



UNSW

UNSW Course Outline

ELEC4445 Entrepreneurial Engineering - 2024

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General Course Information

Course Code : ELEC4445

Year : 2024

Term : Term 3

Teaching Period : T3

Is a multi-term course? : No

Faculty : Faculty of Engineering

Academic Unit : School of Electrical Engineering & Telecommunications

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

Engineers are ideally placed to play a central role in the modern economy which relies more and more on the successes of high-tech startups. From software to hardware, for gaming to AI, the future contributions of engineers will profoundly impact and disrupt the way we live and work.

Now is the time to learn about the entrepreneurial path to leverage the countless opportunities that your education as engineers enables.

Consequently, this course provides an introduction to startups creation and its associated entrepreneurial process. Course content covers the entrepreneurial revolution; opportunities, teams, resources; focus on opportunities; the entrepreneur and the internet; team, resources and capital requirements; disruption; entrepreneurial finance; the deal: valuation, structure and negotiation; rapid growth and troubled times.

The course is intended mainly for 4th-year Electrical Engineering & Telecommunications students but is open to all engineering students. It assumes no specific business knowledge and focuses on the creation of high-tech ventures related to engineering.

Course Aims

This course provides an introduction to startup creation and its associated entrepreneurial process. It complements and enhances the study program. It has no formal prerequisite as it is not a technical course (not a problem-solving course) but an introductory course that aims to help the student to rethink what a successful engineering career means. By studying the entrepreneurial process, i.e., the creation of setting up new ventures, we aim at seeding the idea that engineers can be the creators of their own path: that of the entrepreneur.

Relationship to Other Courses

This course is fairly independent from a typical electrical engineering curriculum while offering new perspectives and insights onto future professional careers.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Explain the role of entrepreneurship in today's society;
CLO2 : Explain the roles of engineers in the entrepreneurial context;
CLO3 : Survey the alternative career paths for engineers made possible through entrepreneurship;
CLO4 : Compare and contrast the Australian high-tech start-up context, the involved risks and the potential rewards;
CLO5 : Detail and critique the entrepreneurial process i.e. the analysis, the exploitation of opportunities and the available resources;
CLO6 : Review and explain the role of IP and the various mechanism securing its exclusive usage;
CLO7 : Survey and explain the various mechanisms for raising capital.

Course Learning Outcomes	Assessment Item
CLO1 : Explain the role of entrepreneurship in today's society;	<ul style="list-style-type: none"> • Weekly Review Quizzes • Assignments: Interview, Headlines, Disruption • Final Examination
CLO2 : Explain the roles of engineers in the entrepreneurial context;	<ul style="list-style-type: none"> • Weekly Review Quizzes • Assignments: Interview, Headlines, Disruption • Final Examination
CLO3 : Survey the alternative career paths for engineers made possible through entrepreneurship;	<ul style="list-style-type: none"> • Weekly Review Quizzes • Assignments: Interview, Headlines, Disruption • Final Examination
CLO4 : Compare and contrast the Australian high-tech start-up context, the involved risks and the potential rewards;	<ul style="list-style-type: none"> • Weekly Review Quizzes • Assignments: Interview, Headlines, Disruption • Final Examination
CLO5 : Detail and critique the entrepreneurial process i.e. the analysis, the exploitation of opportunities and the available resources;	<ul style="list-style-type: none"> • Weekly Review Quizzes • Assignments: Interview, Headlines, Disruption • Final Examination
CLO6 : Review and explain the role of IP and the various mechanism securing its exclusive usage;	<ul style="list-style-type: none"> • Weekly Review Quizzes • Assignments: Interview, Headlines, Disruption • Final Examination
CLO7 : Survey and explain the various mechanisms for raising capital.	<ul style="list-style-type: none"> • Weekly Review Quizzes • Assignments: Interview, Headlines, Disruption • Final Examination

Learning and Teaching Technologies

Moodle - Learning Management System | Microsoft Teams

Learning and Teaching in this course

Attending lectures

You are expected to attend all lectures, guest lectures, and tutorials in order to maximise learning. In addition to the lecture notes and video recordings, you should read relevant sections of the recommended text. Reading additional texts will further enhance your learning experience. Group learning is also encouraged. UNSW assumes that self-directed study of this kind is

undertaken in addition to attending face-to-face classes throughout the course.

Attending tutorials

You should attempt all of your problem sheet questions in advance of attending the tutorial classes. The importance of adequate preparation prior to each tutorial cannot be overemphasized, as the effectiveness and usefulness of the tutorial depends to a large extent on this preparation. Group learning is encouraged. Answers for these questions will be discussed during the tutorial class and the tutor will cover the more complex questions in the tutorial class. In addition, during the tutorial class, 1–2 new questions that are not in your notes may be provided by the tutor, for you to try in class.

