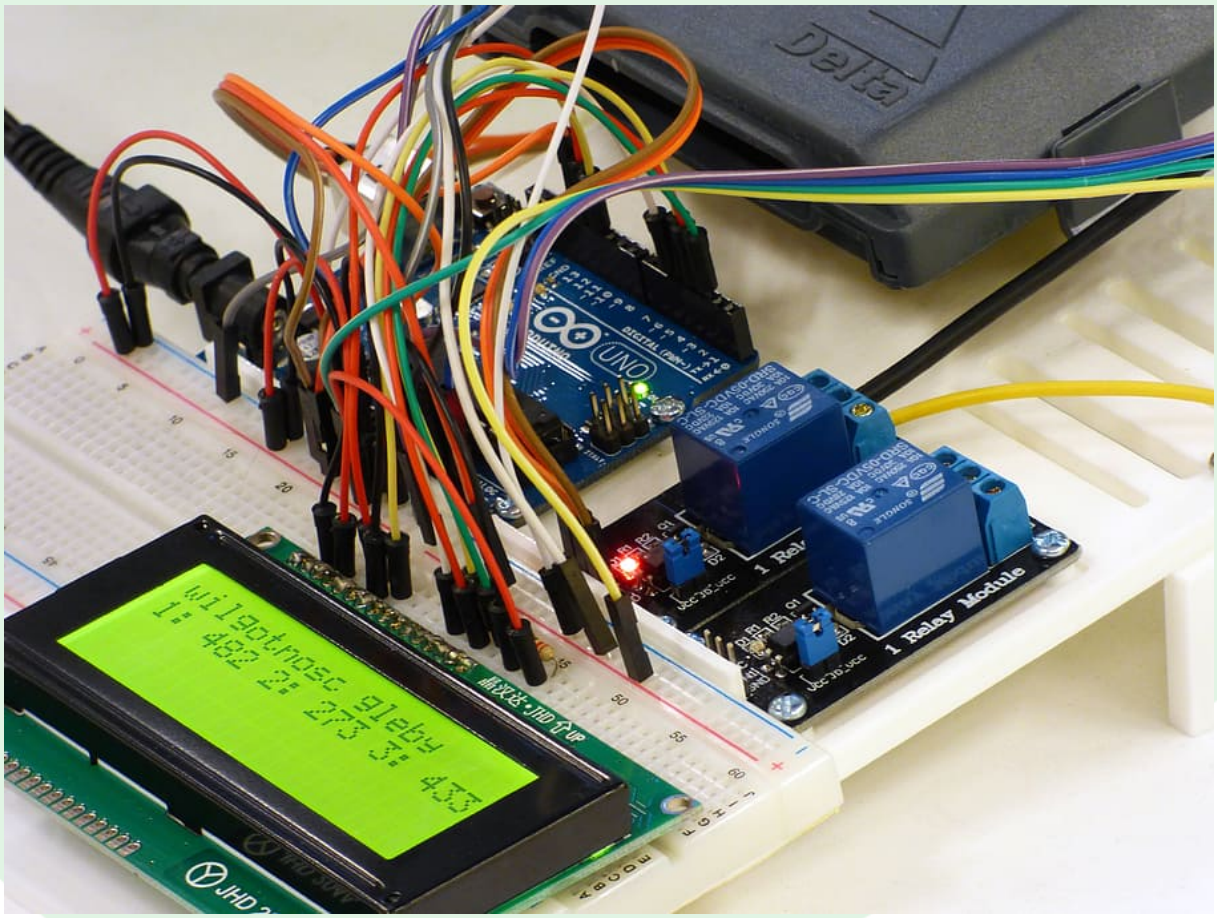
School of Electrical Engineering & Telecommunications

UNSW Engineering

ELEC9123

Design Proficiency

Term 2, 2022



Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
Matthew Priestley	m.priestley@unsw.edu.au		EE314	(02) 9385 5375

Tutors

Name	Email	Availability	Location	Phone
Deepak Mishra	d.mishra@unsw.edu.au		EE417	

Demonstrators

Name	Email	Availability	Location	Phone
Shadman Habib	shadman.habib@student.unsw.edu.au			

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

Engineering Student Support Services

Engineering Industrial Training

UNSW Study Abroad and Exchange (for inbound students)

UNSW Future Students

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)

Email

Engineering Student Support Services – current student enquiries

- e.g. enrolment, progression, 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

Course Details

Units of Credit 6

Summary of the Course

The course involves undertaking and completing a series of design tasks in the electrical engineering and telecommunications area. The design tasks are chosen in one of the following areas: electronic circuit design; signal processing design; control systems design; power systems design; telecommunications design. Each design task in the series may be independent of each other, or may be a sequence of related sub-tasks as part of a larger goal.

