School of Chemical Engineering

UNSW Engineering

CEIC8204

Entrepreneurship and the Innovation Cycle

Term 2, 2023

Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
Dipan Kundu	d.kundu@unsw.edu.au	Email and Teams	E10 222	0293854339

Lecturers

Name	Email	Availability	Location	Phone
Johannes le Coutre	johannes.lecoutre@unsw.edu.au	Email and Teams	E8 437	0293857195

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.

If circumstances outside your control impact on submitting assessments, Special Consideration may be granted, usually in the form of an extension or a supplementary assessment. Applications for Special Consideration must be submitted online.

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.

Course Details

Units of Credit 6

Summary of the Course

Innovation is key to maintain sustainable competitive advantage for organisations around the world. However, bringing innovations to market in the form of a product successfully and repeatedly is a daunting task. This course blends the basics every engineer/researcher/manager needs to translate innovations into products in both entrepreneurial and established firms. The course will provide an appreciation for the realities of industrial practice and for the complex and essential roles played by the various members of product innovation teams. We will touch upon the topics of exploring and scoping innovations; product design and development, design for environment – sustainable development goals, prototyping, patents and intellectual property, product development economics, aspects of managing projects and project risk, preparing business plan, and lean startup principles. Efforts will be made to strike a balance between theory and practice through emphasis on methods. When possible, the topics are built around examples drawn from industrial practices to illustrate the important aspects of the activities. Overall, the course will introduce you to the nuts and bolts of entrepreneurship and innovation cycle. Regular class activities will be complemented with seminars/discussions by industry speakers and experts to provide practical insights.

Course Aims

This course aims to give students a flavour of the multidisciplinary methods and activities involved in the industrial practice of product innovation and design. The course will expose students to interdisciplinary issues in the entrepreneurship and innovation cycle, such as exploring and scoping innovations, product design and development process, industrial design, design for environment, sustainable development goals, protecting innovation, managing projects and projects risks, and business plan basics.

Course Learning Outcomes

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

Learning Outcome	EA Stage 1 Competencies
1. Identify, explain and reflect on the key aspects of scoping innovation, product development process and economics, sustainable development, protecting innovation, project and associated risk management, preparing business plan, and the lean startup principle	PE1.5
2. Understanding the multidisciplinary approach to industrial research and innovation	PE1.5, PE2.3, PE2.4
3. Manage multiple, interdisciplinary tasks to achieve a common objective	PE2.4, PE3.1, PE3.3
4. Strengthen team working and technical communication skills	PE3.2, PE3.6
5. Integrate innovation and entrepreneurial principles in professional scenarios	PE3.2, PE3.4, PE3.5, PE3.6

Teaching Strategies

This course combines three different strategies to enable student learning: (1) direct instruction, (2) work-integrated learning, and (3) project-based learning.

Direct instruction (Stockard et al., 2018) via interactive lectures and online lessons has been selected as the primary method of teaching the theoretical and procedural methods covered in the course. This teaching method provides clear, progressive explanation of key concepts with carefully selected examples to illustrate application, along with opportunities for students to check their nmastery through interactive activities.

Work-Integrated Learning encompasses a wide range of educational practices (Male & KIng, 2019). This course features guest lecturers that provide industry case studies that supports and extends the content introduced through direct instruction. In this way, students are able to integrate their conceptual understanding with real life examples that illustrate the application of key principles.

Project-Based Learning (Guo et al., 2020) is employed in this course to facilitate the integration and consolidation of student learning through the completion of a team-based product design project. By using assessment as learning, students are scaffolded in the entrepreneurial application of innovation methods and tools.

Additional Course Information

The course will complement and reinforce the knowledge skills acquired in previous courses such as DESN1000, DESN2000, CEIC4007, CEIC4008 and other theory, design, project, and professional skills courses within their program. However, the course does not require specific assumed knowledge.

Assessment

All assessments centre around an innovation tournament: innovate a product for a 'relatively simple application' of your choice
This activity aims to inculcate a team-based approach to product innovation and development mock practice. You will be tasked to design a consumer product - a simple one that doesn't require a technology breakthrough and involve fewer parts; utility knife, garlic press, child safety lock, and ice cream scooper are some examples - from a set of product ideas, proposed by you and your colleagues, for genuine unmet needs that no one bothered addressing. You will work as a team and present a conceptual prototype and a business case by preparing a Lean Canvas at the end of this course. This exercise will help you to learn the principles and multidisciplinary aspects of innovation and entrepreneurship and to improve teamwork skills.