Other Professional Outcomes

Relationship to Engineers Australia Stage 1 competencies:

The Course Learning Outcomes (LOs) contribute to the Engineers Australia (National Accreditation Body) Stage 1 competencies as outlined below

Engineers Australia (EA), Professional Engineer Stage 1 Competencies

PE1: Knowledge and Skill Base:

PE1.1 Comprehensive, theory-based **understanding of underpinning fundamentals**: LO 1, 2, 6
PE1.2 Conceptual understanding of underpinning maths, **analysis, statistics, computing**: LO 5, 7
PE1.3 In-depth understanding of specialist bodies of **knowledge**: LO 5, 7
PE1.4 Discernment of knowledge development and research directions: NA
PE1.5 Knowledge of **engineering design** practice: NA
PE1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice: LO 2

PE2: Engineering Application Ability:

PE2.1 Application of established engineering methods to **complex problem solving**: NA
PE2.2 Fluent **application of engineering techniques**, tools and resources: LO 7
PE2.3 Application of systematic engineering synthesis and design processes: NA
PE2.4 Application of systematic approaches to the conduct and management of engineering projects: LO 1, 2, 5

PE3: Professional and Personal Attributes:

PE3.1 Ethical conduct and professional accountability: LO 1, 2, 3, 5

PE3.2 Effective oral and written communication (professional and lay domains): LO 1, 2, 4, 5, 6, 7

PE3.3 Creative, innovative and pro-active demeanour: LO 1, 2, 5, 6

PE3.4 Professional use and management of information: LO 1, 2, 3

PE3.5 Orderly management of self, and professional conduct: LO 1, 2, 3

PE3.6 Effective team membership and team leadership: LO 1, 2, 5

This course is also designed to provide the course learning outcomes which arise from targeted graduate capabilities. The targeted graduate capabilities broadly support the UNSW and Faculty of Engineering graduate capabilities (also listed below).

Targeted Graduate Capabilities

Electrical Engineering and Telecommunications programs are designed to address the following targeted capabilities which were developed by the school in conjunction with the requirements of professional and industry bodies:

- The ability to apply knowledge of basic science and fundamental technologies;
- The skills to communicate effectively, not only with engineers but also with the wider community;
- The capability to undertake challenging analysis and design problems and find optimal solutions;
- Expertise in decomposing a problem into its constituent parts, and in defining the scope of each part;
- A working knowledge of how to locate required information and use information resources to their maximum advantage;
- Proficiency in developing and implementing project plans, investigating alternative solutions, and critically evaluating differing strategies;
- An understanding of the social, cultural and global responsibilities of the professional engineer;
- The ability to work effectively as an individual or in a team;
- An understanding of professional and ethical responsibilities;
- The ability to engage in lifelong independent and reflective learning

UNSW Graduate Capabilities

The course delivery methods and course content directly or indirectly addresses a number of core UNSW graduate capabilities, as follows:

- Developing scholars who have a deep understanding of their discipline, through lectures and solution of analytical problems in tutorials and assessed by assignments and written examinations.
- Developing rigorous analysis, critique, and reflection, and ability to apply knowledge and skills

to solving problems. These will be achieved by the laboratory experiments and interactive checkpoint assessments and lab exams during the labs.

- Developing capable independent and collaborative enquiry, through a series of tutorials spanning the duration of the course.
- Developing independent, self-directed professionals who are enterprising, innovative, creative and responsive to change, through challenging design and project tasks.
- Developing citizens who can apply their discipline in other contexts, are culturally aware and environmentally responsible, through interdisciplinary tasks, seminars and group activities

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Weekly Review Quizzes Assessment Format: Individual	16%	
Assignments: Interview, Headlines, Disruption Assessment Format: Individual	44%	
Final Examination Assessment Format: Individual	40%	Start Date: Not Applicable Due Date: Not Applicable

Assessment Details

Weekly Review Quizzes

Assessment Overview

These 10 minutes online evaluations will be held weekly at the beginning of each lecture and will cover the activity of the preceding week including material from the lectures, guest interviews, and tutorials. Each quiz will count for 2% and take place weekly starting on week 2, except for week 6 (study week). These quizzes test your general understanding of the course material and are designed to give you feedback on your progress. Marks will be assigned according to the correctness of the responses.

