



**MINE2610**  
**Mining Services (Electrical)**

**COURSE STAFF**

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**Consultations:** You are encouraged to ask questions on the course material, after the class times and via email. Lecturer consultation times will be advised on Moodle. ALL email enquiries should be made from your student email address with MINE2610 in the subject line, otherwise risk not being 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> and MS Teams. Please note that you will be deemed to have received this information, so you should take careful note of all announcements.

**COURSE SUMMARY**

**Contact Hours**

<b>Lecture:</b>	Tue	9am-11am	Week 7	<b>Introduction, hybrid (OMB G51)</b>
			Week 8,9,10	Pre-recorded video lectures provided. No additional face-to-face lectures required.
<b>Lec/Tutorials:</b>	Thu	9am-11am	Week 7,8,9,10	Online, tutorial and problem solving support.
<b>Laboratories:</b>	Wed	<b>4pm-6pm</b> (note: not 2pm-4pm)	Week 7,8,9	Online
			Week 10	Hybrid, EE&T lab except students offshore

No other contact hours required for the Electrical Engineering part of the course.

## Context and Aims

MINE2610 (Electrical) is an introduction to Electrical Engineering. It gives an overview of the fundamental aspects of electrical engineering. The course provides an introduction to electrical principles and provides basic technical skills to analyse simple practical circuits. In the practical section it provides experience in analysing simple circuits. It is packaged in such a way that students, having taken this course, can recognise, identify and analyse relevant practical, useful circuits and devices afterwards.

## Indicative Learning Schedule

### Indicative Lecture Schedule

Period	Lecture Set No.	Summary of Lecture Program
Week 7	1	Introduction, Circuit Basics Overview + Lab Safety.
Week 8	2	Kirchhoff's laws, Series & Parallel
Week 9	3	Node Equations & Circuit analysis
Week 9	4	Power & Energy
Week 10	6	Introduction to inductors and capacitors, alternating current
Week 11		Consultation
Week 12		<b>Final exam</b>

### Indicative Laboratory Schedule

Period	Summary of Laboratory Program
Week 7	Familiarisation
Week 8	Series & Parallel Circuits
Week 9	KCL & KVL
Week 10	Power & Energy

## Assessment

You are expected to view all lectures and attend all tutorials, labs and quizzes, in order to maximize learning. **It is important to prepare your tutorial questions in advance of attending the tutorial classes. You must prepare well for your laboratory classes, and will be tested on this preparation at the beginning of each lab exercise.** In addition to the lecture notes, you should read relevant sections of the recommended text. Reading additional texts would further enhance your learning experience. Group learning is also encouraged.

## MINE2610 (Electrical)

Activity	Assessment (As total % of course)
Laboratory Practical Experiments	10%
On-line Fortnightly Quizzes <b>Held in Week 8, 10 worth 10% total.</b>	10%
Final exam	30%
TOTAL	50%

## COURSE DETAILS

### Credits

Course MINE2610 is 6 UOC course. The expected average workload for the electrical engineering component is approximately 12-14 hours per week from Week 7-10.

### Pre-requisites and Assumed Knowledge

There are no pre-requisites for this component of MINE2610.

Working knowledge of basic mathematics including differentiation and integration techniques.

### Learning outcomes

After successful completion of this course, you should be able to:

1. Have an understanding of the breadth of Electrical Engineering.
2. Use Kirchhoff's laws, circuit theorems and node voltage methodology to solve simple circuits,
3. Apply simple steady state sinusoidal analysis to circuits.
4. Demonstrate a basic understanding of transformer operation.
5. Demonstrate a basic understanding of electric machines.

This course is designed to provide the above learning outcomes which arise from targeted graduate capabilities listed in **Appendix A**. The targeted graduate capabilities broadly support the UNSW and Faculty of Engineering graduate capabilities (listed in **Appendix B**). This course also addresses the Engineers Australia (National Accreditation Body) Stage I competency standard as outlined in **Appendix C**.

## TEACHING STRATEGIES

### Delivery Mode

The teaching in this course aims at establishing a good fundamental understanding of the areas covered using:

- Lectures provided as pre-recorded videos, which provide you with a focus on the core analytical material in the course, together with qualitative, alternative explanations to aid your understanding.
- Tutorials which allow for exercises in problem solving and allow time for students to resolve

problems in understanding of lecture material and

- Laboratory sessions which support the formal lecture material and also provide the student with practical construction, measurement and debugging skills.
- Small periodic quizzes, which support and reinforce the lectures and tutorials in understanding the core analytical material.

