of mass and energy balances, transport phenomena, thermodynamics, statistics, unit operations, and process control to plan, conduct and interpret guided experimental enquiries.
CLO2 : Apply the principles of process safety and WHS to identify and manage risks in laboratory operations.
CLO3 : Demonstrate academic and research integrity in the preparation, conduct, analysis and reporting of experiments, including data management.
CLO4 : Combine the knowledge and skills of peers in the effective design, execution and management of team-based experimental projects.
CLO5 : Reflect on experiential learning in the context of chemical engineering practice.
CLO6 : Effectively communicate the background, planning, analysis and interpretation of experiments in written and oral forms.

Course Learning Outcomes	Assessment Item
CLO1 : Integrate and apply knowledge of mass and energy balances, transport phenomena, thermodynamics, statistics, unit operations, and process control to plan, conduct and interpret guided experimental enquiries.	• Experiment proposals • Technical reports • Final Seminar
CLO2 : Apply the principles of process safety and WHS to identify and manage risks in laboratory operations.	• Introductory Quiz • Experiment proposals
CLO3 : Demonstrate academic and research integrity in the preparation, conduct, analysis and reporting of experiments, including data management.	• Introductory Quiz • Technical reports • Experiment proposals
CLO4 : Combine the knowledge and skills of peers in the effective design, execution and management of team-based experimental projects.	• Final Seminar • Technical reports • Experiment proposals
CLO5 : Reflect on experiential learning in the context of chemical engineering practice.	• Final Seminar • Technical reports
CLO6 : Effectively communicate the background, planning, analysis and interpretation of experiments in written and oral forms.	• Final Seminar • Experiment proposals • Technical reports

Learning and Teaching Technologies

Moodle - Learning Management System | Moodle - Learning Management System | Microsoft

Learning and Teaching in this course

Course structure

This course is organised around three experimental rotations themed after different types of process engineering projects. Each rotation will involve you working with other students to plan, execute and report on an experimental campaign.

- Rotation 1 is a 1-week campaign over Weeks 1 to 3 involving a process improvement theme
- Rotations 2 is a 2-week campaign over Weeks 3 to 7 related to process development, and
- Rotation 3 is a 2-week campaign over Weeks 7 to 10 focused on improving process operability.

As with engineering projects, these experimental campaigns overlap and so careful project management is required as individuals and as teams.

Seminar classes

The Seminar classes will comprise a range of classes, consisting of lectures and workshops in Ainsworth 202 (unless otherwise specified), Office Hours, and Experiment Proposal presentations (location TBA). The lectures and workshops aim to prepare students for their experiential learning by explaining and practicing aspects of project management and communication. The Office Hours are a student-led time for addressing their concerns and questions. While the Experiment Proposal presentations are a key aspect of assessment for learning in the course where students their understanding and plans for each experiment and receive constructive and actionable feedback to improve their acheivement of experimental objectives.

Laboratory classes

Laboratory classes will be held in the Chemical Engineering teaching labs in the Science and Engineering Building. Your Rotation 1 and 2 experiments will be conducted in either SEB 103 or 109. Your Rotation 3 experiment will be conducted in the Pilot Hall (SEB 117).

Laboratory access is during your timetabled hours only, except as explicitly pre-arranged with the Lab Manager. Lab classes finish strictly at the indicated end time so make sure you plan your work with this in mind. Your learning in your lab class will be guided by one or more academic staff and one or two demonstrators, plus the Lab Manager.

- Tuesday, 2-5pm – Dr Graeme Bushell (lead), Mr Jun Wen Tang, and Mr Jiancheng Lin with Prof. Guangzhao Mao
- Wednesday, 2-5pm – Dr Sarah Grundy (lead), Mr James Morel, and Dr Peter Neal (coordinator)

Please see the *Staff Details* page for contact details.

Students are expected to comply with all relevant WHS requirements. The following personal protective equipment is must be worn at all times in the laboratories (i.e., during both briefing and experiment sessions).

- safety glasses
- lab coat
- legs covered
- enclosed shoes

Student teams

Many of the activities in this course are team-based (Experiment Proposals, laboratory sessions, the first Technical Report, and the Final Seminar). You should aim to select a team as soon as possible - look for the Team Selection section on the course Moodle page. We recommend teams schedule at least two regular meetings per week.

It is important that you engage constructively and consistently with the rest of your team, as team-based assessments will be moderated by team evaluation surveys. Effective team membership includes

- listening respectfuly and communicating constructively,
- being proactive and responsible in acheiving team purposes,
- being adaptable and building team cohesion,
- earning trust by completing assigned tasks on time and at or above the agreed quality, and
- being able to give and receive feedback in a constructive and non-protective manner.

Activities and resources to assist you in your teamwork will be provided in class and via Moodle.

