



## UNSW Course Outline

# ELEC9716 Electrical Safety - 2024

Published on the 21 May 2024

## General Course Information

**Course Code :** ELEC9716

**Year :** 2024

**Term :** Term 2

**Teaching Period :** T2

**Is a multi-term course? :** No

**Faculty :** Faculty of Engineering

**Academic Unit :** School of Electrical Engineering & Telecommunications

**Delivery Mode :** Online

**Delivery Format :** Standard

**Delivery Location :** Kensington

**Campus :** Sydney

**Study Level :** Postgraduate

**Units of Credit :** 6

### Useful Links

[Handbook Class Timetable](#)

## Course Details & Outcomes

### Course Description

Are you interested in understanding the vital principles of electrical safety that underpin both domestic and industrial installations? Look no further than our comprehensive course designed to equip you with essential knowledge and skills in this critical field.

In this course, we delve into the broad spectrum of electrical safety, exploring key topics

essential for both personal and professional contexts. You will gain a deep understanding of the effects of electric current on the human body, learning how to mitigate risks and ensure safety in various scenarios. From lightning hazards to protection mechanisms such as earthing and double insulation, you will master techniques to safeguard personnel and prevent accidents.

Moreover, we will explore advanced concepts such as residual current detectors and the effects of electric and magnetic fields, empowering you to identify potential hazards and implement effective preventive measures. You will also delve into specialized areas like electrosurgical hazards and electrical fires, honing your skills in investigation and risk mitigation.

Understanding the legal frameworks surrounding electrical safety is crucial, and this course provides invaluable insights into the intersection of electrical safety and the law. Whether you are working in hazardous environments or managing domestic installations, you'll learn to navigate regulatory requirements and uphold the highest safety standards.

Taught by industry experts with extensive experience, this course combines theoretical knowledge with practical applications, ensuring you are well-prepared to tackle real-world challenges. Join us and embark on a journey to become a proficient and safety-conscious professional in the field of electrical safety.

Enroll now and take the first step towards a safer, more secure future in electrical installations!

## Course Aims

The course aims to provide students with an understanding of the hazards to people and equipment that are present in the electrical environment of a power supply utility, commercial or domestic installation, 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.

Topic areas include, the effects of electric current passing through the human body; lightning hazards; protection of personnel: earthing and double insulation; residual current detectors; effects of electric and magnetic fields and electromagnetic radiation; electrosurgical hazards; electrical fires and their investigation; electrical safety and the law; and electrical safety in hazardous atmospheres.

# Course Learning Outcomes

Course Learning Outcomes
CLO1 : Identify the presence of electrical hazards
CLO2 : Employ investigative techniques for determining the cause of electrical accidents, fires and explosions
CLO3 : Analyse electrical hazards and provide solutions to minimise risks
CLO4 : Communicate electrical safety information in a formal engineering report / presentation / group discussion providing independent conclusions
CLO5 : Gain familiarity with the industry procedures on electrical safety
CLO6 : Gain awareness on electrical safety laws nationally and internationally.

Course Learning Outcomes	Assessment Item
CLO1 : Identify the presence of electrical hazards	<ul style="list-style-type: none"><li>• VR Assessment</li><li>• Fortnightly Quiz</li><li>• Case Study Presentation</li><li>• Scenario-based discussion</li></ul>
CLO2 : Employ investigative techniques for determining the cause of electrical accidents, fires and explosions	<ul style="list-style-type: none"><li>• VR Assessment</li><li>• Fortnightly Quiz</li><li>• Case Study Presentation</li><li>• Scenario-based discussion</li></ul>
CLO3 : Analyse electrical hazards and provide solutions to minimise risks	<ul style="list-style-type: none"><li>• VR Assessment</li><li>• Fortnightly Quiz</li><li>• Case Study Presentation</li><li>• Scenario-based discussion</li></ul>
CLO4 : Communicate electrical safety information in a formal engineering report / presentation / group discussion providing independent conclusions	<ul style="list-style-type: none"><li>• Case Study Presentation</li><li>• Scenario-based discussion</li></ul>
CLO5 : Gain familiarity with the industry procedures on electrical safety	<ul style="list-style-type: none"><li>• VR Assessment</li><li>• Fortnightly Quiz</li><li>• Case Study Presentation</li><li>• Scenario-based discussion</li></ul>
CLO6 : Gain awareness on electrical safety laws nationally and internationally.	<ul style="list-style-type: none"><li>• VR Assessment</li><li>• Fortnightly Quiz</li><li>• Case Study Presentation</li><li>• Scenario-based discussion</li></ul>

