PROC 1009 MATERIALS SCIENCE IN ENGINEERING (WSTC)

Credit Points 10

Coordinator Ben Kelley (https://directory.westernsydney.edu.au/search/name/Ben Kelley/)

Description This subject provides you with an introduction to the science of engineering materials and their application across various industries. It covers key topics such as atomic structure, interatomic bonding, crystalline structure, and defects in solids. You will learn about the mechanical and physical properties of a wide range of materials, including metals, ceramics, polymers, composites, and advanced materials. This subject will teach you how to select the right materials for specific engineering needs, while emphasising sustainability principles. You will gain hands-on experience in analysing material properties and understanding phase diagrams, corrosion, and degradation.

School Eng, Design & Built Env

Discipline Materials Engineering

Student Contribution Band

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

Level Undergraduate Level 1 subject

Restrictions

Students must be enrolled in an existing Destination College Diploma program listed below:

- 7188 Diploma in Culture, Society and Justice
- 7189 Diploma in Health Science
- 7190 Diploma in Business
- 7191 Diploma in Information and Communication Technologies
- 7192 Diploma in Building Design and Construction
- 7193 Diploma in Engineering Studies
- 7194 Diploma in Creative Industries and Communications
- 7195 Diploma in Arts
- 7196 Diploma in Science
- 7197 Diploma in Education Studies

Learning Outcomes

After successful completion of this subject, students will be able to:

1. Identify and describe the fundamental principles of materials science, including atomic structure, bonding, crystallography, diffusion, phase diagrams, and the relationships between material properties and structure.
2. Analyse and interpret phase diagrams and microstructures to assess material properties and predict mechanical failures, corrosion, and degradation.
3. Select appropriate materials for specific engineering applications, considering material properties, sustainability principles, and Indigenous Australian knowledge.
4. Apply materials science knowledge to solve practical engineering problems.
5. Work effectively in a team to maintain lab safety, analyse data, and communicate findings.

Subject Content

- Atomic structure and interatomic bonding
- Structure and defects of materials, including metals, ceramics, polymers, composites, and advanced materials
- Mechanical and physical properties, including thermal, electrical, magnetic, and optical
- Diffusion and phase diagrams
- Corrosion and degradation of materials
- Material selection and sustainability

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	2x Quizzes, 1 hour each	30	N	Individual	N
Practical	2 hours x 5	40	N	Individual	N
Applied Project	1000 words or equivalent	20	N	Individual	N
Presentatio	20 minutes per group	10	N	Group	N

Teaching Periods

Spring Block 2 (2025)

Penrith (Kingswood)

On-site

Subject Contact Ben Kelley (https://directory.westernsydney.edu.au/search/name/Ben Kelley/)

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=PROC1009_25-SB2_KW_1#subjects)