



UNSW Course Outline

DESN2000 Engineering Design and Professional Practice (SPREE) - 2024

Published on the 30 Aug 2024

General Course Information

Course Code : DESN2000

Year : 2024

Term : Term 3

Teaching Period : T3

Is a multi-term course? : No

Faculty : Faculty of Engineering

Academic Unit : Faculty of Engineering

Delivery Mode : In Person

Delivery Format : Standard

Delivery Location : Kensington

Campus : Sydney

Study Level : Postgraduate, Undergraduate

Units of Credit : 6

Useful Links

[Handbook Class Timetable](#)

Course Details & Outcomes

Course Description

Design is one of the critical foundations of engineering and a main component in creating value.

A good engineer has complex technical skills, but also creative skills, project management and teamworking skills, and knowledge of professional ethical standards in design.

DESN2000 aims to further develop your skills in engineering design with a particular focus on the early stages, where innovative concepts are created in response to open-ended problems. These skills will be developed in the context of an engineering project, with a focus on three areas: (1) research techniques needed to understand design problems and discover concepts, (2) technical skills needed to build a concept, and (3) evaluation methods for evaluating the concept. Alongside the development of design skills, the course also aims to develop your readiness for professional practice by deepening your understanding and skills in effective project management, teamwork and communication.

The course builds on the teamwork, communication, and project management skills introduced in DESN1000. Skills learned in DESN2000 are further deepened in DESN3000, which will develop skills for managing design in commercial context.

With DESN1000 and DESN3000, DESN2000 provides design skills described in Engineers Australia's Stage 1 Competencies, especially competencies 1.3, 1.5, 1.6; 2., 2.3; and 3.2 and 3.6.

Students who require DESN2000 should enrol in a specific term according to their Engineering Specialisation:

Term 2:

Students with specialisations offered by the School of Electrical Engineering and Telecommunications

Students with specialisations offered by the School of Civil and Environmental Engineering

Students with specialisations offered by the School of Computer Science and Engineering

Students with specialisations offered by the School of Minerals and Energy Resources Engineering

Term 3:

Students with specialisations offered by the School of Mechanical and Manufacturing Engineering

Students with specialisations offered by the School of Photovoltaic and Renewable Energy Engineering

Students with specialisations offered by the School of Chemical Engineering

Students with specialisations offered by the School of Minerals and Energy Resources

Prerequisite Conditions:

1. School of Mechanical and Manufacturing Engineering: (DESN1000 or DPST1071) and MMAN1130 and enrolled in an MME streams (AEROAH, MECHAH, MANFAH, MTRNAH)
2. School of Electrical Engineering and Telecommunications: (DESN1000 or DPST1071) and ELEC2141 and (COMP1511 or COMP1521)
3. School of Chemical Engineering: (DESN1000 or DPST1071) and CEIC2000 and (CHEM1821 or CHEM1021 or CHEM1041)
4. School of Civil and Environmental Engineering: (DESN1000 or DPST1071) and enrolled in a Civil & Environmental Engineering streams (CVENAH, CVENBH, GMATDH)
5. School of Photovoltaic and Renewable Energy Engineering: (DESN1000 or DPST1071) and SOLA 2051
6. School of Computer Science and Engineering: (COMPBH and COMP1521 and (DESN1000 or DPST1071)) or (SENGAH/BINFAH and COMP 2521 and (DESN1000 or DPST1071))
7. School of Minerals and Energy Resources Engineering: (MINEAH and (DESN1000 or DPST1071)) or (PETRAH and CEIC2001 and (DESN1000 or DPST1071))

Course Aims

DESN2000 aims to further develop your skills in engineering design with a particular focus on the early stages, where innovative concepts are created in response to open-ended problems. These skills will be developed in the context of an engineering project, with a focus on three areas: (1) research techniques needed to understand design problems and discover concepts, (2) technical skills needed to build a concept, and (3) evaluation methods for evaluating the concept. Alongside the development of design skills, the course also aims to develop your readiness for professional practice by deepening your understanding and skills in effective project management, teamwork and communication.