Other Professional Outcomes

This course is part of Engineering programs accredited with Engineers Australia. The following list shows how the course learning outcomes (CLO) align with to EA's Stage 1 Elements of Professional Competency (PE):

- CLO 1 - PE1.2, PE1.3, PE1.4, PE1.6, PE2.1, PE2.2, PE2.4
- CLO 2 - PE 1.4, 3.4

- CLO 3 - PE 2.1, 2.2, 3.4
- CLO 4 - PE 1.1, 1.2, 2.1, 2.2
- CLO 5 - PE 3.2, 3.5

Additional Course Information

Integrity and Respect

The UNSW Student Code of Conduct among other things, expects all students to demonstrate integrity in all their academic work, and to treat all staff, students and visitors to the University with courtesy, tolerance and respect.

In line with the comments at the end of this outline (see "Academic Honesty and Plagiarism"), generative AI systems (e.g. ChatGPT) are tools that all graduates should learn how to use responsibly and ethically. It can be a helpful partner for brainstorming, quickly helping you develop some starting points. It can be a patient (and usually reliable) tutor, explaining complex theory in simple terms. Like Wikipedia, it can be a helpful starting point, but it's not where you should finish.

Regardless of how apparently knowledgeable or verbose the system may be, it can't do the work for you. You will need to personally explain your work and your ideas throughout your thesis course in both formal and informal contexts. Thus, you need to know what you're doing and so you must not use a bot to write large portions your work. This is akin to relying too much on the words of others and is a form of plagiarism.

If you make use of text or other generative tools in the conduct of your thesis project, then you must

Discuss how you plan to use it with the academic in your lab class or the course coordinator. Formally and specifically acknowledge how you used it in your submissions in Your Acknowledgements section (in the same way as you would acknowledge the contribution of others to your project) and/or The appropriate part of your work (e.g. Method or Results). Cite the tool (like any other reference source) if you use ideas or text it generated (e.g., OpenAI. (2023). ChatGPT. OpenAI. https://beta.openai.com/docs/models/gpt-3). Include the full response of the AI in an appendix and discuss that response in the body of the document.

Time commitment

UNSW expects students to spend approximately 150 hours to successfully complete a 6 UOC

course like CEIC3007. Completing the three experimental projects will require approximately 30-40 hours in-class contact hours. This time will be spent in inductions and briefings, presenting your experimental plan and progress updates to your demonstrator, as well as actually conducting the experiment and analysing samples. This leaves a significant portion of the course (110-120 hours or at least 10 hours per week) to be completed outside of class. You will spend this time working through provided preparation materials, reviewing background material they find, preparing your experimental plan, reviewing interim results and refining the experimental plan, writing up your findings in reports, and preparing for the final seminar. Students must attend their timetabled classes (seminars, presentations, labs and brief/debrief sessions). This course is not compatible with full-time work.

Competence

Students are expected to enter CEIC3007 having developed competencies in all the material covered in the pre-requisite courses, at least. In addition, this course will draw on skills and content from other third year courses. Little time is available to remediate any deficiencies in your knowledge of those topics. Over the course of the term, you will be developing new competencies and to illustrate the standards we expect, marking rubrics or guidelines will be provided for all assessments. The teaching staff will apply these marking guides fairly and provide you with feedback so you can continue to improve over the term and beyond.

Participation

To complete the experimental projects, you are required to work in a team. We expect all team members to agree on how they will manage the team (e.g. making and documenting decisions), to assign the project work equitably and contribute to the delivery of project outputs to the best of their ability. Your contribution to the team will be peer evaluated throughout the course - the scores from these evaluations will be used to convert your team marks to individual marks.

In the laboratory, students are expected to make productive use of their time, conducting their experiments in a way that does not injure anyone and does not damage the equipment.

For two week experiments -

- After the first session working on a given problem, teams should process their initial results and refine their experimental plan for the following week.
- Following the second session, students will finish analysing their results and prepare a report and/or presentation.

Students are expected to contribute to online discussions through the course forum on Teams. You may wish to discuss challenges faced through this course, ask questions about course content, discuss solutions to problems encountered. It is expected that students will help each other, and the lecturers will contribute as required.

Attendance and punctuality

We expect students to be punctual and attend at all briefings, experiment and seminar sessions. University commitments take precedence over regular work activities, holidays etc. Students who attend less than 80% of their possible classes may be refused final assessment. If you miss a class, we expect you to catch up in your time, lectures will be recorded and made available through Moodle.

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Introductory Quiz Assessment Format: Individual	5%	Due Date: 9am on Monday, Week 2
Experiment proposals Assessment Format: Individual	30%	Due Date: 9am Monday in Weeks 2, 4 and 8
Technical reports Assessment Format: Individual	45%	Due Date: 9pm the day before your regular lab session (e.g. Tuesday teams submit on Monday) in Weeks 3, 7 and 10
Final Seminar Assessment Format: Group	20%	Due Date: During the exam period (slides are due at 9pm the night before).

Assessment Details

Introductory Quiz

Assessment Overview

Individual assessment of student's knowledge of academic and research integrity, as well as general and laboratory workplace health and safety. If not completed recently, this quiz requires the completion of standard university WHS and integrity training modules. Students will have multiple attempts and be provided with automated feedback upon closure of the quiz.