Assessment of each task requires the construction of working system to solve a specified problem.

Course Aims

The aim of this course is to:

- Test student's design proficiency, through a sequence of basic design challenges in a chosen discipline. There is scope for students to demonstrate superior skills,
- Ensure students have attained sufficient fundamental design knowledge, and thus that all graduating students have at least a minimum level of proficiency in their chosen discipline. Students should expect that this course will reinforce their existing knowledge and increase their confidence in design,
- Expose students to individual responsibility and self-directed learning. Students are individually responsible for their level of proficiency.

Course Learning Outcomes

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

Learning Outcome	EA Stage 1 Competencies
1. Have shown their capacity to successfully harness their technical knowledge to carry out meaningful design tasks in either the power or telecommunications field.	PE1.3, PE2.1, PE2.2
2. Have identified, documented and improved any issues related to their knowledge base.	PE1.3, PE3.5
3. Be able to identify and document the design requirements and the relevant concepts and resources in order to successfully reach the design goals.	PE1.5, PE2.3, PE2.4, PE3.2, PE3.5
4. Have the ability to combine various streams of electrical engineering to develop a solution to a design problem.	PE2.3, PE2.4

Teaching Strategies

The laboratory as well as mentor guidance will provide the primary face-to-face teaching methodology. Students will also spend significant time during the course engaged in self-directed learning in their own time. The course is centred on small design tasks, where students will already have most of, if not all, the requisite discipline knowledge. Students will utilise laboratory time to practice and test their designs with experienced mentors available to provide tutorial assistance. Each student will be assigned a discipline mentor and will be a part of a small group. Each group will be associated with just one subject discipline. The groups provide a means for organised discussion and exchanging of ideas.

Additional Course Information

Credits

This is a 6 UoC course and the expected workload is 15 hours per week throughout the 10-week term.

Relationship to Other Courses

This is a postgraduate course in the School of Electrical Engineering and Telecommunications.

Pre-requisites and Assumed Knowledge

This is a postgraduate course that draws on knowledge and practical skills gained in your undergraduate degree. This course does not focus on teaching the design process itself, nor the basic theories and concepts of any of the streams or disciplines. Instead, the combination of the students' theoretical knowledge and design skills in these areas will be assessed. Consequently, this course is quite significant in preparing the student for the step from university life to the professional environment.

Assessment

General Information

The assessment consists solely of the three design tasks - there is no final examination.

Design Tasks 1, 2 and 3 will be marked during the Friday lab classes in weeks 3, 7 and 10, respectively. The assessment for each task is separated into two components:

- Design Implementation (60% of total assignment mark); and
- Design Journal (40% of total assignment mark)

Design Tasks 1 and 2 are each worth 35% and 40% respectively. **You must pass both Design Tasks 1 and 2 to pass this course.** Design Task 3 is worth 20% and is much more difficult than the other tasks. You can pass this course without attempting Design Task 3, but you will not maximize your total course mark in this instance. Hence, Design Task 3 is meant to rigorously test your design and knowledge skills to achieve a high mark for this course. A student will get a chance to undertake a supplementary design task after the final week of the term if a fail mark is achieved for Design Task 1 **or** 2 (not both).

The first design task is undertaken by all students in the course. After this, students must select either the topic of power system design or telecommunication system design for Design Tasks 2 **and** 3. Note that this decision will occur during Week 2. It is recommended that the decision be based around which field best suits the student's background electrical engineering study and industry experience.

The Class Notebook

This course will use Class Notebook from the ELEC9123 Microsoft Teams channel. Here, you are required to develop a design journal which will be assessed on the Friday of the final week of each design task (Weeks 3, 7, and 10). Note that you do NOT need to submit the journal to Moodle, as the markers have access to the Class Notebook. In the design journal, students will be able to self-reflect on their work and experiences with the design task. Students should provide a description of the research, design, experimentation, and successful and failed attempts towards their final design for the course. In the same journal, the students should also provide a detailed reference and online resource list that they used in order to complete the design task. The Design Journal will be reviewed during a seminar oral at end of Weeks 3, 7 and 10. In the seminar oral, a lab demonstrator will ask questions about the design to the student and will review the design log to assign a mark for Design Journal (40% of the total mark of each design task). More detail on the design journal and seminar oral will be provided during the term.

Marks and Supplementary Assessment Items

Marks will not be released during the term. Instead, feedback will be given at the completion of each new design task in the form of grades according to Table 1 for each assessment component. A student must pass Design Tasks 1 **and** 2 individually to pass the subject. This means that no grade of fail can be obtained for either assessment component in each of these two design tasks. Note that a failed assessment component will automatically mean that the student has failed that design task assignment. If a student fails either Design Task 1 **or** 2 (not both), they may receive a supplementary design task at the discretion of the course convenor during week 11. The final mark of a student performing a

supplementary design task will be capped at 50% for that task. Finally, a student that has failed both Design Tasks 1 and 2 or has both failed one of these tasks and the supplementary design task will fail the subject. In this case, the final course mark will be the highest individual design task mark less than 50%.