Relationship to Other Courses

Prerequisites: ENGG1000/DESN1000/DPST1071 and SOLA2051

Course Learning Outcomes

Course Learning Outcomes
CL01 : Develop design concepts using standard methods to collect, assess and integrate end-user, stakeholder and project requirements.
CL02 : Validate the suitability of designs using standard technical methods while considering end-user and stakeholder contexts.
CL03 : Implement disciplinary technical theory and skills pertinent to the design project.
CL04 : Contribute to the work of a team and collaborate on the design project, including the implementation of organisational and interpersonal tools.
CL05 : Integrate project management techniques to plan, execute and complete an open-ended design project.
CL06 : Explain designs to various audiences using oral, written, and visual forms of professional and persuasive communication.

Course Learning Outcomes	Assessment Item
CL01 : Develop design concepts using standard methods to collect, assess and integrate end-user, stakeholder and project requirements.	<ul style="list-style-type: none">• Design Journal• Design Presentation
CL02 : Validate the suitability of designs using standard technical methods while considering end-user and stakeholder contexts.	<ul style="list-style-type: none">• School Assessments• Design Journal• Design Presentation
CL03 : Implement disciplinary technical theory and skills pertinent to the design project.	<ul style="list-style-type: none">• School Assessments• Design Presentation
CL04 : Contribute to the work of a team and collaborate on the design project, including the implementation of organisational and interpersonal tools.	<ul style="list-style-type: none">• School Assessments• Design Journal• Design Presentation
CL05 : Integrate project management techniques to plan, execute and complete an open-ended design project.	<ul style="list-style-type: none">• School Assessments• Design Journal
CL06 : Explain designs to various audiences using oral, written, and visual forms of professional and persuasive communication.	<ul style="list-style-type: none">• School Assessments• Design Journal• Design Presentation

Learning and Teaching Technologies

Moodle - Learning Management System | Microsoft Teams | Echo 360

Learning and Teaching in this course

The primary teaching vehicle of the course is an engineering project in which students learn to

apply scientific, engineering, and user-centred knowledge to a design problem. Details of this project are provided in a separate *Project Brief*. Students will complete both individual and group work. For each hour of contact it is expected that you will put in at least 1.5 hours of private study. It is expected that groups meet outside of the scheduled times and progress their group project independently.

This course uses both Moodle and Microsoft Teams as the portal for remote teaching and learning. It will be used for file sharing, virtual classrooms, announcements and other communications. You are expected to check the platforms regularly. In the first instance, you are encouraged to ask questions after lectures. Otherwise course discussions and questions take place on MS Teams. Your demonstrators and academic staff will actively monitor these posts. Please use replies and keep discussions in appropriate channels. If required, emails must be made from your student email address with DESN2000 in the subject line. All class materials for 2024 T3 will be delivered online via MS Teams, with some aspects handled via Moodle. This includes the project brief, lecture notes, lab guides, workshop guides and assessment guides. You will be added to the DESN2000 Teams instance automatically.

You are expected to attend all lectures, which are all delivered F2F and recorded to be available on Echo 360. These provide the backbone for your practical work in the workshops and your project. Workshops (both from the general DESIGN component and the School specific TECHNICAL component) are the primary means through which students work through their project and associated exercises aimed at developing understanding of the course materials. Demonstrators are available to provide guidance and support teams in their project development. Your class times may vary week to week. Please check your myUNSW timetable for your class times each week.

Other Professional Outcomes

OBJECTIVES

This course develops conceptual design skills you need in engineering. The course teaches two types of design skills. Generic design skills include models of design process, economic and practical reasoning behind concept design, research and concept creation techniques in design, evaluation techniques in design, as well as communication, project management, and teamwork techniques. This course will give students skills for creating innovative design concepts in the context of a renewable energy engineering project. The focus is on the early stages of the process when students must learn to cope with open-ended problems which are typical of

design. This course combines generic design content with discipline-specific content. The generic section focuses on mapping contextual information including human-centred design; analysis of varying types of information; creative methods for translating the information into design concepts; communication of the information; and evaluation methods for analysing the validity of the design proposals.

