

AR7411 Module Specification

Module Title: Build (B)	Module Code: AR7411 Level: 7 Credit: 30 ECTS credit: 15	Module Leader: Gwyn Stacey
Pre-requisite: None	Pre-cursor: None	
Co-requisite: None	Excluded combinations: None	Suitable for incoming study abroad? N
Location of delivery: Other If 'Other' please insert location here: Centre for Alternative Technology		
Summary of module for applicants:		
<p>The aim of this module is to develop an advanced understanding of the practical aspects of implementing designs and construction in practice. This module will offer students the opportunity to gain knowledge of a selection of sustainable building systems through hands-on building workshops. It will also offer students the opportunity to design a small structure that can be built at 1:1 scale by students at CAT and with the available facilities. Designs from the cohort's submissions will be selected and built by small groups of students, who will also analyse and develop an understanding of the costs and industry implications of such construction, as well as materials use and sourcing.</p>		
Main topics of study:		
<ul style="list-style-type: none"> • Resource Limitations to materials • Natural and synthetic fibre Insulations • Moisture handling and materials in Renovation • Straw bale construction • Cementitious materials (limes and cements) • Hemp and binder construction and use in renovation • Composite materials and boards • Modular prefabricated building components • Timber use • Earth and clay building (e.g., Rammed Earth, Light Earth) • Environmental Assessment methods for materials (e.g., Life Cycle Assessment, Embodied Energy, Embodied Carbon) • Modern methods of sustainable construction • Environmental Impacts of materials (CO₂, biodiversity) • Health impacts and safety issues of materials • Material's testing • Practical implications of use 		
This module will be able to demonstrate at least one of the following examples/ exposures		
<p><i>Live, applied project</i> <input checked="" type="checkbox"/></p> <p><i>Company/engagement visits</i> <input checked="" type="checkbox"/></p> <p><i>Company/industry sector endorsement/badging/sponsorship/award</i> <input checked="" type="checkbox"/></p>		
Learning Outcomes for the module		
<p>Where a LO meets one of the UEL core competencies, please put a code next to the LO that links to the competence.</p> <ul style="list-style-type: none"> • <i>Digital Proficiency - Code = (DP)</i> • <i>Industry Connections - Code = (IC)</i> • <i>Social & Emotional Intelligence - Code = (SEI)</i> • <i>Physical Intelligence - Code = (PI)</i> • <i>Cultural Intelligence - Code = (CI)</i> 		

- *Community Connections & UEL Give Back - Code = (CC)*
- *Cognitive Intelligence – Code = (COI)*
- *Enterprise and Entrepreneurship (EE)*

At the end of this module, students will be able to:

(note reference numbers e.g. GC3.1, relate to ARB criteria for prescription at Part 2)

Knowledge

1. Synthesize sustainable and natural building systems such as strawbale, lime and rammed earth construction into design concepts and construction (IC)

Thinking skills

2. Understand the impact of buildings on the environment, and the precepts of sustainable design (GC5.2)
3. Undertake investigation, critical appraisal and selection of alternative structural, constructional and material systems relevant to architectural design (GC8.1)
4. Implement strategies for building construction, and ability to integrate knowledge of structural theories and construction techniques (GC8.2)
5. Appraise the physical properties and characteristics of building materials, components and systems, and the environmental impact of specification choices (GC8.3)

Subject-based practical skills

6. critically examine the financial factors implied in varying building types, constructional systems, and specification choices, and the impact of these on architectural design (GC10.1) (EE)
7. understand the cost control mechanisms which operate during the development of a project (GC10.2)
8. ability to evaluate materials, processes and techniques that apply to complex architectural designs and building construction, and to integrate these into practicable design proposals

Skills for life and work (general skills)

9. present design proposals clearly and concisely orally (DP)
10. work within a diverse team to design, develop and construct a small-scale building (PI) (SEI)

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

For on campus students:

- the principles of the materials and construction systems will be learned through lectures and workshops and personal study
- students will also be able to apply the building theory into practice in hands-on workshops
- concurrently students will have the opportunity to develop a design for a small structure using sustainable building methods
- two to 4 designs will be selected and this provides a few students with the experience of building one of their designs. Every student will have the opportunity to see a design develop into a built structure.
- Students will also be required to consider within a structured report the costs and industry challenges that would apply to building such structures in practice.