Group and individual marking for team submissions (Group marking is overall 30%)

From concept development through to business plan, all submissions are group assessment tasks, and 40% of the total mark for these assessments will be based on the group effort (which includes how coherent the group effort is). However, the submission/assignment sections must be numbered, and you must identify on the cover sheet which sections of the report were written/worked on by which members.

Submission of Assessment Tasks

All assessment tasks must be via Moodle unless otherwise specified. When you submit work through Moodle for assessment, you are agreeing to uphold the Student Code.

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.

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. Project Proposal and Pitch	25%	Week 3 (Thursday)	1, 2, 3, 4
2. Concept Development	40%	Weeks 5, 7 & 9 (Friday)	1, 3
3. Proof of Concept Presentation	15%	Week 10 (Friday)	2, 3, 4, 5
4. Business Plan	20%	Week 11	1, 2, 3, 4, 5

Assessment 1: Project Proposal and Pitch (Group)

Due date: Week 3 (Thursday)

Project Proposal and Pitch (25 %)

***Project Proposal: a brief one to two page project proposal (Week 3)* – 12%**

A brief, descriptive project title; 3 nearest competitors (existing solutions) and price; a description of the product opportunity, which may include documentation of the market need, shortcomings of existing competitive products, and definition of the target market and its size.

***Proposal Pitching: Proposal Presentation (Week 3)* – 5%**

A 60-90 seconds presentation in class. The presentation should include:

A verbal or visual demonstration of the product opportunity described in the proposal. Spend time explaining the market opportunity and demonstrating the existing competitive products.

Convincing arguments why your colleagues should vote for your product proposal.

***Project Preferences (Proposals are up for vote)* – 5%**

You are required to vote for the top ten proposals by marking them on a scale of 1 to 10, 10 being the most preferred and 1 the least preferred. For this task, you should consider whether the proposal addresses a significant need/problem and if there is a good market opportunity. You should also consider the overall quality of the proposal and pitch. Please be careful of expressing preferences (marking highly) for projects that are too complex. Complexity is not necessarily equivalent to quality.

***Workshop participation/contribution* – 3% (1% per week)**

Workshop activities in the course have been designed to improve learning and help you with the assessments. Therefore you must take part in the weekly workshops that follow the lectures. Your participation and contribution to the workshop will add up to 1% per week to your mark from the accompanying assessment.

Assessment 2: Concept Development

Due date: Weeks 5, 7 & 9 (Friday)

Concept Development (40%)

This consists of three assignments:

Assignment 1: Mission Statement and Customer Needs List (Week 5) – 10%

- Describe your team's processes for getting organised and for identifying customer needs. Comment on this process and on your results.
- Write a mission statement for your project team.
- Develop an organised list of customer needs for your product
- Try to complete an importance survey. If you feel the need to understand preferences and trade-offs, this is highly recommended.

Assignment 2: Concept Sketches, Target Specifications and Patent Review (Week 7) – 13%

- Describe some of the steps of your concept generation and target specifications processes. Comment on the process and the results.
- Hand in sketches and bullet-point descriptions of 10 alternative concepts for your product. For each sketch, note which of the important customer needs it addresses and which it does not.

- Choose a few (3 to 4) critical customer needs from your list. For these critical few, prepare a list of the target specifications and provide documentation to support these decisions.
- Perform a preliminary patent review for any prior art and related ideas. Is there any? briefly describe the closest matches and attach appropriate material from the web.

Assignment 3: Preliminary Concept Selection and Schedule (Week 9) – 12%

- Hand in sketches of the two or three concepts you believe are most promising.
- Show the concept selection matrix (screening or scoring) that you used to make these choices. Include a simple description or sketch of each of the concept alternatives considered.
- Prepare a list of the key uncertainties or questions you still need to address to determine the viability of your product. For each one, specify an associated plan of action (such as analysis, mock ups, interviews, experiments, etc.).
- Describe your team's process. Comment on the process and the results

***Workshop participation/contribution* – 5% (1% per week)**

Workshop activities in the course have been designed to improve learning and help you with the assessments. Therefore you must take part in the weekly workshops that are run following the lectures. Your participation and contribution to the workshop will add up to 1% per week to your mark from the accompanying assessment.

Assessment 3: Proof of Concept Presentation (Group)

Due date: Week 10 (Friday)

Proof of Concept Presentation: Review - Final Concept and Model (Week 10) – 14%

- Prepare a 10-minute presentation of your (single) selected product concept. The presentation should include a review of your mission statement, customer needs, selected concept, and your key target specifications.
- As part of your presentation, demonstrate some form of "proof-of-concept" prototype model.
- Hand in a one-page description and sketch of your selected concept.
- Describe your team's process. Comment on the process and the results.

