



UNSW Course Outline

CEIC4007 Product Design Project Thesis A - 2024

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General Course Information

Course Code : CEIC4007

Year : 2024

Term : Term 1

Teaching Period : T1

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

Design and creative development are the engine of growth for economies and industry product portfolios. Chemical products touch consumers the world over, delivering innovations in pharmaceuticals, advanced materials, cosmetics, and foods.

This is the first course of the two-course product research and design project sequence.

In this course, you will begin exploring global corporate innovations through case studies and active working groups, map consumer and market need to develop an intellectual property strategy and development plan for a novel consumer product. Designing and delivering new products to market is a complex process. It involves open-ended problems that demand creativity, reflection, and quantitative analysis of results. These problems can have multiple correct approaches and that will require you to demonstrate your expertise through the practice of innovation, creativity and authoritative judgement. Industry partners will work with you to explore, create, and assess your product as it develops.

Whether you're interested in developing new innovations for existing companies or for your own entrepreneurial efforts, you will gain confidence and independence that will enable you to make real contributions to the global economy.

You will continue and complete your project in CEIC4008 Product Design Project Thesis B.

Course Aims

This course aims to develop and extend student capabilities in:

- Applying general engineering and design principles to product design through case studies, and the self-directed identification and study of examples,
- Practicing consumer and market research, using publicly available and intellectual property documentation,
- Defining consumer need and linking technological barriers / enablers to the identified need, and
- Developing a product intellectual property strategy.

Relationship to Other Courses

Builds on CEIC6711 fundamentals

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Develop a product design following industry and professional engineering standards.
CLO2 : Critically reflect on a specialist body of knowledge (literature, patents and others), related to their design goal.
CLO3 : Apply scientific and engineering methods to solve a practical commercial design problem.
CLO4 : Analyse past and preliminary data objectively using quantitative and mathematical methods.
CLO5 : Demonstrate oral and written communication in professional and lay domains.

Course Learning Outcomes	Assessment Item
CLO1 : Develop a product design following industry and professional engineering standards.	<ul style="list-style-type: none">• Presentations in biweekly tutor meetings with group• Preliminary concept interview• Final provisional patent and documentation of product
CLO2 : Critically reflect on a specialist body of knowledge (literature, patents and others), related to their design goal.	<ul style="list-style-type: none">• Preliminary concept interview• Final provisional patent and documentation of product
CLO3 : Apply scientific and engineering methods to solve a practical commercial design problem.	<ul style="list-style-type: none">• Product/Project Management Plans• Presentations in biweekly tutor meetings with group• Final provisional patent and documentation of product
CLO4 : Analyse past and preliminary data objectively using quantitative and mathematical methods.	<ul style="list-style-type: none">• Presentations in biweekly tutor meetings with group• Final provisional patent and documentation of product
CLO5 : Demonstrate oral and written communication in professional and lay domains.	<ul style="list-style-type: none">• Product/Project Management Plans• Preliminary concept interview• Presentations in biweekly tutor meetings with group• Final provisional patent and documentation of product

Learning and Teaching Technologies

Moodle - Learning Management System

Learning and Teaching in this course

N/A

Other Professional Outcomes

Engineers Australia, Professional Engineer Stage 1 Competencies

This course contributes to your development of the following EA Professional Engineer competencies:

- 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
- 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
- PE3.2 Effective oral and written communication in professional and lay domains

This course is part of UNSW Food Science specialisations approved (2021-2026) by the Institute of Food Technologists Higher Education Review Board (IFT HERB).

Additional Course Information

None

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Presentations in biweekly tutor meetings with group Assessment Format: Group	10%	Start Date: Not Applicable Due Date: Biweekly
Preliminary concept interview Assessment Format: Individual	20%	Start Date: Not Applicable Due Date: Week 7
Product/Project Management Plans Assessment Format: Individual	20%	Start Date: Not Applicable Due Date: Week 10
Final provisional patent and documentation of product Assessment Format: Individual	50%	Start Date: Not Applicable Due Date: Week 11

Assessment Details

Presentations in biweekly tutor meetings with group

Assessment Overview

Structured communication of progress, proposed direction, and needs via completion of less than 60 minute tasks during workshop. These could include presentations on specific assigned subjects, such as background research on the product topic area, or completion of a tutorial on a 3D drawing package, for example. As the project definition phase coalesces, a specific product concept will be developed and various aspects of that will be the focus of these discussions. Engagement with the research and patent literature will be an important part of the preparation for the presentations.

The work will be completed for the topic chosen by a group, but each member will complete one part individually and be marked individually. Feedback will be provided during the workshop portion of the class as well as during the return of marks.

Course Learning Outcomes

- CLO1 : Develop a product design following industry and professional engineering standards.
- CLO3 : Apply scientific and engineering methods to solve a practical commercial design problem.
- CLO4 : Analyse past and preliminary data objectively using quantitative and mathematical methods.
- CLO5 : Demonstrate oral and written communication in professional and lay domains.

