

# PROC 4002 ENGINEERING MATERIALS FROM WASTE

**Credit Points** 10

**Legacy Code** 301417

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**Description** Students will learn about the high potential of waste materials produced by continually growing rapid urbanisation and rising populations, which can be widely reused in engineering projects such as buildings, roads. The focus of this unit is the use of solid waste such as glass, tailings and demolished waste in engineering materials such as concrete, road base and asphalt. In addition, students will explore several recycling and recovery processes and investigate the performance of waste incorporated into engineering materials. Students report on real world state-of-the-art developments while integrating concepts of the circular economy, Australian standards and regulations to ensure the compliance of the developed materials. Work Integrated Learning (WIL) is a component of this unit.

**School** Eng, Design & Built Env

**Discipline** Materials Engineering

**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 4 subject

## Learning Outcomes

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

1. Identify the purpose of using waste materials in engineering projects.
2. Select appropriate type and proportion of waste materials for a specific application.
3. Determine the properties of waste materials incorporated into concrete, road base and asphalt.
4. Identify proper methods for recycling and recovery processes of waste materials by incorporating into the concept of circular economy.
5. Apply appropriate Australian standards and regulations in developing new sustainable engineering materials.
6. Collaborate with diverse others in teams to conduct experiments or lab work safely and ethically.
7. Enhance graduate skills capability on scholarly research

## Subject Content

- 1.Characteristics of various waste materials such as glass, tailings, demolished waste, fly ash, plastics and metals, etc.
- 2.Use of waste materials, particularly glass, tailings and demolished waste, in concrete, road base and asphalt.
- 3.Properties and performance of waste materials incorporated concrete, road base and asphalt.
- 4.Recycling and recovery processes of waste materials.
- 5.Incorporation of the circular economy concept in the reuse of waste materials.
- 6.Application of Australian standards and regulations for compliance checking.

## 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.

Item	Length	Percent	Threshold	Individual/ Group Task
Quiz (x2)	1 hour (per Quiz)	30 (15% per quiz)	N	Individual
Laboratory report (x 2)	1000 words (each)	30 (15% per report)	N	Group
Research report	3500-5000 words	40	Y	Individual

Prescribed Texts

- Christensen, TH (ed.) 2011, Solid waste technology & management, vols 1 & 2, Wiley, Chichester.

Teaching Periods