In SOLA2051 you acquired a few new skills that you applied in the solution of a complex practical problem. One of the skills that you discovered is your innate ability to learn based on need. You also realised that you are able to solve problems that may have seen too complicated in the beginning but were proven to be fully solvable with the help of your newly acquired skills and the power of teamwork. This semester you will take your engineering skills one step further as you solve a real-world challenge with the help of an even bigger and better team. We will start by understanding and using design thinking to come up with a project for the term. We will then hone our organisational skills learning the basics of project management. This will help planning a strategy to solve the challenge of the semester. While you plan and implement your strategy you'll learn four invaluable engineering skills: leveraging open-source hardware, the basics of technical drawing using CAD, basic PCB design and implementing your design using 3D printing and other computer assisted machining techniques. Throughout the semester you will work on your project as a team applying these skills plus any others that you will acquire on your own based on the needs of the project. As you will be tackling a real-world problem, there is no predefined way to solve it, this is precisely what makes it fun! Teamwork will be instrumental in getting to an optimal solution. You will have a chance to rate your teammates performance at the end of the semester by means of peer assessment. The course instructor and demonstrators will be there to guide you but may not have all the answers you are looking for. Fortunately, nowadays information and specialised resources are only a few typed questions away. You are strongly encouraged to look for solutions beyond the confinements of the course. After all, this is a real-world challenge and you are an engineer! This term you will take your engineering skills one step further as you solve a real-world challenge with the help of an even bigger and better team.

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
School Assessments Assessment Format: Individual	60%	Start Date: Not Applicable Due Date: Not Applicable
Design Journal Assessment Format: Individual	20%	
Design Presentation Assessment Format: Group	20%	

Assessment Details

School Assessments

Assessment Overview

Each student is required to complete their school-specific assessment, comprised of three sub-tasks. For each sub-task, assessment criteria are related to the school's project and discipline, covering areas of design creation and evaluation, technical knowledge, project management and communication.

Course Learning Outcomes

- CL02 : Validate the suitability of designs using standard technical methods while considering end-user and stakeholder contexts.
- CL03 : Implement disciplinary technical theory and skills pertinent to the design project.
- CL04 : Contribute to the work of a team and collaborate on the design project, including the implementation of organisational and interpersonal tools.
- CL05 : Integrate project management techniques to plan, execute and complete an open-ended design project.
- CL06 : Explain designs to various audiences using oral, written, and visual forms of professional and persuasive communication.

Detailed Assessment Description

The School of Photovoltaic and Renewable Energy Engineering component worth 60% of the DESN2000 assessment is composed of the following 5 tasks. Refer to the Moodle and MS Teams for more details on each individual task.

1. Project Proposal (group assessment) with slides due 11:59PM Monday Week 3 as a Formative Assessment.
2. Interim Presentation (group assessment) with slides due 11:59PM Monday Week 5 worth 10%

of the total DESN2000 grade.

3. CAD Design (individual assessment) due 11:59PM Monday Week 7 worth 20% of the total DESN2000 grade. Peer grading to occur over the following week.
4. Prototype demonstration (group assessment) due 11:59PM Monday Week 10 worth 15% of the total DESN2000 grade.
5. Final Written Report (group assessment) due 11:59PM Tuesday Week 11 worth 15% of the total DESN2000 grade.

Assessment Length

N/A

Submission notes

See individual assessment guides.

Assignment submission Turnitin type

Not Applicable

Generative AI Permission Level

Planning/Design Assistance

You are permitted to use generative AI tools, software or services to generate initial ideas, structures, or outlines. However, you must develop or edit those ideas to such a significant extent that what is submitted is your own work, i.e., what is generated by the tool, software or service should not be a part of your final submission. You should keep copies of your iterations to show your Course Authority if there is any uncertainty about the originality of your work.

