University of the West of England
BRISTOL

CORPORATE AND ACADEMIC SERVICES

MODULE SPECIFICATION

Part 1: Basic Data						
Module Title	Energy Conservation in the Built Environment					
Module Code	UBLMMU-30-2.		Level	2	Version	1
Owning Faculty	Environment and Technology		Field	Construction and Property		
Contributes towards	BSc Climate Change and Energy Management					
UWE Credit Rating	30	ECTS Credit Rating	15	Module Type	Standard	
Pre-requisites	None		Co- requisites	None		
Excluded Combinations	UBLMSB-30-1 Building Physics and Services		Module Entry requirements	None		
Valid From	September 2012		Valid to	September 2018		

CAP Approval Date	June 2013

Part 2: Learning and Teaching	
Learning Outcomes	This module aims to teach students the basics of energy conservation in the built environment – buildings and transport – giving students a solid technical basis for the management and policy aspects explored in other modules. On successful completion of this module students will be able to: 1. Explain the processes by which buildings have typically interacted with their physical environment and how that might differ in a sustainable context. (A) 2. Identify the aspects of environmental physics and building services that impact a building's carbon footprint. (A) 3. Explain the purpose and operation of simple Building Services Systems (A) 4. Explain the main elements of UK Government policy on transport and climate change, and the main challenges involved in meeting national targets. (A) 5. Discuss the potential for energy and carbon reductions in transport from technological, behavioural and structural policy options. (A) 6. Perform the fundamental calculations associated with thermal comfort, heat balance, heating, cooling and ventilation in buildings, indicating the relevance of the results. (B) 7. Write a technical assessment of the energy conservation possibilities associated with the built environment. (B) In addition the educational experience may explore, develop, and practise <u>but not formally discretely assess</u> the following: • The broadening of information literacy with an introduction to a wide range of information types and sources.
Syllabus Outline	**Element 1 – Internal Environments, Science and Sustainability** : the historical context; health & wellbeing in buildings; vernacular environments; air quality; the role of material science; the climate change context; the resource depletion context; the energy security context.

Element 2 – Human Thermal Comfort and Thermal Performance of Structures
: thermal comfort; microclimates; heat loss in buildings; thermal insulation; air-tightness; casual & solar heat gains; thermal mass; passive cooling techniques; natural ventilation; condensation.

Element 3 – Mechanical Heating, Ventilation & Air Conditioning
: space heating systems; mechanical ventilation; comfort cooling; humidity control; heat pumps; heat recovery, community heating,.

Element 4 – Transport
National transport policy and climate change; vehicle technology; potential for modal shift to walking, cycling and public transport; behaviour change; transport and spatial planning; aviation and shipping; freight and logistics.

Element 5 – Visual Comfort and Lighting
: fundamentals of light and colour; workings of the eye; daylight in buildings; lamp technologies; luminaire geometry; lighting layouts; lighting control; lighting applications; emergency lighting; way-finding.

Element 6 – Electrical Power & Communications
: electricity; electrical distribution; micro-generation; motors; power quality; IT networks; server rooms; wireless systems; lightning protection.#

Element 7 – Boilers & Hot Water
: combustion; stoichiometry; flue gas analysis; condensing boilers; combi-boilers; water cylinders; solar thermal; hot water distribution losses

Element 8 – Controls – Building Management System
: open & closed loop control; time switches; occupancy sensors; temperature, daylight, humidity and CO2 sensors; interlocks; control strategies.

Note: all elements are not weighted equally in study or assessment time.

Contact Hours/Scheduled Hours

Activity	**hrs**
Contact time including site visits	72
Assimilation and development of knowledge	148
Exam preparation	40
Coursework preparation	40
Total study time	300

Teaching and Learning Methods

For directed study students should carry out the learning activities given to them in each element, covering topics from lectures and essential reading sources.

For self-directed study, students should study aspects of the topics they find most interesting, recording their findings in a structured and coherent set of course notes

Each element of syllabus will involve an introduction of the topics through lecture, when students will receive an explanation of the context of the subject and an indication of the depth to which they are expected to study it. Topics will then be explored further in practical lab-based activities and tours of campus facilities.

Students will be supported in their study with on-line resources including publications, websites, video clips and blackboard resources.

Finally students will be supported in tutorials to analysis issues and solve related problems as required in assessments.

Reading Strategy

Essential Reading
For each element, key chapters and publications will be indicated for students to use as the basis of their directed study. Students should expect to buy at least one core textbook.

	Some essential reading will be provided as electronic resources (within copyright frameworks). At least one copy of each is texts will also be provided in the Library. **Further Reading** Further reading is advisable and students are encouraged to explore at least one of the titles recommended during their self-directed study for each element. **Access and Skills** Formal opportunities for students to develop their library and information skills are provided within the induction period and via program mentoring. Additional support is available through the Library Services web pages, including interactive tutorials on finding books and journals, evaluating information and referencing.
Indicative Reading List	Begg, C (Current) *Energy: Management, Supply and Conservation*, Elsevier CIBSE (Current) *Part F Energy Efficiency in Buildings*, CIBSE Publications Committee on Climate Change, (2010) The Fourth Carbon Budget - Reducing emissions through the 2020s. London. [Chapter 4] Hall,F & Greeno,R. (Current) *Building Services Handbook,* Ascot: The Chartered Institute of Building Harwatt, H., Kimble, M. and Jopson, A., (2009) Exploring public attitudes to climate change and travel choices: deliberative research. [online] London: Department for Transport King, S., Dyball, M., Webster, T., Sharpe, A., Worley, A., DeWitt, J., Marsden, G.,. McMullen, R. (Current) *Environmental Science in Building*, Hants:

Part 3: Assessment	
Assessment Strategy	**<u>Summative Assessment</u>** The examination is used to concentrate students' attention on assimilating the factual and conceptual content of the module. **Component A** Exam will contain short answer question to test general knowledge of the subject and apply problem solving skills to typical energy conservation scenarios in the built environment. **Component B** Coursework is used to improve technical report writing while analysing the practical implications of energy conservation in different systems associated with the built environment. Every element of the module will contain a directed piece of coursework that students will be expected to undertake. A selection of this work will then be submitted for assessment. **<u>Formative Feedback</u>** Formative feedback will be given with mock in-class tests using electronic voting, peer review and tutor feedback in tutorials.

Identify final assessment component and element	**Component A - Examination**	
% weighting between components A and B (Standard modules only)	**A:**	**B**:
	50	**50**

First Sit	
Component A (controlled conditions) **Description of each element**	**Element weighting (as % of component)**
1. Exam (3 hours)	100
Component B **Description of each element**	**Element weighting (as % of component)**
1. Portfolio 3000 words	100

Resit (further attendance at taught classes is not required)	
Component A (controlled conditions) **Description of each element**	**Element weighting (as % of component)**
1. Exam (3 hours)	100
Component B **Description of each element**	**Element weighting (as % of component)**
1. Portfolio 3000 words	100
If a student is permitted an **EXCEPTIONAL RETAKE** of the module the assessment will be that indicated by the Module Description at the time that retake commences.	