Course Learning Outcomes

- CLO1 : Explain the role of entrepreneurship in today's society;
- CLO2 : Explain the roles of engineers in the entrepreneurial context;
- CLO3 : Survey the alternative career paths for engineers made possible through entrepreneurship;
- CLO4 : Compare and contrast the Australian high-tech start-up context, the involved risks and the potential rewards;
- CLO5 : Detail and critique the entrepreneurial process i.e. the analysis, the exploitation of opportunities and the available resources;
- CLO6 : Review and explain the role of IP and the various mechanism securing its exclusive

usage;

- CLO7 : Survey and explain the various mechanisms for raising capital.

Generative AI Permission Level

No Assistance

This assessment is designed for you to complete without the use of any generative AI. You are not permitted to use any generative AI tools, software or service to search for or generate information or answers.

For more information on Generative AI and permitted use please see [here](#).

Assignments: Interview, Headlines, Disruption

Assessment Overview

Interview (10%): This assignment consists mainly of a summary of the most important observations and insights you have gathered during an interview with an entrepreneur. You are trying to understand what motivates the entrepreneur and how he perceives his own business, what are his motivations, what he considers to be the critical points along the paths to business creation. You are also trying to understand the process this entrepreneur went through during the various entrepreneurial phases and how his perception of this process changed (e.g., would he do it again the same way).

Headlines (14%): The goal of this assignment is to relate the concepts covered during the class to real-life events currently taking place in the technology sector. You are requested to write a 2,000-word essay on one of the headlines made available, focussing on the key concept(s) identified. In doing so, you should: Succinctly explain the context of the headline; Justify the importance of the headline (why was it a headline?); Analyse the situation using the concepts developed within the course, e.g., customers, markets, competition, business models, venture money, capitalisation, P/E ratios, etc.; If appropriate, express your position (agreement or disagreement) with respect to the view expressed.

Disruption (20%): As an entrepreneur, one of your tasks is to recognise opportunities. During the course, you will have seen that opportunities best play out in markets that are nascent, immature, or fragmented. In other words, markets and opportunities cannot be decoupled. As covered during the lecture entitled “Disruption”, some of the best opportunities are tagged as disruptive, i.e., that they can lead to “the transfer of wealth in an industry from dominant incumbents to disadvantaged entrants”. In this assignment, you are asked to perform a disruption analysis of the potential impact of specific technology covering the following points: the technology, the

markets, the players, and the economic stakes.

A rubric will be used for marking the assignments. Verbal class-wide feedback will be given during lectures and individual feedback will also be provided upon request.

Course Learning Outcomes

- CLO1 : Explain the role of entrepreneurship in today's society;
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- CLO4 : Compare and contrast the Australian high-tech start-up context, the involved risks and the potential rewards;
- CLO5 : Detail and critique the entrepreneurial process i.e. the analysis, the exploitation of opportunities and the available resources;
- CLO6 : Review and explain the role of IP and the various mechanism securing its exclusive usage;
- CLO7 : Survey and explain the various mechanisms for raising capital.

Generative AI Permission Level

Simple Editing Assistance

In completing this assessment, you are permitted to use standard editing and referencing functions in the software you use to complete your assessment. These functions are described below. You must not use any functions that generate or paraphrase passages of text or other media, whether based on your own work or not.

If your Convenor has concerns that your submission contains passages of AI-generated text or media, you may be asked to account for your work. If you are unable to satisfactorily demonstrate your understanding of your submission you may be referred to UNSW Conduct & Integrity Office for investigation for academic misconduct and possible penalties.

For more information on Generative AI and permitted use please see [here](#).

Final Examination

Assessment Overview

The final examination covers all material presented during the term, including guest lectures and tutorials. Marks will be assigned according to the correctness of the responses.

Course Learning Outcomes

- CLO1 : Explain the role of entrepreneurship in today's society;
- CLO2 : Explain the roles of engineers in the entrepreneurial context;
- CLO3 : Survey the alternative career paths for engineers made possible through

entrepreneurship;

- CLO4 : Compare and contrast the Australian high-tech start-up context, the involved risks and the potential rewards;
- CLO5 : Detail and critique the entrepreneurial process i.e. the analysis, the exploitation of opportunities and the available resources;
- CLO6 : Review and explain the role of IP and the various mechanism securing its exclusive usage;
- CLO7 : Survey and explain the various mechanisms for raising capital.

Generative AI Permission Level

No Assistance

This assessment is designed for you to complete without the use of any generative AI. You are not permitted to use any generative AI tools, software or service to search for or generate information or answers.

For more information on Generative AI and permitted use please see [here](#).

General Assessment Information

Assessment is based three assignments, 8 weekly review quizzes and one final examination.

Weekly Review Quizzes (16%): These *10 minutes on-line evaluations* will be held weekly at the beginning of each lecture and will cover the activity of the preceding week including material from the lectures, guest interviews and tutorials. Each quiz will count for 2% and take place weekly starting on week 2, except for week 6 (study week). These quizzes test your general understanding of the course material and are designed to give you feedback on your progress. Marks will be assigned according to the correctness of the responses.

