

# ELEC 1004 ELECTRICAL FUNDAMENTALS (WSTC ASSOC D)

**Credit Points** 10

**Legacy Code** 700104

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

**Description** The objective of this subject is to introduce to the student a number of concepts within electrical engineering. These include 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 fees 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

**Equivalent Subjects** ELEC 1003 - Electrical Fundamentals ELEC 1005 - Electrical Fundamentals (WSTC)

## Restrictions

Students must be enrolled in 7022 Associate Degree in Engineering

## 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. Kirchhoffs 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	Mandatory
Quiz	1hr	10	N	Individual	N
Practical	2hrs	25	N	Individual	N
Applied Project	Model + 600 words	25	N	Group	N
Final Exam	120 mins	40	N	Individual	N

## Prescribed Texts

- Alexander, C.K & Sadiku, M. N. O 2017, Fundamentals of electric circuits, 6th edn, McGraw-Hill, New York.

## Teaching Periods

## Quarter 3 (2025)

### Nirimba Education Precinct

#### Hybrid

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

View timetable ([https://classregistration.westernsydney.edu.au/odd/timetable/?subject\\_code=ELEC1004\\_25-Q3\\_BL\\_3#subjects](https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=ELEC1004_25-Q3_BL_3#subjects))

### Penrith (Kingswood)

#### Hybrid

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