

MODULE TITLE	Sustainable Architecture	CREDIT VALUE	10
MODULE CODE	CSM3375	MODULE CONVENER	Dr Adam Feldman (Coordinator)
DURATION: TERM	1	2	3
DURATION: WEEKS	2		
Number of Students Taking Module (anticipated)	28		

DESCRIPTION - summary of the module content

A module to explore sustainability in the built environment. How can land, building materials, resources and energy be employed to a community's advantage but with low levels of long term, irreversible and environmental impact? The module looks for design ingenuity, sustainable building practices, lowering of energy and resource demand, but without necessarily any fall in building quality or enjoyment! Building regulations and safety must still be met and how can we measure the sustainability and performance of a building?

Many of the subjects modules in years 1, 2 and 3 of the Renewable Energy degree course are considered Co-requisite and usefully beneficial to this module (see towards the end of this document).

AIMS - intentions of the module

This module aims to develop architectural design capability in candidates, building on acquired knowledge of Energy Management principles and practice covered in Year 2. It aims to develop knowledge and understanding of new material on architectural design principles and processes (at an introductory level), sustainable construction materials and sustainable construction practice and to develop capability in the design of buildings integrated renewable energy systems.

INTENDED LEARNING OUTCOMES (ILOs) (see assessment section below for how ILOs will be assessed)

By means of conducting research, design calculations and drawings, culminating in the preparation of a architectural design competition poster of a standard comparable to professional submissions, **candidates should demonstrate:**

Module Specific Skills and Knowledge

1. that they have acquired detailed knowledge and understanding of sustainable architectural design principles and practice
2. that they can produce detailed conceptual design drawings for buildings that are low energy / energy efficient (as measured by contemporary buildings codes and established measurement methodologies) as well as cost-efficient and fit-for-purpose
3. that they have gained awareness and can apply the relevant buildings regulations, planning requirements, and associated codes of practice
4. that they have acquired deep knowledge and understanding of buildings integrated renewable energy technologies and energy efficiency measures and can design systems for deployment in buildings domestic or small commercial/industrial
5. that they have gained an appreciation of sustainable construction materials and practices such that an appropriate range of materials is selected and appropriate process are specified in their building designs

Discipline Specific Skills and Knowledge

6. a detailed and coherent understanding of design processes that can be applied in unfamiliar situations, such that this can be applied in critical appraisal of uncertainties, ambiguities and the limits of knowledge in a design brief
7. an understanding of the need for analysis and enquiry in the design process and justification of decisions throughout a design process
8. capability to propose innovative aspects in designs for familiar and unfamiliar situations
9. an ability to model and analyse complex systems, processes and products in renewable energy, using scientific principles and to recognise the limitations of each analysis

Personal and Key Transferable / Employment Skills and Knowledge

10. an ability to assess the limitations of software applied in particular cases and to select the appropriate computer based tool to solve an unfamiliar problem
11. autonomy in planning and managing resources that support the syllabus plan and can reflect on the efficiency of use of these resources
12. that they can conduct and present / report calculations, to a deadline, with awareness of professional codes of conduct and standards and can incorporate an ethical dimension and/or exercise personal judgement into/on their work
13. by additional means of oral presentation, candidates should demonstrate a capability to relay technical information effectively using the spoken word, supported by professional quality visual aids, and be to able to defend their reasoning and conclusions against probing questioning
14. they can interact effectively in a group situation and work as part of a team (including, possibly, as the leader) such that they can recognise differing team roles within a team

SYLLABUS PLAN - summary of the structure and academic content of the module

Introduction -Review of relevant renewable energy technologies presented in previous years Energy efficiency in the home Passive solar design: solar gain, shading Photovoltaic panels Solar hot water heating systems Ground source heat pumps Micro wind technologies MicroCHP technologies Sunpath diagrams and degree day calculations Field class: Visit to Key Organics Ltd Estimation of heating, ventilation, lighting and power requirements. Audit of existing plant and determination of special services needs. Study of the working patterns and typical working environment. Establishment of client acceptance criteria Materials and techniques to construct a light industrial unit. Field class: Mike Grigg's House, St Issey, North Cornwall Passive solar design principles in practice High thermal mass domestic dwellings Heat recovery systems Air reticulation systems Domestic insulation materials and methods Architectural Design Guidelines Lighting: Natural, Artificial Ventilation: Natural, Artificial Building envelope Thermal comfort Water: fixtures, collection, sewerage Measuring Sustainability BREEM & Ecohomes ISBEM NCM Computer codes for accessing building performance Sustainable Building Materials Rammed earth structures Cob structures Clay and stone buildings Lime, straw, timber Recycled materials Sustainable Construction Techniques Lightweight timber Heavyweight Eco-minimalist Emerging Hybrids Zero (fossil) Energy Developments The ZED Wheel The 21 Steps Project image Private amenities Renewable energy technologies Housing densities Carbon balance Building physics Field Class: Site visit to the Jubilee Wharf ZED development in Penryn. Initial Criticisms of student design concepts.

