

# ENGR 7020 SUSTAINABILITY AND RISK ENGINEERING (PG)

**Credit Points** 10

**Legacy Code** 300939

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

**Description** Analysis of sustainability with engineering perspective is increasingly becoming important in the modern world. Also, in the future sustainability will include risk engineering. Hence, engineers with in-depth understanding of different tools that can be used for both sustainability and risk analysis will have significant competitive edge in their future career. The main objective of this subject is to introduce different tools available for sustainability and risk analysis in various engineering applications. The content includes renewable/alternative energy systems, energy/resource efficiency, sustainable/green buildings, sustainable transport and infrastructure, sustainable water management, environmental management systems, sustainability reporting, life cycle analysis, probability/reliability theory, risk assessment models, overall system analysis.

**School** Eng, Design & Built Env

**Discipline** Other Engineering And Related Technologies

**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** Postgraduate Coursework Level 7 subject

## Restrictions

Students must be enrolled in a postgraduate program

## Assumed Knowledge

Engineering problem solving skills.

## Learning Outcomes

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

1. Apply engineering knowledge for comprehensive analysis of engineering systems for sustainability.
2. Choose appropriate tools/methods for sustainability and risk analysis of engineering systems.
3. Conduct thorough energy/water/materials audit for a given engineering system and construct detailed mass balance tables.
4. Determine appropriate water, energy, transport and infrastructure system based on sustainability and risk management criteria.
5. Carry - out triple bottom line based life cycle analysis of engineering systems including rigorous economic analysis tools.
6. Conduct overall system analysis of engineering systems considering sustainability and risk criteria.

## Subject Content

mass balance/ flow analysis  
heat/energy flow/conservation/loss analysis  
renewable/ alternative energy systems  
energy/resource efficiency  
sustainable/green buildings  
sustainable transport and infrastructure

sustainable water management  
environmental management systems  
sustainability reporting/ framework  
life cycle analysis  
probability/ reliability theory  
risk assessment models  
integrated system analysis.

## 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	1 hour per quiz	20	N	Individual	N
Report	5,000 words including tables, figures and pictures	25	N	Group	N
Practical	1,000 words including tables, figures and pictures.	5	N	Group	N
Final Exam	3 hours	50	N	Individual	N

## Prescribed Texts

- Vezzoli, C. and Manzini, E. (2008). Design for environmental sustainability. Springer, London.
- Wang J.X. and Roush M.L. (2000). "What every engineer should know about risk engineering and management ", New York : Marcel Dekker, Inc.
- White, I. (2010). Water and the city: risk, resilience, and planning for a sustainable future, Routledge, New York.
- Yigitcanlar, T. (2010). Rethinking sustainable development: urban management, engineering, and design, Engineering Science Reference, Hershey, Pa.

## Teaching Periods

## Spring (2025)

### Parramatta City - Macquarie St

#### On-site

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

View timetable ([https://classregistration.westernsydney.edu.au/odd/timetable/?subject\\_code=ENGR7020\\_25-SPR\\_PC\\_1#subjects](https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=ENGR7020_25-SPR_PC_1#subjects))