Assignments: 3 assignments to be done in groups of three to four people. Assignment 1 (10%) consists in conducting an interview with an entrepreneur (due date: week 4). Assignment 2 (14%) is in the form of an assay on a chosen high-tech business issue that links to the concepts view in class (due date: week 7). Assignment 3 (20%) consists in developing a disruption analysis based on new technologies or business models (due date: week 10). Marks will be assigned according to how completely and correctly the problems have been addressed, the quality of the written material, and the understanding of the course material demonstrated. **Late reports will attract a penalty of 10% per day (including weekends).**

Final Examination (40%): 2 hour open-book exam covering lectures, tutorials and guest presentations. University approved calculators are allowed. The examination tests analytical and critical thinking and general understanding of the course material in a controlled fashion.

Questions may be drawn from any aspect of the course. Marks will be assigned according to the correctness of the responses.

Grading Basis

Standard

Requirements to pass course

A final mark of 50 or more must be achieved to pass the course, taking into account all assessments.

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 0 : 2 September - 8 September	Reading	
Week 1 : 9 September - 15 September	Lecture	Course overview
	Tutorial	Financial mathematics
Week 2 : 16 September - 22 September	Lecture	Opportunities, teams, resources
	Tutorial	Guest speaker
Week 3 : 23 September - 29 September	Lecture	Focus on opportunities
	Tutorial	Guest speaker
Week 4 : 30 September - 6 October	Lecture	The entrepreneur and the internet
	Tutorial	Guest speaker
Week 5 : 7 October - 13 October	Lecture	Team, resource and capital requirements
	Tutorial	Guest speaker
Week 6 : 14 October - 20 October	Lecture	Flexibility week: no lecture
	Tutorial	Flexibility week: no tutorial
Week 7 : 21 October - 27 October	Lecture	Disruption
	Tutorial	Guest lecturer
Week 8 : 28 October - 3 November	Lecture	The entrepreneur and AI
	Tutorial	Guest lecturer
Week 9 : 4 November - 10 November	Lecture	Equity, valuation, deal
	Tutorial	Guest lecturer
Week 10 : 11 November - 17 November	Lecture	Equity, valuation, deal
	Lecture	Overall review

Attendance Requirements

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

Course Resources

Prescribed Resources

Recommended Resources

Extensive lecture notes covering both the standard lectures and guest lecturers' material will be distributed in class and also made available online through Moodle. Nevertheless the following reference material is recommended:

1. New Venture Creation – Entrepreneurship for the 21st Century, 6th Edition, J.A. Timmons and S. Spinelli, McGraw-Hill Irvin, 2004
2. Introduction to corporate finance, A. Frino, T. Cusack, K. Wilson, Prentice-Hall, 2001

Course Evaluation and Development

This course is under constant revision in order to improve the learning outcomes for all students. Please forward any feedback (positive or negative) on the course to the course convener or via the online student survey [myExperience](#). You can also provide feedback to ELSOC who will raise your concerns at student focus group meetings. As a result of previous feedback obtained for this course and in our efforts to provide a rich and meaningful learning experience, we have continued to evaluate and modify our delivery and assessment methods.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Francois Ladouceur		Level 3, Newton Building			No	Yes

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 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

General Conduct and Behaviour

Consideration and respect for the needs of your fellow students and teaching staff is an expectation. Conduct which unduly disrupts or interferes with a class is not acceptable and students may be asked to leave the class.

Use of AI for assessments

Your work must be your own. If you use AI in the writing of your assessment, you must acknowledge this and your submission must be substantially your own work. More information can be found on this [website](#).

Workplace Health & Safety (WHS)

WHS for students and staff is of utmost priority. Most courses involve laboratory work. You must follow the [rules about conduct in the laboratory](#). About COVID-19, advice can be found on this [website](#).

School Contact Information

Consultations: Lecturer consultation times will be advised during the first lecture. You are welcome to email the tutor or laboratory demonstrator, who can answer your questions on this course and can also provide you with consultation times. ALL email enquiries should be made from your student email address with ELEC/TELEXXXX in the subject line; otherwise they will not be answered.

Keeping Informed: Announcements may be made during classes, via email (to your student email address) and/or via online learning and teaching platforms – in this course, we will use Moodle <https://moodle.telt.unsw.edu.au/login/index.php>. Please note that you will be deemed to have received this information, so you should take careful note of all announcements.

Student Support Enquiries

[For enrolment and progression enquiries please contact Student Services](#)

Web

[Electrical Engineering Homepage](#)