LEARNING AND TEACHING

LEARNING ACTIVITIES AND TEACHING METHODS (given in hours of study time)

Scheduled Learning & Teaching Activities	27.00	Guided Independent Study	73.00	Placement / Study Abroad
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DETAILS OF LEARNING ACTIVITIES AND TEACHING METHODS

Category	Hours of study time	Description
Scheduled learning & teaching activities	27	Lectures
Guided independent study	73	Private study

ASSESSMENT

FORMATIVE ASSESSMENT - for feedback and development purposes; does not count towards module grade

SUMMATIVE ASSESSMENT (% of credit)

Coursework	100	Written Exams	0	Practical Exams
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DETAILS OF SUMMATIVE ASSESSMENT

Form of Assessment	% of Credit	Size of Assessment (e.g. duration/length)	ILOs Assessed	Feedback Method
Group poster	70	2 x A1, 4000 words	1-12	Written
Group poster	30	15 mins	13-12	Written

DETAILS OF RE-ASSESSMENT (where required by referral or deferral)

Original Form of Assessment	Form of Re-assessment	ILOs Re-assessed	Time Scale for Re-reassessment
Summative assessment	Additional assessment	As above	August Ref/Def period

RE-ASSESSMENT NOTES

As above 1 piece of CW 100%

RESOURCES

INDICATIVE LEARNING RESOURCES - The following list is offered as an indication of the type & level of information that you are expected to consult. Further guidance will be provided by the Module Convener

Basic reading:

Boyle, G. (ed) Renewable Energy Chapter 2, Oxford University Press. ISBN: 0199261784

Bill Dunster Architects ZEDfactory Ltd. 2006. From A to ZED: Realising Zero (fossil) Energy Developments. CD-ROM edition. Available on RE Share Drive.

Dunster, B., Simmons, C., Gilbert, B., 2008. The ZEDbook. Abingdon: Taylor & Francis. ISBN 10 0-415-391997. Shelf Number: 721.0467 DUN.

Smith, P., 2001. Architecture in a climate of change : a guide to sustainable design. Oxford : Architectural Press, 2001. ISBN: 0750653469. Shelf Number: 720.47 SMI

Roaf, S., Fuentes, M., Thomas, S., 2003. Ecohouse II. Architectural Press. ISBN: 0750657340. Available in RE Lab.

Thomas, R., Photovoltaics and Architecture, Spon Press, London, ISBN: 0415231825, Shelf Number: 720.472

Porteous, C. with MacGregor, K., Solar architecture in Cool Climates, ISBN: 190291662X, Shelf Number: 728.370472

Kilbert, C.J. 2005. Sustainable construction : green building design and delivery. Hoboken, N.J. : Wiley, c2005. ISBN: 0471661139. Shelf Number: 720.47

Brandon, P.S., and Lombardi, P. 2005. Evaluating sustainable development in the built environment. Oxford: Blackwell, 2005. ISBN: 0632064862. Shelf Number: 307.1216 BRA

Steele, J. 2005. Ecological architecture: a critical history. London : Thames & Hudson, 2005. ISBN: 0500342105. Shelf Number: 720.47 STE

Minke, G., and Mahlke, F., 2005. Building with straw: design and technology of a sustainable architecture. (Translated from German) Basel : Birkhauser, c2005. ISBN: 3764371714. Shelf Number: 693.997 MIN

Williamson, T.J., Radford, A., and Bennetts, H., 2003. Understanding sustainable architecture. London : Spon Press, 2003. ISBN: 0415283515. Shelf Number: 691 WIL

Dearling, A., and Meltzer, G., 2003. Another kind of space: creating ecological dwellings and environments. Lyme Regis: Enabler, ISBN: 0952331659. Shelf Number: 720.47 DEA

Slessor, C., and Linden, J., 2001. Eco-tech: sustainable architecture and high technology. London : Thames & Hudson, ISBN: 0500283060. Shelf Number: 720.47 SLE

Addis, W., 2005. Building with reclaimed components and materials: a design handbook for reuse and recycling. London: Earthscan Publications Ltd, ISBN: 1844072746. Shelf Number: 691 ADD

Greenspec, 2005. Green building products: The Greenspec guide to residential building materials. New Society Publishers. ISBN: 0865715432 Shelf Number: 691 GRE

Stulz, R., and Mukerji, K., 2005. Appropriate building materials: a catalogue of potential solutions. St Gallen : The Swiss Centre for Development Cooperation (SKAT) : ITDG Publishing , 2005. ISBN: 1853392251. Shelf Number: 691 STU

ELE: [CSM3375 ELE Page](#)

Reading list for this module:

Type	Author	Title	Edition	Publisher	Year	ISBN	Search
Set	Boyle, G.	Renewable Energy: power for a sustainable future		Open University Press	2012	0-199-26179-2	Library

CREDIT VALUE 10

ECTS VALUE 5

PRE-REQUISITE MODULES None

CO-REQUISITE MODULES None

NQF LEVEL (FHEQ) 3 (NQF Level 6)

AVAILABLE AS DISTANCE LEARNING No

ORIGIN DATE Monday 12 March 2012

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KEY WORDS SEARCH Architecture, Building Design, Sustainable