Course Learning Outcomes

- CLO2 : Apply the principles of process safety and WHS to identify and manage risks in laboratory operations.
- CLO3 : Demonstrate academic and research integrity in the preparation, conduct, analysis and

reporting of experiments, including data management.

Detailed Assessment Description

Complete online modules on Laboratory Safety Awareness and Working with Academic Integrity before attempting the quiz. Information on how to register for these modules is provided on Moodle. Your team will also need to submit your completed team contract before you will be able to access the quiz.

You will need to provide evidence of completion of each course. Successful completion of this quiz is required before you will be permitted to work in the lab.

We recommend starting early as modules often take 24h to appear in your Moodle courses, and students sometimes encounter issues with registrations that requires staff intervention.

Submission notes

Submitted via a Moodle Quiz

Assignment submission Turnitin type

Not Applicable

Experiment proposals

Assessment Overview

Students present and defend their proposed work plan to experiment demonstrator. Proposals are group assessed with the answering of questions assessed individually. Team marks are moderated with peer assessment to give individual marks. Students will receive feedback directly during the session and against a rubric.

Course Learning Outcomes

- CLO1 : Integrate and apply knowledge of mass and energy balances, transport phenomena, thermodynamics, statistics, unit operations, and process control to plan, conduct and interpret guided experimental enquiries.
- CLO2 : Apply the principles of process safety and WHS to identify and manage risks in laboratory operations.
- CLO3 : Demonstrate academic and research integrity in the preparation, conduct, analysis and reporting of experiments, including data management.
- CLO4 : Combine the knowledge and skills of peers in the effective design, execution and management of team-based experimental projects.
- CLO6 : Effectively communicate the background, planning, analysis and interpretation of experiments in written and oral forms.

Detailed Assessment Description

You will present an experimental proposal for each of the three experiments, in person during the regular seminar timeslot (Monday 10am-12noon) in the week you commence each experiment. The session will consist of your proposal presentation (max. 10min), followed by 15-20min of Q&A with your demonstrator. Please contact your demonstrator for the experiment to arrange the exact time and location.

While the seminar is presented as a team, you will receive an individual mark. More details about this task (including assessment criteria) are provided in the assessment guide on Moodle. There will also be a Team Evaluation activity due in Weeks 3, 7 and 10 on your regular lab day.

Assessment Length

30 minutes

Submission notes

Submit your risk management form and presentation slides using the dedicated activities on Moodle.

Assignment submission Turnitin type

Not Applicable

Technical reports

Assessment Overview

Students will write a technical report documenting the results of their experimental investigations and interpreting their meaning. At least one report will be written as a team and at least one individually with further details provided in class. Team report marks will be moderated by peer assessment to give individual marks. Students will receive written feedback and marks against a rubric.

Course Learning Outcomes

- CLO1 : Integrate and apply knowledge of mass and energy balances, transport phenomena, thermodynamics, statistics, unit operations, and process control to plan, conduct and interpret guided experimental enquiries.
- CLO3 : Demonstrate academic and research integrity in the preparation, conduct, analysis and reporting of experiments, including data management.
- CLO4 : Combine the knowledge and skills of peers in the effective design, execution and management of team-based experimental projects.
- CLO5 : Reflect on experiential learning in the context of chemical engineering practice.
- CLO6 : Effectively communicate the background, planning, analysis and interpretation of

experiments in written and oral forms.

Detailed Assessment Description

Report 1 will be written as a team while Reports 2 and 3 will be written individually. As such, short extensions are not available for Report 1 - only for Report 2 and 3.

See the assessment guide for more details including assessment criteria.

Submission notes

Submit your report as a Word file through the Turnitin activity on Moodle.

Assignment submission Turnitin type

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

Final Seminar

Assessment Overview

Students will give a team-based presentation reflecting on their learning against the course learning outcomes using evidence from their particular experiments and the course in general. The presentation will be followed by Q&A with the audience. Students will receive feedback during the session and against a rubric.

Course Learning Outcomes

- CLO1 : Integrate and apply knowledge of mass and energy balances, transport phenomena, thermodynamics, statistics, unit operations, and process control to plan, conduct and interpret guided experimental enquiries.
- CLO4 : Combine the knowledge and skills of peers in the effective design, execution and management of team-based experimental projects.
- CLO5 : Reflect on experiential learning in the context of chemical engineering practice.
- CLO6 : Effectively communicate the background, planning, analysis and interpretation of experiments in written and oral forms.

Assessment Length

15-20 minute presentation, plus 10 minutes for questions

Submission notes

Submit your slides in activity on Moodle.

Assessment information

Teams will give the presentation in person to the rest of their lab class and their demonstrators.

See the assessment guide for more details including assessment criteria.

