

# ELEC 3006 ELECTRICAL MACHINES 1

**Credit Points** 10

**Legacy Code** 300071

**Coordinator** Jamal Rizk (<https://directory.westernsydney.edu.au/search/name/Jamal Rizk/>)

**Description** This subject introduces the fundamental principles of electrical machines, the principles of electromechanical energy conversion and the operation and analysis of Direct Current (DC) generators and motors, induction motors and synchronous machines. Students apply principles and theory to practical exercises to develop their understanding. The subject also introduces various special purpose electrical machines, such as permanent magnet machines, step motors and reluctance machines for an understanding on different types of machines.

**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 3 subject

**Pre-requisite(s)** ELEC 2010 or ELEC 3011

## Learning Outcomes

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

1. Explain the principles in the operation of DC generators and motors, as well as Induction Motors
2. Apply machine theory techniques in the calculation of voltages, currents, power, speed and torque.
3. Outline the difference between AC & DC machines and their use.
4. Predict the expected responses of electrical machines to the input power.
5. Describe a machine circuit, calculation of machine parameters, machine efficiency and the losses in an electrical machine.
6. Identify different methods of speed control of DC motors and ways to control the speed of Induction Motors.

## Subject Content

1. DC Machines
2. Permanent Magnet/ Brushless Machines
3. Induction Machines
4. Synchronous Machines.
5. Single-phase Motors
6. Special Machines

## 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	6x3 hours	20	N	Individual	Y
Intra-session Exam	1.5 hour	20	N	Individual	Y
Final Exam	3 hours	60	N	Individual	Y

Teaching Periods

## Autumn (2025)

### Penrith (Kingswood)

**On-site**

**Subject Contact** Jamal Rizk (<https://directory.westernsydney.edu.au/search/name/Jamal Rizk/>)

[View timetable](https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=ELEC3006_25-AUT_KW_1#subjects) ([https://classregistration.westernsydney.edu.au/odd/timetable/?subject\\_code=ELEC3006\\_25-AUT\\_KW\\_1#subjects](https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=ELEC3006_25-AUT_KW_1#subjects))

## Parramatta City - Macquarie St

**On-site**

**Subject Contact** Jamal Rizk (<https://directory.westernsydney.edu.au/search/name/Jamal Rizk/>)

[View timetable](https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=ELEC3006_25-AUT_PC_1#subjects) ([https://classregistration.westernsydney.edu.au/odd/timetable/?subject\\_code=ELEC3006\\_25-AUT\\_PC\\_1#subjects](https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=ELEC3006_25-AUT_PC_1#subjects))

## Sydney City Campus - Term 1 (2025)

### Sydney City

**On-site**

**Subject Contact** Ehsan Gatavi (<https://directory.westernsydney.edu.au/search/name/Ehsan Gatavi/>)

[View timetable](https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=ELEC3006_25-SC1_SC_1#subjects) ([https://classregistration.westernsydney.edu.au/odd/timetable/?subject\\_code=ELEC3006\\_25-SC1\\_SC\\_1#subjects](https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=ELEC3006_25-SC1_SC_1#subjects))

## Sydney City Campus - Term 3 (2025)

### Sydney City

**On-site**

**Subject Contact** Ehsan Gatavi (<https://directory.westernsydney.edu.au/search/name/Ehsan Gatavi/>)

[View timetable](https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=ELEC3006_25-SC3_SC_1#subjects) ([https://classregistration.westernsydney.edu.au/odd/timetable/?subject\\_code=ELEC3006\\_25-SC3\\_SC\\_1#subjects](https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=ELEC3006_25-SC3_SC_1#subjects))