## Learning and Teaching Technologies

Moodle - Learning Management System

# Other Professional Outcomes

## Engineers Australia (EA), Professional Engineer Stage 1 Competencies

The Course Learning Outcomes (CLOs) contribute to your development of the following EA competencies:

### *PE1: Knowledge and Skill Base:*

PE1.1 Comprehensive, theory-based understanding of underpinning fundamentals: CLO 1, 2, 3, 4, 5, 6

PE1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing: CLO 2, 4, 5, 6

PE1.3 In-depth understanding of specialist bodies of knowledge: CLO 2, 3, 4, 5, 6

PE1.4 Discernment of knowledge development and research directions: CLO 2, 3, 4, 5, 6

PE1.5 Knowledge of engineering design practice: CLO 1, 2, 3, 5, 6

PE1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice: CLO 2, 3, 5, 6

### *PE2: Engineering Application Ability:*

PE2.1 Application of established engineering methods to complex problem solving: CLO 2, 3, 4, 5

PE2.2 Fluent application of engineering techniques, tools and resources: CLO 2, 3, 4, 5

PE2.3 Application of systematic engineering synthesis and design processes: CLO 2, 5

PE2.4 Application of systematic approaches to the conduct and management of engineering projects: CLO 1, 2, 3, 5, 6

### *PE3: Professional and Personal Attributes:*

PE3.1 Ethical conduct and professional accountability: CLO 1, 2, 3, 4, 5, 6

PE3.2 Effective oral and written communication (professional and lay domains): CLO 2, 3, 4, 6

PE3.3 Creative, innovative and pro-active demeanour: CLO 2, 3, 4

PE3.4 Professional use and management of information: CLO 2, 3, 4, 5, 6

PE3.5 Orderly management of self, and professional conduct: CLO 3, 4, 5, 6

PE3.6 Effective team membership and team leadership: CLO 1, 2, 3, 4, 5, 6

## 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

# Assessments

## Assessment Structure

Assessment Item	Weight	Relevant Dates
VR Assessment Assessment Format: Individual	25%	Start Date: Not Applicable Due Date: Not Applicable
Fortnightly Quiz Assessment Format: Individual	25%	Start Date: Not Applicable Due Date: Not Applicable
Case Study Presentation Assessment Format: Group	35%	Due Date: 26/07/2024 05:00 PM
Scenario-based discussion Assessment Format: Individual	15%	Due Date: 02/08/2024 05:00 PM

## Assessment Details

### VR Assessment

#### Assessment Overview

This assessment has two parts:

- 1) Interactive H5P Lectures (1%) comprise 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.

Feedback will be available online after the announced deadlines for each VR.

#### **Course Learning Outcomes**

- CLO1 : Identify the presence of electrical hazards
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- CLO5 : Gain familiarity with the industry procedures on electrical safety
- CLO6 : Gain awareness on electrical safety laws nationally and internationally.

#### **Detailed Assessment Description**

The submission deadline for each VR Assessment is as below:

Mandatory modules (M1, M2, M3) – Week 5, 28 June 2024 (Friday), 5 pm AEST.

Elective modules (any two of your choice) - Week 10, 2 August 2024 (Friday), 5 pm AEST.

#### **Fortnightly Quiz**

#### **Assessment Overview**

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 quizzes via Moodle. Complete 5 quizzes, one for each module. Each quiz carries 5% making a total of 25% towards the course.

Feedback for the Quiz will be automatically available after completion.

#### **Course Learning Outcomes**

- CLO1 : Identify the presence of electrical hazards
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### Detailed Assessment Description

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.

### Assignment submission Turnitin type

This is not a Turnitin assignment

## Case Study Presentation

### Assessment Overview

This assessment has two parts:

Team Activity (Group) - Each student group presents a video of a case study on a topic related to Electrical safety (topic list provided). This contributes 30% towards the course. Mark is individualised based on the team participation marked by the mentors and/or industry experts and/or peers.