Assignment submission Turnitin type

Not Applicable

General Assessment Information

Successful completion of online pre-lab quizzes, risk assessment and experimental planning are required prior to each of three experimental projects. This preparation work will require you to perform a review of relevant literature to learn about the process you're investigating and the analytical techniques you will use, as well as attending the experiment briefing session in the lab. You need to think about how you will plan your work out over one or two weeks (depending on the experiment). Finally, your team should conduct a qualitative risk assessment for the experiment and apparatus.

Before starting each experiment, teams will present an experimental plan using visual aids to a demonstrator and answer their questions. These presentations will be conducted online during the scheduled Seminar time as noted in the course schedule. Upon successfully completing this oral defence, your team can commence your experiment. Slides and completed Risk Management Form (HS017) will be submitted prior to the presentation.

The first experimental project will be carried out in one 3-hour laboratory sessions, while the second and third projects will be carried out over two 3-hour laboratory sessions in consecutive weeks. Each week you will begin by meeting with your demonstrator to discuss your reflection of the previous week (of preparation, or of experimentation and analysis). Before you leave each week, you will again meet with your demonstrator to debrief and discuss your plans for the following week.

You will receive specific feedback on your report as well as general feedback for the class. Take some time to reflect and act on that feedback before the next report/presentation is due.

Grading Basis

Standard

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 0 : 20 May - 26 May	Online Activity	Getting started with CEIC3007 During this week, you should • Read through this course outline, as well as the introductory material on Moodle and put all assessment deadlines in your calendar. • Find a team - you can see students enrolled in the course in the participants page on Moodle. Group selection will be available from Friday of O-Week. • Register for online training - look at the Introductory Quiz guide on Moodle for registration instructions. • Complete the pre-lab lesson and read through the supporting materials for your first experiment. Doing this before your lab induction will mean you will be better prepared to understand the briefing and know what information to collect about your apparatus.
Week 1 : 27 May - 2 June	Assessment	Introductory Quiz • If not already done so, complete the Lab Safety Awareness (HSELSO) and Working with Academic Integrity (WWAI) training modules. • Once you have submitted your team contract, you can attempt the Quiz.
	Seminar	Course launch seminar (10am-12noon on Monday in Ainsworth 202) • Introduction to the course (including how you'll learn and be assessed, and how the course is organised), • Advice on how to succeed, and • How to prepare for your first experiment.
	Laboratory	Lab induction and Rotation 1 briefing (2-4pm on your lab day, meet in SEB 102) • Critical information about working safely in Chemical Engineering teaching laboratories, and • A discussion and demonstration of how to safely complete your experiment and operate your experimental apparatus for your second experiment. • Gather information for your Experiment Proposal and Risk Management Form.
	Homework	Individual • If not already done, complete pre-lab lesson and readings. • Read through the Guide to Experiment Propopsals. Team • Meet as a team to get to know each other, share contact details, decide regular meeting times, talk through your team contract and conduct initial task allocation. • Following the briefing, meet to develop your experimental plan for acheiving the Rotation 1 experimental objectives. • Prepare for your Rotation 1 Experiment Proposal presentation. • Conduct a qualitative risk analysis of your experiment and complete the standard Risk Management Form (HS017). • Organise a time and location for your Rotation 1 Experiment Proposal presentation with your demonstrator.
Week 2 : 3 June - 9 June	Assessment	Introductory Quiz • Complete the quiz by 9am Monday morning Risk Management Form • One member of the team should submit your completed HS017 Risk Management Form for your experiment by 9am Monday.
	Seminar	Rotation 1 Experiment Proposal (30min timeslot during 10am-12noon by arrangement with your demonstrator - location TBC) • Present the proposed plan for your first experiment to your demonstrator (maximum 10 minutes). • Answer your demonstrator's questions on your Experiment Proposal. • Discuss whether your Risk Management Form is satisfactory.
	Laboratory	Rotation 1 Lab (2-5pm on your lab day in either SEB 103 or 109) Before the Lab • Carry out any changes or additional work recommended by your demonstrator • Prepare tables for collecting data During the Lab • Execute your plan for Rotation 1 • Record notes and observations about the conduct of your experiment in your notebook. • Collect your experiment data in a spreadsheet and post it in your private channel on Teams • If required, arrange a time (with Andrew Chau) for a few team members to analyse your calibration and experimental samples.
	Homework	Individual • Read the Guide to Technincal Reports. • Reflect on your experimental experience and document those thoughts for the team. • Complete the pre-lab lesson and readings for your second experiment. Doing

