Unit 37: Environmental Assessment & Monitoring

Unit code	**R/615/1423**
Unit level	**5**
Credit value	**15**

Introduction

The construction industry is one of the least sustainable industries in the world; using around half of all the resources that humankind consumes. Yet society depends on construction to grow; making it increasingly important to find ways to reduce its impact. Environmental assessment methods were conceived in order to drive improvements in the built environment. They provide common methodologies that enable the environmental impact of buildings and building products to be measured, evaluated and reduced.

This unit explores the important role that environmental assessment and monitoring plays in reducing the environmental impact of the built environment.

On successful completion of this unit students will be able to undertake an environmental assessment of a building and compare its performance against other similar buildings. Students will understand the types of environmental impact that a building can have and how this affects the environment over time. They will evaluate the different environmental assessment methods that exist, and understand the motivations, methods and differences between them.

Learning Outcomes

By the end of this unit students will be able to:

1. Discuss what is meant by sustainability and its relevance to the built environment.
2. Compare the ways that sustainability in construction can be quantified, assessed and monitored, and how this can be used to drive change in the construction industry.
3. Evaluate the features and drivers behind different environmental assessment methods.
4. Carry-out an environmental assessment on a building; comparing its performance with similar buildings.

Essential Content

LO1 **Discuss what is meant by sustainability and its relevance to the built environment**

What is sustainability?

The meaning of sustainability.

The changes to our global climate and their causes and consequences.

The concept of the three pillars of sustainability.

The impact of the construction industry:

What makes the built environment so unsustainable?

Why is it important to balance the need for buildings with their impact on the environment?

What are the barriers to sustainability faced by the construction industry?

LO2 **Compare the ways that sustainability in construction can be quantified, assessed and monitored, and how this can be used to drive change in the construction industry**

Quantifying, measuring and evaluating sustainability:

Quantitative measures of sustainability.

Qualitative measures of sustainability.

Bringing about change in the built environment:

'Top-down' sustainability: bringing about change through regulation.

'Bottom-up' sustainability: bringing about change through the market.

LO3 **Evaluate the features and drivers behind different environmental assessment methods**

Building level schemes:

What are the different industry standard assessment methods used for evaluating the environmental impact of buildings?

How do these schemes differ in the relative importance they give to different areas of concern?

Component level schemes:

What are the different industry standard assessment methods used for evaluating the environmental impact of materials and components?

How do these relate to and feed into building level assessment methods?

LO4 **Carry-out an environmental assessment on a building; comparing its performance with similar buildings**

Selecting an environmental assessment method:

Understand the needs and aspirations of the project and determine what the project's sustainability focus will be.

Use research carried out as part of LO3 to select the most appropriate environmental assessment method to use.

Project assessment:

Carry out the assessment to rate the environmental impact of the project.

Identify the most effective ways the project could improve its environmental impact.

Compare the costs and benefits of the project from an economic, social and environmental perspective with other similar buildings.

Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
LO1 Discuss what is meant by sustainability and its relevance to the built environment		
P1 Discuss the 'three pillars of sustainability' and the impact humankind is having on the environment. **P2** Analyse the ways in which buildings are unsustainable and the barriers to sustainability in the construction industry.	**M1** Analyse how the 'three pillars of sustainability' are interrelated, and why it is important for the built environment to balance these.	**D1** Critically evaluate how governments seek to address sustainability through legislation.
LO2 Compare the ways that sustainability in construction can be quantified, assessed and monitored; evaluating how this can be used to drive change in the construction industry		
P3 Compare quantitative and qualitative measures of sustainability. **P4** Compare 'bottom-up' and 'top-down' approaches to driving sustainability.	**M2** Examine how different approaches to sustainability drive the construction industry to reduce its environmental impact.	**D2** Critically evaluate assessment methods and how they aim to overcome the barriers to sustainable construction.

Pass	Merit	Distinction
LO3 Evaluate the features and drivers behind different environmental assessment methods		
P5 Compare industry standard building-level environmental assessment methods and identify their particular areas of emphasis. **P6** Evaluate different methods of evaluating the environmental impact of materials and components, and how these relate to building level schemes.	**M3** Analyse the various environmental assessment methods and their approaches towards reducing a building's impact.	**LO3 LO4** **D3** Critically evaluate how environmental assessment methods respond to different environmental concerns and improve the performance of the building.
LO4 Carry-out an environmental assessment on a building; comparing its performance with similar buildings		
P7 Assess the environmental performance of a given building using an industry standard environmental assessment method. **P8** Compare a given building's environmental performance with other similar buildings.	**M4** Examine how the results of the environmental assessment can be used to improve the environmental performance of the building.	

Recommended Resources

Textbooks

BERGE, B. (2009) *The Ecology of Building Materials*. 2nd Ed. Abingdon: Routledge.

HALLIDAY, S. (2008) *Sustainable Construction*. 2nd Ed. Oxford: Butterworth-Heinemann.

KUBBA, S. (2012) *Handbook of Green Building Design and Construction: LEED, BREEAM, and Green Globes*. 1st Ed. Oxford: Butterworth-Heinemann.

Websites

www.breeam.com	BRE-BREEAM (General Reference)
www.usgbc.org/leed	Leadership in Energy and Environmental Design (General Reference)
www.gbca.org.au/green-star	Green Building Council Australia – Green Start (General Reference)
estidama.upc.gov.ae	Abu Dhabi Urban Planning Council – Estidama (General Reference)
www.passivehouse.com	Passive House Institute (General Reference)

Links

This unit links to the following related units:

Unit 8: Mathematics for Construction

Unit 9: Principles of Heating Services Design & Installation

Unit 10: Principles of Ventilation and Air Conditioning Design & Installation

Unit 16: Principles of Alternative Energy

Unit 17: Principles of Public Health Engineering

Unit 31: Advanced Heating, Ventilation and Air Conditioning Design & Installation

Unit 40: Alternative Energy Systems Design & Installation