***Workshop participation/contribution* – 1% (1% per week)**

Workshop activities in the course have been designed to improve learning and help you with the assessments. Therefore you must take part in the weekly workshops run following the lectures. Your participation and contribution to the workshop will add up to 1% per week to your mark from the accompanying assessment.

Assessment 4: Business Plan (Group)

Due date: Week 11

As part of this assessment you will prepare a Lean Canvas business plan on your team's product/solution.

Attendance Requirements

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

Course Schedule

View class timetable

Timetable

Date	Type	Content
Week 1: 29 May - 2 June	Lecture	Each week's activity include 2 h lecture, 1 h workshop and 1 h guest seminar **Course introduction and objectives** **Exploring Innovations -** Quest for breakthrough ideas – where to start? "fuzzy front end" of product innovation introduction to strategic and industrial context to innovations
	Workshop	The workshop will focus on methods of exploring innovations
	Seminar	Guest seminar by relevant industry/academic speakers with entrepreneurial experience/expertise
Week 2: 5 June - 9 June	Lecture	Each week's activity include 2 h lecture, 1 h workshop and 1 h guest seminar **Product Design & Development part 1 -** development processes, opportunity identification, product planning, identifying customer needs
	Workshop	The workshop will focus on the process of identifying customer needs
	Seminar	Guest seminar by relevant industry/academic speakers with entrepreneurial experience/expertise
Week 3: 12 June - 16 June	Lecture	Each week's activity include 2 h lecture, 1 h workshop and 1 h guest seminar **Product Design & Development part 2 -** identifying customer needs, product specifications, and concept generation **Design for Environment -** environmental

		impacts associated with products, methods for reducing such impacts through design decisions, sustainable development goals (UN-SDG)
	Workshop	In this workshop the focus will be concept generation exercise from customer needs
	Seminar	Guest seminar by relevant industry/academic speakers with entrepreneurial experience/expertise
Week 4: 19 June - 23 June	Lecture	Each week's activity include 2 h lecture, 1 h workshop and 1 h guest seminar **Patents and Intellectual property –** role of intellectual property in product development, types of intellectual property and how to protect, overview of patents, preparing a disclosure (general overview and introduction)
	Workshop	The workshop will focus on exercises concerning patents/intellectual properties.
	Seminar	Guest seminar by relevant industry/academic speakers with entrepreneurial experience/expertise
Week 5: 26 June - 30 June	Lecture	Each week's activity include 2 h lecture, 1 h workshop and 1 h guest seminar **Product Development Economics -** elements of economic analysis, when to perform economic analysis, and the process
	Workshop	The workshop will have esercises around the economics of product development
	Seminar	Guest seminar by relevant industry/academic speakers with entrepreneurial experience/expertise
Week 6: 3 July - 7 July	Online Activity	***Flexibility week: time for revision/consolidation***
Week 7: 10 July - 14 July	Lecture	Each week's activity include 2 h lecture, 1 h workshop and 1 h guest seminar **Managing Projects and Risk** –baseline project planning, accelerating projects, project execution, assessing project status, corrective actions, project evaluation**,** project risk management, agile method of project management
	Workshop	The workshop will have activities/exercises

		focusing on project/risk management
	Seminar	Guest seminar by relevant industry/academic speakers with entrepreneurial experience/expertise
Week 8: 17 July - 21 July	Lecture	Each week's activity include 2 h lecture, 1 h workshop and 1 h guest seminar **Preparing Business Plan part 1 –** Business plan considerations, **d**o's and don'ts in preparing a Business Plan, organisational plan, marketing plan
	Workshop	The workshop will have activities/exercises focusing on preparing effective business plan
	Seminar	Guest seminar by relevant industry/academic speakers with entrepreneurial experience/expertise
Week 9: 24 July - 28 July	Lecture	Each week's activity include 2 h lecture, 1 h workshop and 1 h guest seminar **Preparing Business Plan part 2 –** financial documents, business plan for non-profits, financing business **Business Model Canvas and Lean Canvas**
	Workshop	The workshop will focus on drafting a lean canvas business plan
	Seminar	Guest seminar by relevant industry/academic speakers with entrepreneurial experience/expertise
Week 10: 31 July - 4 August	Lecture	Each week's activity include 2 h lecture, 1 h workshop and 1 h guest seminar **Entrepreneurship –** Lean startup principles for continuous innovation in any venture
	Workshop	The workshop will have exercises around the application of the lean startup principles
	Seminar	Guest seminar by relevant industry/academic speakers with entrepreneurial experience/expertise