		this before Week 3 will mean you will be better prepared to understand the briefing and know what information to collect about your apparatus. Team • Meet to debrief after the proposal presentation and decide what follow-up work is required. • Meet following your lab, to plan how you will prepare your technical report. • Analyse your data, collate lab notes and reflections, and consider how your results relate to theory, literature and industrial practice. • Write your Rotation 1 Technical Report.
Week 3 : 10 June - 16 June	Assessment	Technical Report 1 • Complete and submit your team-written technical report. Only one person needs to complete the task. • Following submission you will be able to complete the team evaluation activity.
	Seminar	King's Birthday Public Holiday There is no class today, however you are encouraged to watch the pre-recorded lecture about writing technical reports. Any questions about the course can be posted to Teams.
	Laboratory	Rotation 2 briefing (2-3pm on your lab day, meet in SEB 102) • A discussion and demonstration of how to safely complete your experiment and operate your experimental apparatus for your second experiment. • Gather information for your Experiment Proposal and Risk Management Form.
	Homework	Individual • If not already done, complete pre-lab lesson and readings. Team • Following the briefing, meet to develop your experimental plan for acheiving the Rotation 2 experimental objectives. • Prepare for your Rotation 2 Experiment Proposal presentation. • Conduct a qualitative risk analysis of your experiment and complete the standard Risk Management Form (HS017). • Organise a time and location for your Rotation 2 Experiment Proposal presentation with your demonstrator.
Week 4 : 17 June - 23 June	Seminar	Rotation 2 Experiment Proposal (30min timeslot during 10am-12noon by arrangement with your demonstrator - location TBC) • Present the proposed plan for your second experiment to your demonstrator (maximum 10 minutes). • Answer your demonstrator's questions on your Experiment Proposal. • Discuss whether your Risk Management Form is satisfactory.
	Laboratory	Rotation 2 Lab 1 (2-5pm on your lab day in either SEB 103 or 109) Before the Lab • Carry out any changes or additional work recommended by your demonstrator • Prepare tables for collecting data During the Lab • Execute your plan for the first lab of Rotation 2 • Record notes and observations about the conduct of your experiment in your notebook. • Collect your experiment data in a spreadsheet and post it in your private channel on Teams • If required, arrange a time (with Andrew Chau) for a few team members to analyse your calibration and experimental samples.
	Homework	Individual • Analyse your data, reflect on how the experiment went, and consider how your results relate to theory, literature and industrial practice. • Try using process modelling/simulation to replicate or extend your results. Team • Meet following the proposal presentation to debrief and decide what follow-up work is required. • Meet to discuss your findings from this week's lab, review the experimental plan for next week and decide any changes with your team.
Week 5 : 24 June - 30 June	Seminar	Reports, Reflections and Office Hours (from 10am on Monday in Ainsworth 202) • Review feedback on the first round of technical reports • Activities and advice on the reflection component of Technical Reports and the Final Seminar. • Time for Q&A on any aspect of the course. • The session will finish once any questions posed have been answered.
	Experiment	Rotation 2 Lab 2 (2-5pm on your lab day in either SEB 103 or 109) Before the Lab • Finalise your plan for Week 2 Prepare tables for collecting data During the Lab • Continue executing your plan for Rotation 2 • Record notes and observations about the conduct of your experiment in your notebook. • Collect your experiment data in a spreadsheet and post it in your private channel on Teams • If required, arrange a time (with Andrew Chau) for a few team members to analyse your calibration and experimental samples.

	Homework	Individual • Analyse your data, reflect on how the experiment went, and consider how your results relate to theory, literature and industrial practice. • Employ process modelling/simulation to replicate or extend your results. • Write your individual Technical Report for Rotation 2. Team meetings • Meet to review your experimental plan before your second lab session • You may wish to meet following the lab to discuss data generated and outcomes of your experiment before writing your individual reports.
Week 6 : 1 July - 7 July	Other	Flexibility Week • Being Flex Week there are no timetabled classes. The course coordinator will be available on Teams to answer any questions that come up during the week. • Any make-up labs required from Experiments 1 and 2 will be held in this week.
	Homework	Individual • Continue working on your individual Rotation 2 Technical Report. • Complete the pre-lab lesson and readings for your third experiment. Doing this before Week 7 will mean you will be better prepared to understand the briefing and know what information to collect about your apparatus. Team • Although you are working on an individual report, you might find it helpful to meet with the team to perform some internal peer review on each others draft reports. • Your team may wish to meet and get an early start on preparing for your third experiment.
Week 7 : 8 July - 14 July	Assessment	Technical Report 2 • Complete and submit your individually-written technical report. • Following submission you will be able to complete the team evaluation activity for Experiment 2.
	Seminar	Process Control and Office Hours (from 10am on Monday in Teams) • Introduction to the third round of experiments which all involve some form of process control. • Time for Q&A on any aspect of the course. • The session will finish once any questions posed have been answered.
	Experiment	Experiment 3 briefing (2-3pm on your lab day. Meet outside SEB 117) • A discussion and demonstration of how to safely complete your experiment and operate your experimental apparatus for your second experiment. • Gather information for your Experiment Proposal and Risk Management Form.
	Homework	Individual • If not already done, complete pre-lab lesson and readings. Team • Debrief together on the feedback on your Rotation 2 Technical Reports. • Following the briefing, meet to develop your experimental plan for acheiving the Rotation 3 experimental objectives. • Prepare for your Rotation 3 Experiment Proposal presentation • Conduct a qualitative risk analysis of your experiment and complete the standard Risk Management Form (HS017) • Organise a time and location for your Rotation 3 Experiment Proposal presentation with your demonstrator.
Week 8 : 15 July - 21 July	Seminar	Rotation 3 Experiment Proposal (30min timeslot during 10am - 12noon by arrangement with your demonstrator - location TBA) • Present the proposed plan for your second experiment to your demonstrator (maximum 10 minutes). • Answer your demonstrator's questions on your Experiment Proposal. • Discuss whether your Risk Management Form is satisfactory.
	Experiment	Rotation 3 Lab 1 (2-5pm on your lab day in either SEB 117) Before the Lab • Carry out any changes or additional work recommended by your demonstrator • Prepare tables for collecting data During the Lab • Execute your plan for the first lab of Rotation 2 • Record notes and observations about the conduct of your experiment in your notebook. • Collect your experiment data in a spreadsheet and post it in your private channel on Teams
	Homework	Individual • Analyse your data, reflect on how the experiment went, and consider how your results relate to theory, literature and industrial practice. • Using the data your team collected, calculate your own set of PID parameters to test during next week's lab class. Team • Meet to debrief after the proposal presentation and decide what follow-up work is required. • Meet, following your lab, to review and revise your plan for the second week of Experiment 3.
Week 9 : 22 July - 28 July	Seminar	Report Review and Office Hours (from 10am on Monday in Teams)