Peer assessment (individual) - Each student will assess three other videos submitted by other groups (allocations are done randomly). The assessment rubric will be provided. This contributes 5% towards the course.

### Course Learning Outcomes

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- CLO4 : Communicate electrical safety information in a formal engineering report / presentation / group discussion providing independent conclusions
- CLO5 : Gain familiarity with the industry procedures on electrical safety
- CLO6 : Gain awareness on electrical safety laws nationally and internationally.

### Assignment submission Turnitin type

This is not a Turnitin assignment

## Scenario-based discussion

### Assessment Overview

In this assignment, you will be given a scenario of electrical incidents which will comprise incident details. You need to analyze the given incident and provide Engineering, Administrative, PPE/PPM (Personal Protective Equipment/ Personal Protective Measures) solutions and

standards related to the incident.

Scenario-based assignment contributes 15% towards the course. Submission will be via Moodle and the deadline is 24 hours from the time of opening.

### Course Learning Outcomes

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- CLO6 : Gain awareness on electrical safety laws nationally and internationally.

## **General Assessment Information**

Students must attempt each assessment component to pass the course.

There are no final exams for this course.

### Grading Basis

Standard

## **Course Schedule**

Teaching Week/Module	Activity Type	Content
Week 0 : 20 May - 26 May	Other	
Week 1 : 27 May - 2 June	Online Activity	Choose elective modules, Familiarise with the course platform, Read all instructions, Commence preparation for M1.
Week 2 : 3 June - 9 June	Online Activity	M1 - Complete VR, Quiz, Meet your team members, Perform an icebreaker activity with the team.
Week 3 : 10 June - 16 June	Online Activity	Commence preparation for M2, Complete teamwork training modules, Select 3 potential CSP topics
Week 4 : 17 June - 23 June	Online Activity	M2 - Complete VR, Quiz, Role assignments in team and project planning, Finalise CSP topic.
Week 5 : 24 June - 30 June	Online Activity	Commence preparation for M3, Leadership activity, continue discussion for CSP, peer review of teamwork
Week 6 : 1 July - 7 July	Online Activity	M3 - Complete VR, Quiz, Communication activity, continue discussion for CSP, peer review of teamwork.
Week 7 : 8 July - 14 July	Online Activity	Commence preparation for your Elective1, Accountability & Trust, continue discussion for CSP, peer review of teamwork.
Week 8 : 15 July - 21 July	Online Activity	Elective1 - Complete VR, Quiz, Conflict management, continue discussion for CSP, peer review of teamwork.
Week 9 : 22 July - 28 July	Online Activity	Commence preparation for Elective2, feedback & reflections, submit CSP video; peer review of teamwork.
Week 10 : 29 July - 4 August	Online Activity	Elective 2 - Complete VR, Quiz, Submit assignment, Peer assessment for CSP videos.

# Attendance Requirements

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

## General Schedule Information

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; Week 2 M1 - Complete VR, Quiz, Meet your team members, Perform an icebreaker activity with the team; Week 3 Commence preparation for M2, Complete teamwork training modules, Select 3 potential CSP topics; Week 4

M2 - Complete VR, Quiz, Role assignments in team and project planning, Finalise CSP topic; Week 5 Commence preparation for M3, Leadership activity, continue discussion for CSP, peer review of teamwork; Week 6 M3 - Complete VR, Quiz, Communication activity, continue discussion for CSP, peer review of teamwork; Week 7 Commence preparation for your Elective1, Accountability & Trust, continue discussion for CSP, peer review of teamwork; Week 8 Elective1 - Complete VR, Quiz, Conflict management, continue discussion for CSP, peer review of teamwork; Week 9 Commence preparation for Elective2, feedback & reflections, submit CSP video; peer review of teamwork; Week 10 Elective2 - Complete VR, Quiz, Submit assignment, Peer assessment for CSP videos. Total Workload for the term 150 hours

## Course 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 introduced an online session dedicated to addressing any queries regarding the Scenario

based Assignment. Based on student feedback, we will be providing examples of exceptional and poorly executed assignments from last year offering valuable reference points.

# Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Anam Malik				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](http://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