If a student passes both Design Tasks 1 and 2 and has a perfect attendance record to the compulsory lab sessions, then they **will** pass the subject. This means that a minimum of the basic mark, from Table 1, must be achieved for both assessment categories in each of these design tasks. A student can pass this course without attempting Design Task 3, but they will not maximize their total course mark in this instance. Hence, Design Task 3 is meant to rigorously test a student's design and knowledge skills to achieve a high mark for this course.

Table 1: Course and Lab Grading

Marks Range	Grade
<50%	Fail
50 – 64%	Basic
65 – 74%	Satisfactory
75 – 84%	High
≥ 85%	Outstanding

Each Design Task has a minimum level of functionality to pass the Design Implementation component and hence pass the assignment. The design tasks also have a list of deliverables which are ranked from Basic to Outstanding. Completing the higher-grade deliverables will generate a higher mark for the Design Implementation component. Correctly completing the Outstanding-Level deliverable for a task will maximise the mark for the Design Implementation component.

Seminar Orals and Submission of Assessment

Marking of a Design Task will take place in lab oral seminars during each Friday of weeks 3, 7 and 10. The seminar oral consists of a lab demonstrator checking that your simulation file performs correctly/incorrectly for each deliverable and the demonstrator assigning a grade for Design Implementation (60% of total assignment mark). The seminar also includes the demonstrator asking the student questions to test their understanding of their design and reviewing their design journal. The demonstrator will then assign a grade for Design Journal (40% of total assignment mark). Note that these assessment seminar consultations are thorough and may take up to an hour for each student. The student will be asked about all different facets of their design during these sessions. If there are any suspicions that the design is not a student's own work, then this will be dealt with in accordance with UNSW Policy on Academic Misconduct. A student must ensure that the design is their own work. A cheating student will be easily identified during the seminar oral. The marking sessions will be conducted via Microsoft Teams. More information on these marking sessions, including the scheduling of the sessions on the Friday of weeks 3, 7 and 10 will be provided in the week before the task is due. Missing the scheduled seminar oral will constitute a fail grade for that assignment. A student who has missed a scheduled seminar oral may be allocated another session at the course convenor's discretion. This may include the allocation of a penalty to the design task grade at the course convenor's discretion. Students will undertake each design task by themselves. Whilst a student may ask their peers a technical question, they must not copy a design. It will become obvious that a design has been copied during the seminar oral.

All design tasks must be conducted in MATLAB Simulink (using the Simulink and Simscape Electrical libraries). It is recommended that you also download the Control Systems Toolbox add on to help with the design tasks. The Simulink simulation file/s must be submitted via the Moodle course page before Friday 8am the week that the task is due. The simulation files must be setup in a particular format as specified by each design task worksheet. A penalty may be given for any late submissions or submissions with formatting errors at the course convenor's discretion.

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. Design Task 1	35%	Week 3	1, 2, 3, 4
2. Design Task 2	40%	Week 7	1, 2, 3, 4
3. Design Task 3	20%	Week 10	1, 2, 3, 4
4. Online Engagement/Participation Activity	5%	Not Applicable	2, 3

Assessment 1: Design Task 1

Due date: Week 3

Presentation / Demonstration of Design Task 1

21% Design Implementation (CLO1,2,3,4) + 14% Design Journal (CLO2,3)

Assessment 2: Design Task 2

Due date: Week 7

Presentation / Demonstration of Design Task 2

24% Design Implementation (CLO1,2,3,4) + 16% Design Journal (CLO2,3)

Assessment 3: Design Task 3

Due date: Week 10

Presentation / Demonstration of Design Task 3

12% Design Implementation (CLO1,2,3,4) + 8% Design Journal (CLO2,3)

Assessment 4: Online Engagement/Participation Activity

Students will be required to engage in online activity and participation throughout the duration of the course, on Moodle. This activity will be primarily via group-based discussion, centred on the design tasks. Meaningful contribution to these discussions will be required in order to gain a satisfactory participation score. Details of this assessment and the activities will be made available in Moodle in Week 2.

Attendance Requirements

Student attendance at each compulsory Friday lab/lecture session will be recorded. At the completion of week 10, an attendance mark will be awarded out of 5% (where 5% is awarded for attendance at **all** Friday sessions from weeks 1-10). Missing a session will result in the 5% being scaled to reflect the number of attended sessions.

