School of Chemical Engineering

UNSW Engineering

CEIC8204

Topics in Business Management in Chemical Engineering

Term 2, 2022

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

Enquiries related to the course (e.g. course content, assessment instructions) should be raised during the scheduled classes, office hours, or in Teams channels/Moodle forums designated for that purpose.

Learning and question etiquette:

- Please be prepared for classes and attend the timetabled classes so that you can ask questions during the class time.
- Please respect that demonstrators and tutors have scheduled the class time to help you learn and are likely to be busy with other responsibilities outside those times; questions asked outside of class times will take longer to be answered.
- PhD students and other casuals who are teaching classes are normally only expected to look after the timetabled class and not to provide follow-up one-on-one assistance.
- Please don't ask questions in private that could be reasonably asked in a way that everyone can learn from the discussion.
- As a member of a community of learners, please try answering each other's questions!
- Please limit private messages to staff (via email or Teams) to *confidential* matters related to course administration.

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.

Course Details

Units of Credit 6

Summary of the Course

Innovation is key to maintaining a sustainable competitive advantage for organisations worldwide. 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, 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 an 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 the entrepreneurship and the innovation cycle. Regular class activities will be complemented with seminars/discussions by industry speakers and experts to provide practical insights.

Course Aims

The focus of this project-based course is to give the students a taste for the multidisciplinary methods and activities involved in the industrial practice of product innovation and development. The course will provide exposure to some of the interdisciplinary issues in the entrepreneurship and innovation cycle, such as exploring and scoping innovations, product design and development process, design for environment, sustainable development goals, protecting innovation, managing projects and projects risks, project development economics, business plan basics, and lean startup principles.

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. Develop a working understanding of the multidisciplinary approach to industrial research and innovation.	PE1.5, PE2.3, PE2.4
3. Be able to manage multiple, interdisciplinary tasks to achieve a common objective.	PE2.4, PE3.1, PE3.3
4. Be able to strengthen team working and technical communication skills.	PE3.2, PE3.6

Learning Outcome	EA Stage 1 Competencies
5. Be able to integrate innovation and entrepreneurial principles in professional scenarios.	PE3.2, PE3.4, PE3.5, PE3.6

Teaching Strategies

Teaching/learning (nybrid: face-to-face and online) in this course will consist of 2h lecture, 1 h tutorial/case studies, and about 45 min to 1h guest seminar every week.

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 a clear, progressive explanation of key concepts with carefully selected examples to illustrate application, along with opportunities for students to check their mastery 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 support 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

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

Assessment 1: Project proposal and Pitch

Due date: Week 3 (Thu)

For a product idea of choice, you will submit a proposal and present a 60-90 seconds pitch incorporating a brief project title, three 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.

This assessment is an individual submission.

Assessment 2: Concept Development

Due date: Weeks 4, 5 & 7 (Thu)

You will undertake this assessment as a team and submit three short reports. First, you will prepare a project mission statement and customer needs for the product. Next, you will submit concept sketches, along with target specifications and an intellectual property review. The final submission should contain a few selected concept sketches along with a selection matrix and remaining uncertainties and a plan to address those.

This is a group assessment, however 60% of the mark will be given for individual contributions.

Assessment 3: Proof of Concept Presentation

Due date: Week 9 (Thu)

You will give a max 10 minute presentation as a team, presenting your team’s product innovation concept, reviewing the mission statement, customer needs, selected concept, and key target specifications incorporated. Besides presenting a one-page description of the product along with the sketch, the students must reflect on the team's process and the outcome.

This is a group assessment, however 60% of the marks will be given for individual contributions.

Assessment 4: Business Plan

Due date: Week 11

As part of this assessment you will prepare a Lean Canvas business plan on your team’s innovation.

This is a group assessment, however 60% of the marks would be given for individual contribusions.

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: 30 May - 3 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
Week 2: 6 June - 10 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
Week 3: 13 June - 17 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)
Week 4: 20 June - 24 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)
Week 5: 27 June - 1	Lecture	Each week's activity include 2 h lecture, 1 h

July		workshop and 1 h guest seminar **Product Development Economics -** elements of economic analysis, when to perform economic analysis, and the process
Week 6: 4 July - 8 July	Online Activity	***Flexibility week: time for revision/consolidation***
Week 7: 11 July - 15 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
Week 8: 18 July - 22 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
Week 9: 25 July - 29 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**
Week 10: 1 August - 5 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

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 generally not required; 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 due respect. Presenting results clearly gives the marker the best chance of understanding your method; even if the numerical results are incorrect.

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). For some activities including Moodle quizzes 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 students will need to provide some documentary evidence to support absences from any assessments missed because of COVID-19 public health measures such as isolation. UNSW will **not** be insisting on medical certificates for COVID-related absences of 7 days or less, with the positive PCR or RAT result being sufficient. Longer absences due to self-isolation or COVID-related illness will still need documentation such as a medical certificate.

Applications for special consideration **will still be required** for assessment and participation absences related to COVID-19. Special consideration requests should not be lodged for missing classes if there are no assessment activities in that class.

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.

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.

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
- Engineering Current Student Resources
- Student Support and Success
- Academic Skills
- Student Wellbeing, Health and Safety
- Equitable Learning Services
- IT Service Centre

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.

On-campus class attendance

Physical distancing recommendations must be followed for all face-to-face classes. To ensure this, only students enrolled in those 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 class. Students enrolled in online classes can swap their enrolment from online to a **limited** number of on-campus classes by Sunday, Week 1.

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 are sick or have been advised to self-isolate by NSW health or government authorities. Current alerts and a list of hotspots can be found here. Do not come to campus if you have any of the following symptoms: fever (37.5 °C or higher), cough, sore throat, shortness of breath (difficulty breathing), runny nose, loss of taste, or loss of smell. If you need to have a COVID-19 test, you must not come to campus and remain in self-isolation until you receive the results of your test.

You will not be penalised for missing a face-to-face activity due to illness or a requirement to self-

isolate. We will work with you to ensure continuity of learning during your isolation and have plans in place for you to catch up on any content or learning activities you may miss. Where this might not be possible, an application for fee remission may be discussed. Further information is available on any course Moodle or Teams site.
For more information, please refer to the FAQs: https://www.covid-19.unsw.edu.au/safe-return-campus-faqs

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

Dr Peter Wich

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	✓