		• Review of feedback on your second technical reports. • Time for Q&A on any aspect of the course. • The session will finish once any questions posed have been answered.
	Experiment	Rotation 3 Lab 2 (2-5pm on your lab day in either SEB 117) Before the Lab • Finalise your plan for Week 2 • Prepare tables for collecting data During the Lab • Continue executing your plan for Rotation 3 • Record notes and observations about the conduct of your experiment in your notebook. • Collect your experiment data in a spreadsheet and post it in your private channel on Teams
	Homework	Individual • Analyse your data, reflect on how the experiment went, and consider how your results relate to theory, literature and industrial practice. • Write your individual Technical Report for Rotation 3. Team • Meet to review your experimental plan before your second lab session. • You may wish to meet following the lab to discuss data generated and outcomes of your experiment before writing your individual reports.
Week 10 : 29 July - 4 August	Assessment	Technical Report 3 • Complete and submit your individually-written technical report. • Following submission you will be able to complete the team evaluation activity for Experiment 3.
	Seminar	Preparing for the Final Seminar and Office Hours (from 10am on Monday in Ainsworth 202) • Explanation and advise on preparing for your Final Seminar. • Time for Q&A on any aspect of the course. • The session will finish once any questions posed have been answered.
	Laboratory	Any make-up labs required from Experiment 3 will be held in this week.
	Group Work	Individual • Read through the Assesment Guide for the Final Seminar. Team • Debrief together on your feedback for your third technical reports. • Start planning your Final Seminar presentation.
Week 11 : 5 August - 11 August	Other	Stuvac Being Flex Week there are no timetabled classes. The course coordinator will be available on Teams to answer any questions that come up during the week. Ensure you have checked the exam timetable or Moodle for the time and location of your Final Seminar.

Attendance Requirements

The Seminar will be used for the course lectures, proposal presentations and office hours and will be on campus activities unless otherwise specified. As for your Laboratory class, you should plan to attend campus on every week of term (except Week 6 and 10). In Weeks 2, 4, 5, 9 and 9 you will be conducting experiments. In the non-experiment weeks, you will have inductions, debriefs with your demonstrator, and briefings on upcoming experiments all held in the Chemical Engineering teaching labs. The distillation experiments will also require one or two team members to attend the lab the following day to analyse your calibration and experimental samples.

If you are unable to attend for reasons beyond your control (e.g. sickness, misadventure), please apply for special consideration. The only exceptions to this are students who have been excused from attending through special consideration or equitable learning plans. Alternative schedules may be occassionaly made by prior arrangement with the teaching staff - students in this

situation should contact the coordinator as soon as possible.

General Schedule Information

Course Resources

Prescribed Resources

Online lessons, videos and suggested readings, plus links to other online resources will be provided on the course Moodle page (http://moodle.telt.unsw.edu.au/). These will be progressively released as the course progresses.

You are expected to provide the required PPE yourself. See the "Laboratory classes" section on the *Course Details & Outcomes* page for what PPE is required.

Recommended Resources

There is no set textbook for this course. However, you may find it useful to refer to the recommended texts for the courses mentioned in the following sections:

- Pre-requisite courses and assumed knowledge
- Relationship with the discipline and the rest of your program

Study space for project courses

Students enrolled in selected project- and laboratory-based courses (such as CEIC3007) are granted access to Room 102 on Level 1 of the Science and Engineering Building (Map Ref. E8). Access to this space is subject to the following conditions:

- Students must follow any directions from teaching and technical staff.
- This space is provided for private study and/or small group project meetings related to courses taught by the School of Chemical Engineering.
- Some classes have booked this space and students should vacate the space during these classes.
- Students using the space are expected to leave the space in the same or better condition than they found it. Keeping this in mind, limited consumption of food and drink is permitted.