Assessment methods which enable students to demonstrate the learning outcomes for the module; please define as necessary:

Weighting:

Learning Outcomes demonstrated:

Design and implementation portfolio [5000 word equivalent]

100%

1 - 10

Reading and resources for the module:

Core

BERGE, B. 2000. *The ecology of building materials*. Oxford: Butterworth-Heinemann

MCDONOUGH, W and BRAUNGART, M 2002. *Cradle to cradle: remaking the way we make things*. New York : North Point Press

KIBERT, C. J., SENDZIMIR, J., GUY, G. B. 2001. *Construction ecology: nature as the basis for green buildings*. New York: Taylor & Francis.

RYAN, C. 2011. *Traditional construction for a sustainable future*. Abingdon, Oxon: Spon Press.

Recommended

Structures

SILVER, P., MCLEAN, W., EVANS, P. 2014. *Structural Engineering for Architects: A Handbook*. Laurence King

MILLAIS, M. (2005). *Building Structures*. Abingdon: Taylor and Francis.

POPOVIC LARSEN, O.; Tyas, A. 2003. *Conceptual structural design: bridging the gap between architects and engineers*. London: Thomas Telford

Construction

BEVAN, R. and WOOLLEY, T. 2008. *Hemp lime construction: A guide to building with hemp lime composites*. Bracknell, IHS BRE Press.

BORER, P. and HARRIS, C 1998. *Out of the Woods: Ecological Designs for Timber Frame Self Build*. Centre for Alternative Technology.

ELIZABETH L. and ADAMS C. Eds. 2000. *Alternative construction: contemporary natural building methods*. New York: Wiley

GALINDO, M. 2012. *Wood: Architecture and design*. Salenstein, Switzerland: Braun.

HOLMES, S. and WINNGATE, M. 2002. *Building with lime: A practical introduction, 2nd revised edition*. London, ITDG Publishing.

LANCASHIRE, R and TAYLOR, L 2011. *Timber frame construction: designing for high performance* (5th edition). High Wycomb: TRADA Technology.

MINKE, G. and MAHLKE. F. 2005. *Building with straw: Design and technology of a sustainable architecture*. Basel: Birkhauser.

MINKE, G. 2006. *Building with earth: Design and technology of a sustainable architecture*. Basel: Birkhäuser.

RYAN, C. 2011. *Traditional construction for a sustainable future*. Abingdon, Oxon: Spon Press.

STANWIX, W. & SPARROW, A. 2014. *Hempcrete Book : Designing and Building with Hemp-Lime*, Cambridge, UIT Cambridge Ltd.

WALKER, P. et al. 2005. *Rammed earth: Design and construction guidelines*: BRE Press.

Provide evidence of how this module will be able to demonstrate at least one of the following examples/ exposures

Live, applied project

The project engages students in a live construction at 1:1 for local community use.

Company/engagement visits

As part of the module several experts attend site to deliver lectures and workshops, there is additional opportunity to visit local material suppliers and community developments.

Company/industry sector endorsement/badging/sponsorship/award

Several of the materials used during the construction are sponsored by industry and supplied by local industry. The module is also supported by professional services and sponsorship.

Indicative learning and teaching time (10 hrs per credit):	Activity
1. Student/tutor interaction: 100	Design tutorials, Workshops, Lectures, Seminars, Studio work, Reviews
2. Student learning time: 200	Background reading and preparation, Assignment preparation, Design Portfolio, Diary, Studio work
Total hours (1 and 2): 300	

For office use only. (Not required for Programme Handbook)

Assessment Pattern for Unistats KIS (Key Information Sets)	Weighting:
Coursework (<i>written assignment, dissertation, portfolio, project output</i>)	
Practical Exam (<i>oral assessment, presentation, practical skills assessment</i>)	

Written Exam	
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HECoS Code:	
UEL Department:	