Resources

Recommended Resources

Karl T. Ulrich, Steven D. Eppinger, Maria C. Yang - Product Design and Development

Linda Pinson - Anatomy of a Business Plan

Eric Ries - The Lean Startup; How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses

Further reading suggestions will be provided in the lecture slides

Course Evaluation and Development

The School of Chemical Engineering evaluates each course each time it is run through (i) myExperience Surveys, and (ii) Focus Group Meetings. As part of the myExperience process, your student evaluations on various aspects of the course are graded; the Course Coordinator prepares a summary report for the Head of School. Any problem areas are identified for remedial action, and ideas for making improvements to the course are noted for action the next time that the course is run. Focus Group Meetings are conducted each term. Student comments on each course are collected and disseminated to the Lecturers concerned, noting any points which can help improve the course.

All of the activities in this course from the online lessons through to the team project have been designed in response to student feedback.

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.

Late penalties

Unless otherwise specified, submissions received after the due date and time will be penalised at a rate of 5% per day or part thereof (including weekends) and will not be accepted more than 5 days late. For some activities including Exams, Quizzes, Peer Feedback, and Team Evaluation surveys, extensions and late submissions are not possible.

Special consideration

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 submitting an assessment or sitting an exam.

UNSW has a Fit to Sit / Submit rule, which means that if you attempt an exam or submit a piece of assessment, 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.

Please note that for **all** special consideration requests (including COVID-19-related requests), students will need documentary evidence to support absences from any classes or assessments.

Academic Honesty and Plagiarism

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	Unacceptable actions
✓ reading/searching through material we have given you, including lecture slides, course notes, sample problems, workshop problem solutions	✗ asking for help with an assessment from other students, friends, family
✓ reading/searching lecture transcripts	✗ asking for help on Q&A or homework help websites
✓ reading/searching resources that we have pointed you to as part of this course, including textbooks, journal articles, websites	✗ searching for answers to the specific assessment questions online or in shared documents
✓ reading/searching through your own notes for this course	✗ copying material from any source into your answers
✓ all of the above, for any previous courses	✗ using generative AI tools to complete or substantially complete an assessment for you
✓ using spell checkers, grammar checkers etc to improve the quality of your writing	✗ paying someone else to do the assessment for you
✓ studying course material with other students	

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.

Academic Information

To help you plan your degree, assistance is available from academic advisors in The Nucleus and also in the School of Chemical Engineering.

Additional support for students

- Current Student Gateway for information about key dates, access to services, and lots more information
- Engineering Student Life - Current Student Resources for information about everything from getting to campus to our first year guide
- Student Support and Success for our UNSW team dedicated to helping with university life, visas, wellbeing, and academic performance
- Academic Skills to brush up on some study skills, time management skills, get one-on-one support in developing good learning habits, or join workshops on skills development
- Student Wellbeing, Health and Safety for information on the UNSW health services, mental health support, and lots of other useful wellbeing resources
- Equitable Learning Services for assistance with long term conditions that impact on your studies
- IT Service Centre for everything to do with computing, including installing UNSW licensed software, access to computing systems, on-campus WIFI and off-campus VPNs

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

In 2023, most classes at UNSW are running in a face-to-face mode only. Attendance is expected as is

participation in the classes. 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.

This course outline will have further details in the Course Schedule and Assessment sections.

Class numbers are capped in each class to ensure appropriate facilities are available, to maintain student:staff ratios, and to help maintain adequate ventilation in the spaces. Only students enrolled in each specific classes will be allowed in the room. Class rosters will be attached to corresponding rooms and circulated among lab demonstrators and tutors. No over-enrolment is allowed in face-to-face classes.

In certain classroom and laboratory situations where physical distancing cannot be maintained or the staff running the session believe that it will not be maintained, face masks will be designated by the course coordinator as **mandatory PPE** for students and staff. Students are required to bring and use their own face mask. Mask can be purchased from IGA Supermarket (Map B8, Lower Campus), campus pharmacy (Map F14, Middle Campus), the post office (Map F22, Upper Campus) and a vending machine in the foyer of the Biological Sciences Building (Map E26, Upper Campus).

Your health and the health of those in your class is critically important. You must stay at home if you have COVID-19 or have been advised to self-isolate by NSW health or government authorities.

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.

Note: 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.

Image Credit

Pilot Hall with experiment rigs // UNSW Chemical Engineering

CRICOS

CRICOS Provider Code: 00098G

Acknowledgement of Country

We acknowledge the Bedegal people who are the traditional custodians of the lands on which UNSW Kensington campus is located.

Appendix: Engineers Australia (EA) Professional Engineer Competency Standard

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