If your Convenor has concerns that your answer contains passages of AI-generated text or media that have not been sufficiently modified you may be asked to explain your work, but we recognise that you are permitted to use AI generated text and media as a starting point and some traces may remain. 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](#).

Design Journal

Assessment Overview

Students individually keep an active, professional record and reflection of their team's design process, which is reviewed regularly by mentors. Assessment criteria include design process, project management, teamwork and communication.

Course Learning Outcomes

- CL01 : Develop design concepts using standard methods to collect, assess and integrate end-user, stakeholder and project requirements.
- CL02 : Validate the suitability of designs using standard technical methods while considering end-user and stakeholder contexts.
- CL04 : Contribute to the work of a team and collaborate on the design project, including the implementation of organisational and interpersonal tools.
- CL05 : Integrate project management techniques to plan, execute and complete an open-ended design project.
- CL06 : Explain designs to various audiences using oral, written, and visual forms of professional and persuasive communication.

Detailed Assessment Description

Please read Assessment Guide in Moodle

Assignment submission Turnitin type

Not Applicable

Generative AI Permission Level

Planning/Design Assistance

You are permitted to use generative AI tools, software or services to generate initial ideas, structures, or outlines. However, you must develop or edit those ideas to such a significant extent that what is submitted is your own work, i.e., what is generated by the tool, software or service should not be a part of your final submission. You should keep copies of your iterations to show your Course Authority if there is any uncertainty about the originality of your work.

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Design Presentation

Assessment Overview

Student teams give a presentation that pitches their final design solution, including its unique value. Assessment criteria will address the problem-solution, technical validation and communication.

Course Learning Outcomes

- CL01 : Develop design concepts using standard methods to collect, assess and integrate end-user, stakeholder and project requirements.
- CL02 : Validate the suitability of designs using standard technical methods while considering end-user and stakeholder contexts.
- CL03 : Implement disciplinary technical theory and skills pertinent to the design project.
- CL04 : Contribute to the work of a team and collaborate on the design project, including the implementation of organisational and interpersonal tools.
- CL06 : Explain designs to various audiences using oral, written, and visual forms of professional and persuasive communication.

Detailed Assessment Description

Please read Assessment Guide in Moodle

Assignment submission Turnitin type

Not Applicable

Generative AI Permission Level

Not Applicable

Generative AI is not considered to be of assistance to you in completing this assessment. If you do use generative AI in completing this assessment, you should attribute its use.

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

General Assessment Information

Grading Basis

Standard

Course Schedule

Attendance Requirements

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

General Schedule Information

For detailed schedule information, please see the Week 1 Lecture Notes on MS Teams.

Course Resources

Recommended Resources

- van Rooijen, Annemiek et al. 2015. Delft Design Guide. BIS Publisher, Amsterdam. Second

edition.

- Preece (2019), 5th ed., Interaction Design: Beyond Human-Computer Interaction. John Wiley & Sons
- Reinders, Angèle et al. 2012, [The Power of Design: Product Innovation in Sustainable Energy Technologies](#), Chichester, West Sussex, U.K. : John Wiley & Sons.
- Siegel, Neil G. 2019, [Engineering project management](#), Hoboken, NJ, USA, John Wiley and Sons, Incorporated.

Additional Costs

Each group will be provided with starting equipment for your project, as well as a small budget for additional components. You will be reimbursed for any expenses incurred developing your project at the end of the term up to the allocated budget.

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 your student society 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 including updated lecture notes, workshops, blended learning resources, in-class demonstrations, and industry guest lectures.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Michael Nielsen		TETB 105	+61 2 9065 3094	Fridays 11-12 in person. Email/ Teams during normal business hours.	No	Yes
	Ilpo Koskinen					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 policies. 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)