Detailed Assessment Description

Workshop Week 1

Assessment Length

5 slides

Assessment information

None

Assignment submission Turnitin type

Not Applicable

Preliminary concept interview

Assessment Overview

Students will discuss their initial product justification with an instructor. The short presentation

will be followed by questions from peers, instructor, and industry mentors. Once a product goal has been identified, discussions by the responsible individuals will focus on justification of the financial, competitive, innovative, and feasibility aspects of the goal.

Feedback will be given during the oral presentation as well as electronically to allow documentation and incorporation into project development. Feedback will also be given individually to students during marking to suggest areas of improvement for each part of the presentation and its owner. The students can then use the feedback to shape the project and ensure it is an appropriate scope for the time available and that the student evaluations are accurate.

Course Learning Outcomes

- CLO1 : Develop a product design following industry and professional engineering standards.
- CLO2 : Critically reflect on a specialist body of knowledge (literature, patents and others), related to their design goal.
- CLO5 : Demonstrate oral and written communication in professional and lay domains.

Detailed Assessment Description

Workshop Week 7

Assignment submission Turnitin type

Not Applicable

Product/Project Management Plans

Assessment Overview

Communication of the initial, and then more developed, scope of product plan to instructor. With a product goal in mind, the students must identify the key roles needed for the project team to carry out the work successfully. These roles will be assumed and the responsibilities, the success criteria for the roles, and the plan for interaction and project execution will be mapped and communicated individually by the responsible person. Each group member will own and present one to two sections of the plan and argue for its feasibility going forward. Feedback will be provided during marking for each individual's contribution.

Course Learning Outcomes

- CLO3 : Apply scientific and engineering methods to solve a practical commercial design problem.
- CLO5 : Demonstrate oral and written communication in professional and lay domains.

Detailed Assessment Description

Workshop Week 10

Assessment Length

5 slides

Submission notes

None

Assignment submission Turnitin type

Not Applicable

Final provisional patent and documentation of product

Assessment Overview

This document parallels the literature review submitted for traditional Thesis projects but will actually take the form of a detailed invention and patent disclosure. Several sections are needed for such a document and can have multiple forms and variations, but will allow individual work on each to be carried out:

- The motivation of the work will be communicated and applications will be discussed.
- Past work and prior art will be reviewed, and gaps or whitespace highlighted.
- Novelty and non-obviousness will be explained (though no legal judgements will be made or inferred).
- Conceptual examples of the new development and concept will be presented along with a plan for the second phase of the thesis to produce a product prototype.

Feedback will be provided during marking to indicate where work could be improved and where additional knowledge will be needed for CEIC4008.

Course Learning Outcomes

- CLO1 : Develop a product design following industry and professional engineering standards.
- CLO2 : Critically reflect on a specialist body of knowledge (literature, patents and others), related to their design goal.
- CLO3 : Apply scientific and engineering methods to solve a practical commercial design problem.
- CLO4 : Analyse past and preliminary data objectively using quantitative and mathematical methods.
- CLO5 : Demonstrate oral and written communication in professional and lay domains.

Detailed Assessment Description

Week 11

Assessment Length

10 pages + Appendices

Assignment submission Turnitin type

Not Applicable

General Assessment Information

None

Grading Basis

Standard

Requirements to pass course

All assignments completed with passing marks

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 12 February - 18 February	Lecture	Intro/Product Design and Development
Week 2 : 19 February - 25 February	Lecture	How to define and utilise market needs?
Week 3 : 26 February - 3 March	Lecture	What is innovation? How do we develop ideas?
Week 4 : 4 March - 10 March	Lecture	Ideas and selection of ideas
Week 5 : 11 March - 17 March	Lecture	Intellectual property, Patents
Week 6 : 18 March - 24 March	Other	Flexibility week (use to work on project and background innovation)
Week 7 : 25 March - 31 March	Lecture	Preliminary presentations
Week 8 : 1 April - 7 April	Lecture	IP strategy construction
Week 9 : 8 April - 14 April	Lecture	The competition: how do we find 'white space' for innovation and opportunity?
Week 10 : 15 April - 21 April	Lecture	Final concept presentation/Q&A

Attendance Requirements

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

General Schedule Information

As posted

Course Resources

Prescribed Resources

Some course materials, and most assessment tasks are delivered through Moodle and students should check regularly for updates and pre-reading assignments.

Recommended Resources

There are many books on the topics relevant to this course but no single textbook covers the whole spectrum. Literature and textbook references will be regularly assigned as pre-reading for lectures. Students will also be required to find information to augment lectures and help with their product development projects.

Additional Costs

None

Course Evaluation and Development

This course is highly interactive and constant feedback is solicited and discussed. As we document new insights these changes will be highlighted on our Teams site.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Patrick Spicer		318 Hilmer			No	Yes
Lecturer	Seyedeh Maryam Hosseini		SEB	NA	As posted	No	No
	Per Zetterlund		SEB	NA	As posted	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.](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 Plagiarism

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 succeed. 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 fulfilling 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 a specific 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 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 this course should normally be asked during the scheduled class so that everyone can benefit from the answer and discussion.