## Lectures

The electrical engineering part of the course will be delivered using pre-recorded video lecture presentations. You will need to watch these video lectures in your own time before the tutorials and labs. Advantages of the video recordings are:

- You will be able to watch them at your own pace.
- You can revisit the lecture content as many times as you like.
- Things that you might miss in a normal live lecture (e.g. difficult mathematical concepts) are available on the recording.

## Laboratory

Students are required to attend laboratory from Week 7 to Week 10 as outlined in the Contact hours on Page 1. Laboratory attendance WILL be kept, and student MUST attend at least 3 out of 4 labs.

**Students are encouraged to complete the Moodle OH&S Safety course before starting the laboratory component in Week 7 (we will run the lab hybrid this year).**

To access the *Moodle OH&S Safety* course, from *Moodle Site Home*, using 'Search courses', find '*Electrical OH&S*'. You should be able to enrol and complete the course with the enrolment key "*elec mood*".

## Tutorials

Students are required to attend tutorials from Week 7 to Week 10 as specified in the Contact hours on Page 1. **Tutorials are not in place as another form of lecture. It is important that you come to tutorials prepared.** The tutorials will be run in the designated lecture time and will be used as problem solving sessions after the viewing of lecture material.

Note that no marks are awarded directly for any part of the tutorial program in this course. However, they should still be treated as an important aspect of the course, not to be taken lightly. There are two components of the tutorial program:

1. Sets of problems are provided to give the student personal practice in solution and understanding. These problems will be related to recent lecture material with an emphasis on the basic concepts.
2. Demonstrations of important problem solving techniques by tutors.

## ASSESSMENT DETAILS

You are expected to view all lectures and attend all tutorials, labs and quizzes, in order to maximize learning. It is important to prepare your tutorial questions in advance of attending the tutorial classes. You must prepare well for your laboratory classes, and will be tested on this preparation at the beginning of each lab exercise. In addition to the lecture notes, you should read relevant sections of the recommended text. Reading additional texts would further enhance your learning experience. Group learning is also encouraged.

As shown in the table of page 2, there are three components to the overall assessment, namely:

### Laboratory Assessment

After completing each experiment, your work will be assessed by the laboratory demonstrator. **You have to attend at least 3 out of 4 of the lab weeks AND attain a pass assessment in labs.**

Students must complete the Moodle OH&S Safety course before starting the practical laboratory component. If a student attends laboratory sessions without having completed the *Moodle OH&S Safety* course, the marks for those labs will be **zero**.

*A satisfactory performance in the laboratory component is a necessary requirement to pass this course.* This means that even if you score 100% on the final written examination and on the quizzes, you will not pass the course if your laboratory assessment is not satisfactory.

**In Summary to pass the laboratory component and therefore the course you MUST do all of the following:**

- **Complete the Moodle OH&S Safety course.**
- **You must attend at least 3 out of 4 the lab classes.**
- **Obtain a pass mark average for the laboratory experiments.**

### Quizzes

The lecture videos will be split up into approximately 3 “sets”, each being associated with a small online quiz. Only two quizzes are used for assessment. Quizzes must be taken at the end of Weeks 2 and 4, and will be available for 3-4 days only.

### Note: Negative Marks

**The quizzes will attract negative marks for incorrect answers or guessed answers.**

There is no limit to how many times each quiz may be attempted. However the mark which contributes to the final grade will be taken as the maximum of the first and second attempt only.

### Midsession examination

The final exam will be a closed book 2-hour exam. In principle, the examination may cover any aspect of the course that has been presented in lectures, tutorials and/or laboratories. **You MUST gain a mark of at least 40% in the exam to pass the subject.**

**Note: For all class assessment tasks ie Laboratory and quizzes, if the student is unable to attend for medical or other serious reasons (e.g. a death in the family) the student must apply for special consideration. ALL relevant documentation (e.g. medical certificates) must be presented. Please see <https://student.unsw.edu.au/special-consideration> for more information. In the case of missing a quiz for one of the reasons above, the assessment will most likely be carried over to the final exam ie the final exam will become a higher % of the assessment. Please note that application for special consideration does not guarantee that it will be granted!**

Note: For repeat students who have a laboratory exemption, the laboratory exam mark from the previous years WILL NOT be counted again, but the final examination will be worth a higher % of their final mark. **A laboratory exemption is only available on application before the end of Week 10** and is only available to students who had a satisfactory laboratory assessment. All other students who have previously failed this course are expected to attend at their scheduled laboratory times and to repeat all aspects of the laboratory.

**Relationship of Assessment Methods to Learning Outcomes**

Assessment	Learning outcomes				
	1	2	3	4	5
Laboratory practical assessments		✓	✓	✓	
Quizzes	✓	-	✓	✓	✓
Exam	✓	✓	✓	✓	✓

**COURSE RESOURCES**

**Textbooks**

**References**

- Allan R Hambley, Electrical Engineering Principles and Applications, Prentice Hall, 2011.
- Alexander & Sadiku, Fundamentals of Electric Circuits, McGraw Hill.
- L.S. Bobrow, Elementary Linear Circuit Analysis, Oxford, 1987 [P621.3192/106].
- R.L. Boylestad, Introductory Circuit Analysis, 9th Edition, Prentice-Hall, 2000 [PQ621.3815/198].
- J.R. Cogdell, Foundations of Electrical Engineering, 2nd Edition, Prentice Hall, 1990 [P621.3/198].

**On-line resources**

**Moodle**

As a part of the teaching component, Moodle will be used to disseminate teaching materials, host

forums and occasionally quizzes. Assessment marks will also be made available via Moodle: <https://moodle.telt.unsw.edu.au/login/index.php>.

### **Mailing list**

Announcements concerning course information will be given in the lectures and/or on Moodle and/or via email (which will be sent to your student email address).

## **OTHER MATTERS**

### **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:

<http://www.lc.unsw.edu.au/plagiarism>.

To find out if you understand plagiarism correctly, try this short quiz:

<https://student.unsw.edu.au/plagiarism-quiz>.

### **Student Responsibilities and Conduct**

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

### **Workload**

It is expected that you will spend at least twelve to fourteen hours per week studying a 6 UoC course, from Week 1 until the final assessment, including both face-to-face classes and independent, self-directed study. In periods where you need to 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.

### **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.

### **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 should seek assistance early if you suffer illness or misadventure which affects your course progress. All applications for special consideration must be lodged online through myUNSW, not to course or school staff. For more detail, consult:

<https://student.unsw.edu.au/special-consideration>

**Continual Course Improvement**

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 myExperience survey. You can also provide feedback to ELSOC who will raise your concerns at student focus group meetings. As a result of previous feedback obtained for this course and in our efforts to provide a rich and meaningful learning experience, we have continued to evaluate and modify our delivery and assessment methods.

# Appendices

## Appendix A: Targeted Graduate Capabilities

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

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

## Appendix B: UNSW Graduate Capabilities

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

- Developing scholars who have a deep understanding of their discipline, through lectures and solution of analytical problems in tutorials and assessed by assignments and written examinations.
- Developing rigorous analysis, critique, and reflection, and ability to apply knowledge and skills to solving problems. These will be achieved by the laboratory experiments and interactive checkpoint assessments and lab exams during the labs.
- Developing capable independent and collaborative enquiry, through a series of tutorials spanning the duration of the course.
- Developing digital and information literacy and lifelong learning skills through assignment work. Developing ethical practitioners who are collaborative and effective team workers through group activities, seminars and tutorials.
- Developing independent, self-directed professionals who are enterprising, innovative, creative and responsive to change, through challenging design and project tasks.
- Developing citizens who can apply their discipline in other contexts, are culturally aware and environmentally responsible, through interdisciplinary tasks, seminars and group activities.

## Appendix C: Engineers Australia (EA) Professional Engineer Competency Standard

	Program Intended Learning Outcomes	
<b>PE1: Knowled ge and</b>	PE1.1 Comprehensive, theory-based understanding of underpinning fundamentals	✓
	PE1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing	✓
	PE1.3 In-depth understanding of specialist bodies of knowledge	
	PE1.4 Discernment of knowledge development and research directions	
	PE1.5 Knowledge of engineering design practice	

	PE1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice	
<b>PE2: Engineering Application Ability</b>	PE2.1 Application of established engineering methods to complex 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	
<b>PE3: Professional and Personal Attributes</b>	PE3.1 Ethical conduct and professional accountability	
	PE3.2 Effective oral and written communication (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	