## 1. Module details

**Module name**

## Sustainability

**Module duration**

It is expected that students with the appropriate entry knowledge and skills will successfully complete this module in 20 hours.

**Module code**

NUER08

**Discipline code**

1105

## 2. Module purpose

This module provides an initial overview of sustainability concepts, which will form a general framework for the study of later modules. Environmental management systems and sustainability principles are examined in the context of some global environment problems. Industry orientation visits allow for observation of sustainability practices in local industry.

It combines both theory and its applications to real situations.

## 3. Prerequisites

Nil

## 4. Relationship to competency standards

This module provides part of the underpinning knowledge and skills identified in the 'Evidence Guide' of specific units in the National Electrotechnology Competency Standards, namely NES411 and NES709.

## 5. Content

**Sustainability principles relating to the operation of :**

society ,
governments and economies,
industry and business practices,
domestic and individual lifestyles.

**Global problems including:**

degradation of ecosystems
resource depletion
pollution
population impacts
global warming

**Solutions to global problems including:**

recognition of the importance of the environment by governments, commerce and society in general.
commensurate action by governments, commerce and society in addressing environment problems.
adoption of sustainability principles and environmental management systems.

technological and behavioural solutions
economic, social and political change

**Sustainability principles including:**

environmental accounting and economies
full cost pricing
triple bottom line ethic
ecologically sustainable development
greenhouse gas abatement
energy efficiency
resource and water use efficiency
life cycle costing
renewable energy substitution
cleaner production
waste minimisation, reuse and recycling
ecological footprint

## 6. Assessment strategy

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| **Assessment methods** | Assessment should be progressive reflecting a wholistic approach to ensure the module purpose is met. To assist in ensuring validity, reliability and fairness assessment instruments should include practical and written exercises, consisting of a number of item types, such as multiple choice, short answer and problem solving. |
| **Conditions of assessment** | Normally learning and assessment will take place in a classroom/ laboratory environment. |

## 7. Learning outcome details

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| **Learning outcome 1** | **Describe briefly some life supporting services provided by earth's ecosystems** | |
| **Assessment criteria** | 1.1 | List some ways in which ecosystems moderate climate. |
| | 1.2 | Outline some ways in which ecosystems purify and store water. |
| | 1.3 | Outline some ways in which ecosystems recycle waste. |
| **Learning outcome 2** | **Explain some of Australia's major ecosystem changes since white settlement in particular, and the problems arising from them.** | |
| **Assessment criteria** | 2.1 | Outline the changes to Australian forest cover since white settlement, and list the resulting loss of ecosystem and human benefits. |
| | 2.2 | Outline the changes to Australia's soils since white settlement, and list the resulting loss of ecosystem and human benefits. |
| | 2.3 | Outline changes to Australia's waterways since white settlement, and list the resulting loss of ecosystem and human benefits. |
| | 2.4 | Investigate the place of environmental accounting in quantifying Australia's environmental losses. |
| | 2.5 | Investigate limits to Australia's population carrying capacity. |
| **Learning outcome 3** | **Identify the mechanisms responsible for global warming, the present consequences and projections for future warming and ecologically and economically sustainable solutions to global warming.** | |
| **Assessment Criteria** | 3.1 | List greenhouse gases and their sources and quantities that contribute to global warming. |
| | 3.2 | List the global warming impacts for Australia for 2030 and 2070 predicted by CSIRO modelling. |
| | 3.3 | Outline the requirements to achieve stable atmospheric concentrations of greenhouse gases. |
| | 3.4 | Outline ecologically and economically sustainable methods for achieving these stable concentrations. |

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| **Learning outcome 4** | **Examine a range of local industries and their operations in terms of the sustainability principles outlined above.** |
| **Assessment Criteria** | 4.1 Prepare a summary of sustainability initiatives as identified in those industries investigated. |

## 8. Delivery of the module

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| **Delivery strategy** | It is recommended that learning and assessment be facilitated in a holistic manner. Small group work on a project may serve as the major assessment item on which a large part of the teaching and learning will focus. This may also facilitate the integration of issues and learning about complex issues. The learning outcome sequence may be other than that indicated in the module. |
| **Resource requirements** | Resources should be sufficient for students to carry out project work individually or in small groups. |
| **Occupational health and safety requirements** | A safe and healthy environment will be provided for students and teachers as well as safety procedures with regard to learning / teaching activity according to local OH&S regulations. These regulations should also be followed during field trips. |
| **Minimum physical resources** | Access to a library containing suitable texts, videos and journals. Access to the internet. |
| **Recommended References** | Australian Environment History: Essays and Cases; Edited Stephen Dovers, Oxford Uni Press 1994.<br><br>Bolton, G.(1992) *Spoils and Spoilers : A History of Australians Shaping the Environment*. 2nd Ed.;, Allen & Unwin.<br><br>Cocks, D. (1996). *People Policy – Australia's Population Choices*. UNSW Press.<br><br>Flannery, T (1994) *The Future Eaters*;, Reed Books.<br><br>Hawken, P., Lovins A.and Lovins, L (1999). *Natural Capitalism. The Next Industrial Revolution*;, Earthscan Publications.<br><br>Henderson-Sellers, A. and Blong, R. (1989) *The Greenhouse Effect: Living in a Warmer Australia*.<br><br>Kohen, J. (1995). *Aboriginal Environmental Impacts*, UNSW Press.<br><br>Lowe, I. (1989) *Living in the Greenhouse*, Scribe.<br><br>Meadows, D., Meadows, L., Randers, J. (1992). *Beyond the Limits*. Earthscan Publications<br><br>Sinclair, P. (2001), *The Murray: A River and its People*; Melbourne Uni Press.<br><br>Suzuki, D. (1994). *Time To Change*, Allen & Unwin.<br><br>Tyler Miller, G. (1998) *Living in the Environment*; ITP. |

Yenken, D. & Wilkinson, D. (2000). *Resetting the Compass – Australia's Journey towards sustainability*. CSIRO Publishing.

Young, A. (1996). *Environmental Change in Australia since 1788*; Oxford Uni Press.

**Other resources**

**Websites**

Australian Greenhouse Office (AGO)
www.ago.gov.au
Sustainable Energy Authority Victoria
www.seav.vic.gov.au
CSIRO
www.csiro.au
Environment Australia,
www.ea.gov.au

**Journals**

Ecos ( CSIRO )
Habitat ( A.C.F. )
Renew (Alternative Technology Association )
Solar Progress (Aust and NZ Solar Energy Society
Waste Management and the Environment

**Videos**

Amory Lovins presents, Natural Capitalism - The Next Industrial Revolution.

**Other Resources:**

Lenzen, M. (1999*). A personal greenhouse gas calculation kit*. Applied Physics Dept., UNSW.

UNEP (2001). *Teaching and Learning for a Sustainable Future – a multimedia professional development program.* Available on CD-ROM or www.unesco.org/education/tlsf.