

# ELEC 1005 ELECTRICAL FUNDAMENTALS (WSTC)

**Credit Points** 10

**Legacy Code** 700024

**Coordinator** Ben Kelley ([https://directory.westernsydney.edu.au/search/name/Ben Kelley/](https://directory.westernsydney.edu.au/search/name/Ben%20Kelley/))

**Description** The objective of this subject is to introduce to the student a number of concepts within electrical engineering. These include the basic definitions of charge, current, potential difference, power; electric circuits and basic laws such as Ohm's and Kirchoff's Laws; Thevenin, Norton's and the maximum power theorems; electromagnetism and the associated fundamental laws; capacitor and resistor circuits and time constants; an introduction to Electronics; communication waves; Logic gates and number systems; and an introduction to Electrical Machines and Renewable Energy systems. Basic principles are explained and applied to a range of typical electrical circuits and devices. These foundations provide students with the basic requirements for a career in engineering where the concepts can be developed or applied to more complex engineering systems.

**School** Eng, Design & Built Env

**Discipline** Electrical And Electronic Engineering And Technology

**Student Contribution Band** HECS Band 2 10cp

Check your HECS Band contribution amount via the Fees ([https://www.westernsydney.edu.au/currentstudents/current\\_students/fees/](https://www.westernsydney.edu.au/currentstudents/current_students/fees/)) page.

**Level** Undergraduate Level 1 subject

**Pre-requisite(s)** Students enrolled in 6033 Diploma in Engineering Bachelor of Engineering Studies or 7034 Diploma in Engineering or 7066 Diploma in Engineering Extended must pass PHYS 0003 Foundation Physics 2 before enrolling in this unit

**Equivalent Subjects** ELEC 1003 - Electrical Fundamentals ELEC 1004 - Electrical Fundamentals (WSTC Assoc Deg)

## Restrictions

Students must be enrolled at Western Sydney University, The College. Students enrolled in Extended Diplomas must pass 40 credit points from the preparatory subjects listed in the program structure prior to enrolling in this University level subject. Students enrolled in the combined Diploma/Bachelor programs listed below must pass all College Preparatory subjects listed in the program structure before progressing to the Year 2 subjects.

## Learning Outcomes

On successful completion of this subject, students should be able to:

1. Explain the elements in an electric circuit
2. Apply the basic principles of analysing an electric circuit
3. Apply nodal, mesh, superposition, Thevenin's analysis DC electric circuits
4. Apply the principles of capacitors and inductors as energy storage elements and their first order circuits
5. Explain characteristics of electronic devices
6. Explain basic principles of communication waves
7. Explain significance of Logic gates and number systems

8. Explain the operation of transformers, DC and AC machines
9. Explain principle of operation of Renewable Energy systems

## Subject Content

1. Introduction to basic electrical quantities
2. Kirchoffs current and voltage laws
3. Series and parallel resistors, current and the voltage divider rules
4. Nodal and Loop analysis, The principle of superposition and Thevenin and Norton equivalent circuits
5. Energy storage elements, capacitors and inductors. Transient Response of first-order circuits
6. An introduction to Electronics
7. An introduction to communication waves
8. Logic gates and number systems
9. An introduction to Transformers, Electrical Machines
10. An introduction to renewable energy systems

## Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Type	Length	Percent	Threshold	Individual/Group Task
Quiz	In-class test x4 (2.5% each) 10 - 15 minutes during tutorial class	10	N	Individual
Intra-session Exam	1 hour	20	N	Individual
Practical	Practicals x5 (4% each) (2 hours each)	20	N	Both (Individual & Group)
Final Exam	2 hours	50	N	Individual

## Prescribed Texts

- Alexander, CK & Sadiku, MNO 2017, Fundamentals of electric circuits, 6th edn, McGraw-Hill Education, New York

## Teaching Periods

## Term 1 (2022) Penrith (Kingswood)

### Day

**Subject Contact** Ben Kelley ([https://directory.westernsydney.edu.au/search/name/Ben Kelley/](https://directory.westernsydney.edu.au/search/name/Ben%20Kelley/))

View timetable ([https://classregistration.westernsydney.edu.au/even/timetable/?subject\\_code=ELEC1005\\_22-T1\\_KW\\_D#subjects](https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=ELEC1005_22-T1_KW_D#subjects))

## Parramatta City - George St

### Day

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## Term 2 (2022)

### Parramatta City - George St

#### Day

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## Term 3 (2022)

### Penrith (Kingswood)

#### Day

**Subject Contact** Ben Kelley ([https://directory.westernsydney.edu.au/search/name/Ben Kelley/](https://directory.westernsydney.edu.au/search/name/Ben%20Kelley/))

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## Term 1 (2023)

### Penrith (Kingswood)

#### On-site

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## Term 2 (2023)

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