

ELEC 4009 INSTRUMENTATION AND MEASUREMENT

Credit Points 10

Coordinator Gaetano Gargiulo ([https://directory.westernsydney.edu.au/search/name/Gaetano Gargiulo/](https://directory.westernsydney.edu.au/search/name/Gaetano%20Gargiulo/))

Description Through practical exercises students will engage with engineering measurement and instrumentation systems. Students determine the most appropriate measurement method and instrument, such as multimeters, digital oscilloscopes and interfacing modules, for particular applications. They will gain experience with the measurement of physical quantities and the instrumentation required to accurately present information to a controller. Additionally, transducers used to measure common physical quantities are presented in detail, while instrumentation includes a detailed analysis of zero-span circuits, Wheatstone bridges, instrumentation amplifiers, isolation amplifiers, voltage-to-current and voltage-to-frequency modules used for faithful signal transmission, digital-to-analogue and analogue-to-digital circuits to deepen student learning.

School Eng, Design & Built Env

Discipline Electronic Engineering

Student Contribution Band HECS Band 2 10cp

Check your fees via the Fees (https://www.westernsydney.edu.au/currentstudents/current_students/fees/) page.

Level Undergraduate Level 4 subject

Pre-requisite(s) ELEC 2001 OR ENGR 2001

Learning Outcomes

1. Use a variety of transducers to measure physical parameters and estimate the errors involved in making measurements.
2. Integrate theory and practice to the selection of electronic components fit to specs: "fit for the job"
3. Integrate theory and technical competencies to the design and test of electronic instrumentation.
4. Interface a wide variety of transducers/sensors.
5. Utilise A/D and D/A converters in the context of digital control.
6. Utilise embedded systems in the context of digital control.

Subject Content

1. Estimation of errors in measurements.
2. Transducers, primary & secondary sensors.
3. General measurement systems.
4. Design of Signal Conditioners.
5. Effects of loading in electronic circuits.
6. Noise in measurements.
7. Aspects of grounding practices.
8. A-D/D-A Conversions

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
Practical	2 submissions required	30	N	Individual	Y
Applied Project	2 submission required	40	N	Individual	Y
Practical Exam	2 hours	30	N	Individual	Y

Teaching Periods

Sydney City Campus - Term 2 (2025)

Sydney City

On-site

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View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=ELEC4009_25-SC2_SC_1#subjects)

Spring (2025)

Penrith (Kingswood)

Hybrid

Subject Contact Gaetano Gargiulo ([https://directory.westernsydney.edu.au/search/name/Gaetano Gargiulo/](https://directory.westernsydney.edu.au/search/name/Gaetano%20Gargiulo/))

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=ELEC4009_25-SPR_KW_3#subjects)

Parramatta City - Macquarie St

Hybrid

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