Failure to observe any of these conditions may result in your access being revoked.

Course Evaluation and Development

Based on student feedback we have:

- Simplified the assessment and reporting
- Increased demonstrator training on experiments and assessment practices
- Shifted the weighting of assessments for proposals and reports, and extended report deadlines.
- Rearranged how marking responsibilities are distributed to reduce variability in final marks
- Switched the format of reports so that the first report is now a group one - this allows more time for in depth feedback on the first report, and provides students with more time to complete their first individual report.
- Shifted the final seminar into the exam period to distance it from the Rotation 3 Technical Report due date.

Feedback is sought through in-term course surveys and the myExperience survey at the end of term. However we appreciate feedback at any time! Let us know if there are things we can improve during term and we will do our best to assist.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Dr Peter Neal		Hilmer (E10) 221		For confidential matters, please contact via Teams chat or call.	Yes	Yes
Head demonstrator	Dr Graeme Bushell		Hilmer (E10) 219		For confidential matters, please contact via Teams chat or call.	No	No
	Dr Sarah Grundy		SEB (E8) 433		For confidential matters, please contact via Teams chat or call.	No	No
Lab supervisor	Mr Hung (Andrew) Chau				During scheduled lab classes only.	No	No
Demonstrator	Prof. Guangzhao Mao				During scheduled classes only.	No	No
	Mr Jiancheng (Ivan) Lin				During scheduled classes only.	No	No
	Mr James Morel				During scheduled classes only.	No	No
	Jun Wen Tang				During scheduled classes only.	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 Workload

Course workload is calculated using the Units-Of-Credit (UOC). The normal workload expectation for one UOC is approximately 25 hours per term. This includes class contact hours, private study, other learning activities, preparation and time spent on all assessable work.

Most coursework courses at UNSW are 6 UOC and involve an estimated 150 hours to complete, for both regular and intensive terms. Each course includes a prescribed number of hours per week (h/w) of scheduled face-to-face and/or online contact. Any additional time beyond the prescribed contact hours should be spent in making sure that you understand the lecture material, completing the set assignments, further reading, and revising for any examinations. Most 6 UoC courses will involve approximately 10-12 hours per week of work on your part. If you're not sure what to do in these hours of independent study, the resources on the UNSW Academic Skills pages offer some suggestions including: making summaries of lectures, read/ summarise sections from the textbook, attempt workshop problems, reattempting workshop problems with some hints from the solutions, looking for additional problems in the textbook.

Full-time enrolment at university means that it is a *full-time* occupation for you and so you would typically need to devote 35 hours per week to your studies to suceed. Full-time enrolment at university is definitely incompatible with full-time employment. Part-time/casual employment can certainly fit into your study schedule but you will have to carefully balance your study obligations with that work and decide how much time for leisure, family, and sleep you want left after fullfilling your commitments to study and work. Everyone only gets 168 hours per week; overloading yourself with both study commitments and work commitments leads to poor outcomes and dissatisfaction with both, overtiredness, mental health issues, and general poor quality of life.

On-campus Class Attendance

Most classes at UNSW are "In Person" and run in a face-to-face mode only. Attendance and participation in the classes is expected. As an evidence-driven engineer or scientist, you'll be interested to know that education research has shown students learn more effectively when they come to class, and less effectively from lecture catch-up recordings. If you have to miss a class due to illness, for example, we expect you to catch up in your time, and within the coming couple of days.

For most courses that are running in an "in person" mode:

- Lectures are normally recorded to provide an opportunity to review material after the lecture; lecture recordings are not a substitute for attending and engaging with the live class.
- Workshops/tutorials are not normally recorded as the activities that are run within those sessions normally cannot be captured by a recording. These activities may also include assessable activities in some or all weeks of the term.
- Laboratories are not recorded and require in-person attendance. Missing laboratory sessions may require you to do a make-up session later in the term; if you miss too many laboratory sessions, it may be necessary to seek a Permitted Withdrawal from the course and reattempt it next year, or end up with an Unsatisfactory Fail for the course.
- Assessments will often require in-person attendance in a timetabled class or a scheduled examination.

Submission of Assessment Tasks

In the School of Chemical Engineering, all written work will be submitted for assessment via Moodle unless otherwise specified. Attaching cover sheets to uploaded work is *not* required unless specifically requested for an individual assessment task; when you submit work through Moodle for assessment you are agreeing to uphold the Student Code.

Some assessments will require you to complete the work online and it may be difficult for the course coordinator to intervene in the system after the due date. You should ensure that you are familiar with assessment systems well before the due date. If you do this, you will have time to get assistance before the assessment closes.

All submissions are expected to be neat and clearly set out. Your results are the pinnacle of all your hard work and should be treated with respect. Presenting results clearly gives the marker the best chance of understanding your method; even if the numerical results are incorrect. Please make it easy for the markers who are looking at your work to see your achievement and give you due credit.

