MODULE SPECIFICATION

Part 1: Information			
Module Title	Low Carbon Building Services		
Module Code	UBLMN7-30-3	Level	Level 6
For implementation from	2019-20		
UWE Credit Rating	30	ECTS Credit Rating	15
Faculty	Faculty of Environment & Technology	Field	Architecture and the Built Environment
Department	FET Dept of Architecture & Built Environ		
Module type:	Standard		
Pre-requisites	None		
Excluded Combinations	Energy Transformations 2019-20		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

Educational Aims: See Learning Outcomes

Outline Syllabus: Fuels and combustion: combustion principles, burner technology and control, fuel storage and handling; sustainable fuels - biofuels and energy from waste; anaerobic digestion; pyrolysis and fuel modification processes;

Boilerhouse practice and system design: hot water and steam generation; plant management and operation; boiler testing and rating; flue gas analysis; emissions control and dispersion; flue and chimney design

On-site electricity generation and storage: diesel generators; battery systems; uninterruptable power supplies; microgeneration; combined heat and power; trigeneration; fuel cells and hydrogen cycles

Solar energy: solar data and geometry, estimation of solar irradiance, active thermal solar collectors, photo-voltaic energy systems; building integrated PV;

Thermal Simulation of Buildings and Services: Introduction to computational fluid dynamics (CFD); dynamic behaviour of materials, space heating, thermal mass; fluid flow, heat transfer and heat exchange; thermal modelling of buildings and artificial lighting.

Lighting Services: user requirement, design calculations, lamp technologies, luminaire technologies, energy efficiency, health and comfort performance.

Energy Modelling: Energy benchmarking; CO2 emissions; compliance software.

Teaching and Learning Methods: Contact time: 72 hours

Assimilation and development of knowledge: 148 hours

Exam preparation: 40 hours

Coursework preparation: 40 hours

Total study time: 300 hours

Scheduled learning Lectures are to introduce topics, define the scope of learning required and provide initial conceptual development. Lectures are followed in the subsequent week by supervised tutorial/seminar sessions to reinforce cognitive development and provide feedback. Supervised tutorials provide guidance in applying quantitative methods required for solving problems, and provide feedback on independent learning and activities undertaken in support of the planned site visits. Software workshops are used to support student learning simulation software.

Independent learning Directed independent learning in this module includes time engaged with essential reading, completion of tutorial exercise drills, preparation for and subsequent analysis of laboratory investigations, preparation for, and completion of, summative assignment. Time spent on independent learning should be in the order of 4-5 hours per week.

Part 3: Assessment

Reports are appropriate forms of assessment as they draw together different aspects of the theory being discussed in a format that would be used in industry. An examination ensures students are focused on turning their learning into a meaningful output.

The Assessment:

Summative assessment will be via a combination of formal examination and coursework assignment, as follows:

Component A - Examination of 3 hours duration – ‘unseen’ questions relating to topics from across the module content

Component B – Coursework:

Part B1 – report into a low carbon design strategy and building fabric thermal and light performance analysis.

Part B2 - report taking account of the likely inclusion of graphical, quantitative and computer-generated outputs.

Formative feedback and preparation for Component A will be undertaken in the programme of scheduled tutorials.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Report - Component B		37 %	Report 1 (2000 words)
Report - Component B		38 %	Report 2 (2000 words)
Examination - Component A	✓	25 %	Exam (3 hours)

Resit Components	Final Assessment	Element weighting	Description
Report - Component B		75 %	Report (4000 words)
Examination - Component A	✓	25 %	Exam (3 hours)

Part 4: Teaching and Learning Methods

Learning Outcomes

On successful completion of this module students will achieve the following learning outcomes:

Module Learning Outcomes	Reference
Develop appropriate low carbon design strategies for a building and estimate the building performance using computational methods	MO1
Develop and simulate energy efficient lighting systems for complex installations	MO2
Critically evaluate the thermal response of buildings under dynamic conditions and estimate the carbon impact design alternatives	MO3
Define the design tasks associated with quantifying sustainable use of energy, water, materials, light and sound	MO4
Critically evaluate the design proposals for engineering plant and systems involving the production, generation and conversion of energy	MO5
Quantitatively analyse energy systems to evaluate inputs/outputs, efficiencies, life-cycle costing, carbon intensity and associated performance criteria	MO6
Plan and execute test procedures to establish plant operation characteristics, record and analyse data, and report results using appropriate forms	MO7

Contact Hours

Independent Study Hours:	
Independent study/self-guided study	228
Total Independent Study Hours:	228
Scheduled Learning and Teaching Hours:	
Face-to-face learning	72
Total Scheduled Learning and Teaching Hours:	72
Hours to be allocated	300
Allocated Hours	300

Reading List

The reading list for this module can be accessed via the following link:

https://uwe.rl.talis.com/modules/ublmn7-30-3.html

Part 5: Contributes Towards
This module contributes towards the following programmes of study: