

# ELEC9716

Electrical Safety

Term 2, 2022



## Course Overview

### Staff Contact Details

#### Convenors

Name	Email	Availability	Location	Phone
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#### Demonstrators

Name	Email	Availability	Location	Phone
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### School Contact Information

**Consultations:** This is a distance course and there are no real-time consultations, either face-to-face or online. All course discussions are via Moodle forum only. You are welcome to email the course coordinator for any specific queries outside the forum discussions. All email enquiries should be made from your student address with ELEC9716 in the subject line; otherwise, they will not be answered.

**Keeping Informed:** Announcements may be made during the term, 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.

As this course is fully online, it makes extensive use of the UNSW learning management system, Moodle, and ancillary applications, it is crucial that you familiarise yourself with Moodle and those other applications. Further, it is critical that you check regularly, at least once each day, for any Announcements in Moodle; even if discussions of course logistics or other matters have taken place in forums or email, announcements are used to convey final outcomes and thus critical information to the cohort.

### 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

This course covers the very broad and important area of electrical safety in domestic and industrial installations. Topic areas include, the effects of electric current passing through the human body; lightning hazards; protection of personnel: earthing and double insulation; protection of personnel: residual current detectors; effects of electric and magnetic fields and electromagnetic radiation; electrosurgical hazards; electrical fires and their investigation; electrical safety and the law; electrical safety in hazardous atmospheres: area classification; gas grouping; temperature classification; flameproof protection; intrinsic safety protection; increased safety protection; non-sparking protection; special protection; pressurization or purging protection; encapsulation, sand filled and oil filled protection; dust ignition proof equipment; cabling and terminations; certification, marking and quality control and maintenance requirements.

### Course Aims

The course aims to enable students to identify hazards to people and equipment that are present in the electrical environment of a power supply utility, commercial or domestic installation, at home and at medical locations, together with the design principles and working procedures that are implemented to minimise the risk of electrical accidents and fires. The legal processes that can arise as a result of electrical accidents and fires are also discussed.

The course also aims to develop competencies for practice and ability to act and display initiative via thorough analysis of explosion hazards and the various methods of overcoming these hazards.

### Course Learning Outcomes

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

Learning Outcome	EA Stage 1 Competencies
1. Identify the presence of electrical hazards	PE1.1, PE1.5, PE2.4, PE3.1, PE3.6
2. Employ investigative techniques for determining the cause of electrical accidents, fires and explosions	PE1.1, PE1.2, PE1.3, PE1.4, PE1.5, PE1.6, PE2.1, PE2.2, PE2.3, PE2.4, PE3.1, PE3.2, PE3.3, PE3.4, PE3.6
3. Analyse electrical hazards and provide solutions to minimise risks	PE1.1, PE1.3, PE1.4, PE1.5, PE1.6, PE2.1, PE2.2, PE3.1, PE3.2, PE3.3, PE3.4, PE3.5, PE3.6
4. Communicate electrical safety information in a formal	PE1.1, PE1.2, PE1.3, PE1.4,

Learning Outcome	EA Stage 1 Competencies
engineering report / presentation / group discussion providing independent conclusions	PE2.1, PE2.2, PE3.1, PE3.2, PE3.3, PE3.4, PE3.5, PE3.6
5. Gain familiarity with the industry procedures on electrical safety	PE1.1, PE1.2, PE1.3, PE1.4, PE1.5, PE1.6, PE2.1, PE2.2, PE2.3, PE2.4, PE3.1, PE3.4, PE3.5, PE3.6
6. Gain awareness on electrical safety laws nationally and internationally.	PE1.1, PE1.2, PE1.3, PE1.4, PE1.5, PE1.6, PE2.4, PE3.1, PE3.2, PE3.4, PE3.5, PE3.6

## Teaching Strategies

The course will be run in a distance mode, which means there are no in-person or online synchronous lectures. To put it simply, this course does not include any real-time communication with the course staff; Students contact the course staff asynchronously only. The course does not have a final examination. The learning in this course is supported via Moodle through:

1. Lecture videos embedded in H5P interactive slides and lecture notes via Moodle book;
2. Industry videos embedded in virtual reality simulations, which allow a 360-degree interactive tour of various scenarios;
3. Asynchronous discussions via Moodle forums, which provide you with a focus on the core analytical material in the course, together with qualitative, alternative explanations to aid your understanding;
4. Quizzes, which allow for exercises in problem solving and MCQs that allow time for you to resolve problems in understanding of the lecture material;
5. Virtual teamwork sessions, that will promote group work and enhance deeper learning of the concepts; and
6. Clear and concise instructions to navigate the course.

These activities will occur in a climate that is, as much as possible, supportive and inclusive of all learners. **It is critical that all students engage with the inherent diversity of the cohort**, recognising the need to give and take through the teaching and learning process, reflective of the diversity encountered in the modern workplace.

Although the course does not have any synchronous contact hours with the course staff, participation in Moodle Forums is expected and assessed. However, note here, that you do have significant flexibility around the amount and timing of your contact in the course, and completion of many tasks, aligned with the flexibility afforded by a fully online course and the virtual environment.

## Additional Course Information

### Study Plan

The course is organised in modules as below.

### ***Mandatory modules***

**Module M1:** Electricity & Human body

**Module M2:** Earthing

**Module M3:** Hazardous area

***Elective modules***

**Choose two from the below list:**

**Module E1:** Power line safety

**Module E2:** Emerging energy sources


**Module E3:** Safety against OV, ELV, RV

**Module E4:** Electrical safety in a medical environment

## Assessment

Students must attempt each assessment component to pass the course.

There are no final exams for this course.

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. VR Assessment	25%	Not Applicable	1, 2, 3, 5, 6
2. Fortnightly Quiz	25%	Not Applicable	1, 2, 3, 5, 6
3. Case Study Presentation (CSP) 	30%	27 July 2022	1, 2, 3, 4, 5, 6
4. Assignment + Peer assessment	20%	5 August 2022	1, 2, 3, 4, 5, 6

### Assessment 1: VR Assessment

This assessment has two parts:

1) Interactive H5P Lectures (**1%**) are the collection of lecture slides, with video lectures embedded along with simple questions that you will need to answer (either MCQ or drag & drop types). You need to complete this 100% to receive a mark of 1%.

2) Virtual reality (VR) simulations (**4%**) cast 360-degree 3D images and provide several electrical related safety hazards and procedures. The students work to identify the safety hazards, work through the risk assessment questions and provide solutions for rectifying the hazards. After completing each scenario, assessment marks will be awarded according to how much of the simulation you were able to complete.

The course requires 5 such assessment completions (3 for mandatory modules and 2 for elective modules), thus, 5 x VR assessments each of 5% makes a total of 25% towards the course.

The submission deadline for each VR Assessment is as below:

- Mandatory modules (M1, M2, M3) – Week 5, 1 July 2022 (Friday), 5 pm AEST.
- Elective modules (any two of your choice) - Week 10, 5 August 2022 (Friday), 5 pm AEST.

### Assessment 2: Fortnightly Quiz

To check that you have achieved the practical learning outcomes for the course via the VR simulations, you will be required to complete the related MCQ Quiz via Moodle. Complete 5 quizzes one for each module.

Each quiz carries 5% making a total of 25% towards the course.

The submission deadline for each quiz is two weeks from the date of opening or Friday 5 pm AEST of Week 10 of the course, whichever is earlier.

This is not a Turnitin assignment

### **Assessment 3: Case Study Presentation (CSP) (Group)**

**Due date:** 27 July 2022

This is a team activity. Each team will present a video of a case study on one of the following topics related to Electrical safety:

The presentation should have the following 5 components with a maximum of 5 min video:

1. Explanation of the incident and identify issue
2. Related law/standards
3. Offer solution – engineering
4. Offer solution – administrative & PPE
5. Relate to learning outcomes achieved from this case study

The video will be assessed by industry experts and mentors and **contributes 30% towards the course**. Note that this mark will be individualised based on the team participation marked by the mentors and peers. It is important that you attend your team meetings with fellow team mates especially in weeks 5, 6, 7, 8 and 9 otherwise you may risk achieving a reduced participation mark.

For course staff to mark the participation, students are expected to make at least one reasonable team contribution to the forum every week. For assessment, these contributions must be made during the weeks 5-9 of the term.

**Video submission deadline is Week 9, Friday 5 pm AEST.**

This is not a Turnitin assignment

### **Assessment 4: Assignment + Peer assessment**

**Due date:** 5 August 2022

The assignment is an individual 24-hr take home assessment from the time of opening. You will be answering a set of questions from the course material and research related questions. The submission will be via Moodle. **This contributes 10% towards the course. The submission deadline is 24 hours from the time of opening or Friday 5 pm AEST of Week 10 of the course, whichever is earlier.**

Peer assessment will be in Week 10. Each student should undertake the assessment for three other case study videos submitted by other teams (allocations are done randomly). The assessment rubric will be provided. **This contributes 10% towards the course. The submission deadline is Friday 5 pm AEST of Week 10 of the course (5 August 2022).**



## Attendance Requirements

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

## Course Schedule

UNSW expects students to be regular and punctual in attendance at all classes including online tutorials and Q&A sessions. Students who attend less than 80% of their possible classes may be refused final assessment. These 'rules' pertain to the more traditional face-to-face mode of course engagement. It is expected that, very broadly, you engage well with the course, in the spirit of these requirements. **Failure to engage regularly with elements of the course, such as Quiz and Teamwork, can be taken as the equivalent of non-attendance and can result in the completion of the course.**

If you find you are unable to participate in the course effectively you should notify the coordinator as early as possible. If you feel you will not be able to contribute or may be required to be absent for a protracted period, you should consider withdrawal from the course, not only for your own sake, but that of others, especially your team members. The latter is particularly important, as late withdrawal has caused significant inconvenience for some students, when left with few or no group members and thus significant work to complete on short notice. Again, please be as respectful as possible of the needs of others.

Many online courses run in a way that means students can do all learning activities at their own pace, in their own time; this course is, generally, no different, as you do have good windows of time available to work through learning materials and activities, to complete quizzes and contribute to forums. However, this course also requires students to meet online in groups. Students are expected to negotiate and navigate logistics to complete tasks associated with the course. Students will also need to find ways, perhaps creatively, to engage with each other around teaching-learning activities and especially to complete the team-work task.

Students are strongly encouraged to review all lecture recordings, VR simulations and attempt all assessments. The below study plan can be used as guideline. You may also choose to complete the activities well before the deadlines.

Period	Study Plan	Workload Hours
Week 1	Choose elective modules; Familiarise with the course platform; Read all instructions; Commence preparation for M1	10
Week 2	M1 – Complete VR, Quiz, Meet your team members; Perform an icebreaker activity with the team;	16
Week 3	Commence preparation for M2; Complete teamwork training modules; Select 3 potential CSP topics;	11
Week 4	M2 – Complete VR, Quiz, Role assignments in team and project planning; Finalise CSP topic;	16
Week 5	Commence preparation for M3; Leadership activity, continue discussion for CSP; peer review of teamwork;	11
Week 6	M3 – Complete VR, Quiz, Communication activity; continue discussion for CSP; peer review of teamwork;	17
Week 7	Commence preparation for your Elective1; Accountability & Trust; continue discussion for CSP; peer review of teamwork;	18
Week 8	Elective1 – Complete VR, Quiz, Conflict management; continue	17

	discussion for CSP; Submit assignment; peer review of teamwork;	
Week 9	Commence preparation for Elective2; feedback & reflections; submit CSP video; peer review of teamwork;	15
Week 10	Elective2 – Complete VR, Quiz, Peer assessment for CSP videos.	19
<b>Total Workload for the term</b>		<b>150</b>

## Resources

### Prescribed Resources

Course material compiled by the course coordinator is available online in Moodle via the Moodle book App. All lecture slides and lecture videos are made available in Moodle as well, with relevant YouTube videos embedded in the VR simulations.

### Recommended Resources

The following reference books may be useful.

- Massimo A.G. Mitolo, "Electrical Safety of Low-Voltage Systems", Mc Graw Hill, 2009.
- John Cadick, Mary Capelli-Schellpfeffer, Dennis Neitzel, "Electrical Safety Handbook", 3rd edition, McGraw-Hill, 2006.
- J. Maxwell Adams, "ELECTRICAL SAFETY - a guide to the causes and prevention of electrical hazards", The Institution of Electrical Engineers, 1994.
- W. Fordham Cooper, "Electrical Safety Engineering", second edition, Butterworth & Co., 1986.
- D.C. Winburn, "Practical Electrical Safety", Marcel Dekker Inc., 1988.
- Handbook of International Electrical Safety Practices, Princeton energy Resources International, 2010, Scrivener Publishing, USA.

### 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/STEEP 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. This term we have incorporated guidelines on teamwork activities based on student feedback.

## **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

## 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	✓