Marking guidelines for assignment submissions will be provided at the same time as assignment details to assist with meeting assessable requirements. Submissions will be marked according to the marking guidelines provided.

Academic Integrity

Academic integrity is fundamental to success at university. Academic integrity can be defined as a commitment to six fundamental values in academic pursuits: honesty, trust, fairness, respect,

responsibility and courage (International Center for Academic Integrity, 'The Fundamental Values of Academic Integrity', T. Fishman (ed), Clemson University, 2013). At UNSW, this means that your work must be your own, and others' ideas should be appropriately acknowledged. If you don't follow these rules, plagiarism may be detected in your work.

Further information about academic integrity and plagiarism can be located at:

- The Current Students site
- The ELISE training site

The Conduct and Integrity Unit provides further resources to assist you to understand your conduct obligations as a student: https://student.unsw.edu.au/conduct.

To help describe what we are looking for, here are some things that we consider to be quite acceptable (even desirable!) actions for many assessments, and some that we consider to be unacceptable in most circumstances. Please check with the instructions for your assessments and your course coordinator if you're unsure. As a rule of thumb, if you don't think you could look the lecturer in the eye and say "this is my own work", then it's not acceptable.

Acceptable actions

 reading/searching through material we have given you, including lecture slides, course notes, sample problems, workshop problem solutions

 reading/searching lecture transcripts

 reading/searching resources that we have pointed you to as part of this course, including textbooks, journal articles, websites

 reading/searching through your own notes for this course

 all of the above, for any previous courses

 using spell checkers, grammar checkers etc to improve the quality of your writing

 studying course material with other students

Unacceptable actions

 asking for help completing an assessment from other students, friends, family

- asking for help on Q&A or homework help websites

- searching for answers to the specific assessment questions online or in shared documents

- copying material from any source into your answers

- using generative AI tools to complete or substantially complete an assessment for you

- paying someone else to do the assessment for you

Referencing is a way of acknowledging the sources of information that you use to research your assignments. You need to provide a reference whenever you draw on someone else's words, ideas or research. Not referencing other people's work can constitute plagiarism. Further information about referencing styles can be located at https://student.unsw.edu.au/referencing.

For assessments in the School of Chemical Engineering, we recommend the use of referencing software such as Mendeley or EndNote for managing references and citations. Unless required otherwise specified (i.e. in the assignment instructions) students in the School of Chemical Engineering should use either the APA 7th edition, or the American Chemical Society (ACS) referencing style as canonical author-date and numbered styles respectively.

Artificial intelligence tools such as ChatGPT, CodePilot, and built-in tools within Word are modern tools that are useful in some circumstances. In your degree at UNSW, we're teaching you skills that are needed for your professional life, which will include how to use AI tools responsibly plus lots of things that AI tools cannot do for you. AI tools already are (or will soon be) part of professional practice for all of us. However, if we were only teaching you things that AI could do, your degree would be worthless, and you wouldn't have a job in 5 years.

Whether the use of AI tools in an assessment is appropriate will depend on the goals of that assessment. As ever, you should discuss this with your lecturers – there will certainly be assessments where the use of AI tools is encouraged, as well as others where it would interfere with your learning and place you at a disadvantage later. Our goal is to help you learn how to ethically and professionally use the tools available to you. To learn more about the use of AI, see this discussion we have written where we analyse the strengths and weaknesses of generative AI tools and discuss when it is professionally and ethically appropriate to use them.

While AI may might provide useful tools to help with some assessments, UNSW's policy is quite clear that taking the output of generative AI and submitting it as your own work will never be

appropriate, just as paying someone else to complete an assessment for you is serious misconduct.

Asking Questions

Asking questions is an important part of learning. Learning to ask good questions and building the confidence to do so in front of others is an important professional skill that you need to develop. The best place to ask questions is during the scheduled classes for this course, with the obvious exception being questions that are private in nature such as special consideration or equitable learning plans. Between classes, you might also think of questions — some of those you might save up for the next class (write them down!), and some of them you might ask in a Q&A channel on Teams or a Q&A forum on Moodle. Please understand that staff won't be able to answer questions on Teams/Moodle immediately but will endeavour to do so during their regular working hours (i.e. probably not at midnight!) and when they are next working on this particular course (i.e. it might be a day or two). Please respect that staff are juggling multiple work responsibilities (teaching more than one course, supervising research students, doing experiments, writing grants, …) and also need to have balance between work and the rest of their life.

School Contact Information

For assistance with enrolment, class registration, progression checks and other administrative matters, please see the Nucleus: Student Hub. They are located inside the Library – first right as you enter the main library entrance. You can also contact them via http://unsw.to/webforms or reserve a place in the face-to-face queue using the UniVerse app.

For course administration matters, please contact the Course Coordinator.

Questions about the this course should normally be asked during the scheduled class so that everyone can benefit from the answer and discussion.