Course Schedule

Contact Hours

The course consists of a weekly three-hour lecture/laboratory class and four-hour lecture/laboratory class starting in week 1. Note that more information on these classes will be given in the first class. These sessions will allow students to get help from lab demonstrators and ask technical questions. Pre-recorded lectures may also be uploaded to Moodle to help with the understanding of particular content.

	Day	Time	Location
Lectures/Open Labs	Wednesday (w1-10)	9am – 12noon	Microsoft Teams Meeting/Face-to-face
Lectures/Compulsory Labs	Friday (w1-10)	9am – 1pm	Microsoft Teams Meeting/Face-to-face

Indicative Lecture Schedule

Period	Summary of Lecture Program
Week 1	Introduction to course and important technical/design skills. Design Task 1 is given and explained.
Week 2	Work on Design Task 1
Week 3	**Design Task 1 assessment due**
Week 4	Design Task 2 is given and explained
Week 5	Work on Design Task 2
Week 6	Work on Design Task 2
Week 7	**Design Task 2 assessment due**
Week 8	Design Task 3 is given and explained
Week 9	Work on Design Task 3
Week 10	**Design Task 3 assessment due**

View class timetable

Timetable

Date	Type	Content
Week 3: 13 June - 17 June	Assessment	Design Task 1
Week 7: 11 July - 15 July	Assessment	Design Task 2
Week 10: 1 August - 5	Assessment	Design Task 3

August		

Resources

Prescribed Resources

Textbooks

This course has no specific recommended text. As it heavily relies on the technical knowledge of other courses, the textbooks of those subjects and their course notes are recommended resources for the students.

Academic Honesty and Plagiarism

Academic Honesty and Plagiarism

Plagiarism is the unacknowledged use of other people's work, including the copying of assignment works and laboratory results from other students. Plagiarism is considered a form of academic misconduct, and the University has very strict rules that include some severe penalties. For UNSW policies, penalties and information to help you avoid plagiarism, see https://student.unsw.edu.au/plagiarism. To find out if you understand plagiarism correctly, try this short quiz: https://student.unsw.edu.au/plagiarism-quiz.

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.

Academic Information

COVID19 - Important Health Related Notice

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. **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.

If you are required to self-isolate and/or need emotional or financial support, please contact the Nucleus: Student Hub. If you are unable to complete an assessment, or attend a class with an attendance or participation requirement, please let your teacher know and apply for special consideration through the Special Consideration portal. To advise the University of a positive COVID-19 test result or if you suspect you have COVID-19 and are being tested, please fill in this form.

UNSW requires all staff and students to follow NSW Health advice. Any failure to act in accordance with that advice may amount to a breach of the Student Code of Conduct. Please refer to the Safe Return to Campus guide for students for more information on safe practices.

Dates to note

Important Dates available at: https://student.unsw.edu.au/dates

Student Responsibilities and Conduct

Students are expected to be familiar with and adhere to all UNSW policies (see https://student.unsw.edu.au/policy), and particular attention is drawn to the following:

Workload

It is expected that you will spend at least **15 hours per week** studying a 6 UoC course, from Week 1 until the final assessment, including both formal classes and *independent, self-directed study*. In periods where you need to complete assignments or prepare for examinations, the workload may be greater. Over-commitment has been a common source of failure for many students. You should take the required workload into account when planning how to balance study with employment and other activities.

Attendance

Regular and punctual attendance at all classes is expected. UNSW regulations state that if students attend less than 80% of scheduled classes they may be refused final assessment.

Work Health and Safety

UNSW policy requires each person to work safely and responsibly, in order to avoid personal injury and to protect the safety of others.

Special Consideration and Supplementary Examinations

You must submit all assignments and attend all examinations scheduled for your course. You can apply for special consideration when illness or other circumstances beyond your control interfere with an assessment performance. If you need to submit an application for special consideration for an exam or assessment, you must submit the application **prior to the start** of the exam or before the assessment is submitted, except where illness or misadventure prevent you from doing so. Be aware of the “fit to sit/submit” rule which means that if you sit an exam or submit an assignment, you are declaring yourself well enough to do so and cannot later apply for Special Consideration. For more information and how to apply, see https://student.unsw.edu.au/special-consideration.

Administrative Matters

On issues and procedures regarding such matters as special needs, equity and diversity, occupational health and safety, enrolment, rights, and general expectations of students, please refer to the School and UNSW policies:

https://student.unsw.edu.au/guide

https://www.engineering.unsw.edu.au/electrical-engineering/resources

Disclaimer

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

"White bread board, integrated circuit, computer, arduino, technology, robot, computer equipment, electronics," Piqsels, https://www.piqsels.com/en/public-domain-photo-ftsjl (accessed May 16th, 2022).

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	