EV7128 Module Specification

Module Title: Energy Flows in Buildings	**Module Code: EV7128** **Level: 7** **Credit: 15** **ECTS credit: 7.5**	**Module Leader**: Frances Hill
Pre-requisite: none	**Pre-cursor: none**	
Co-requisite: none	**Excluded combinations: none**	**Suitable for incoming study abroad?** N

Location of delivery: CAT and online – blended delivery

Summary of module for applicants:

In this module students will: Synthesise an understanding of the conceptual aspects and appreciate the complex nature of the inter relationships that exist between occupant comfort, energy flows in buildings and energy efficient building design.

They will practically apply this understanding and define how they relate to adaptation and sustainability in the built environment.

Students will go on to develop a systematic, holistic, multidisciplinary and analytical approach to the critical appraisal of energy efficient design, heat flows, and provision of thermal comfort with respect to the demands of climate change adaptation and the principles of sustainability.

Main topics of study:

- Thermal comfort
- Heat transfers through building fabric, determination of U values
- Ventilation
- Sunlight and solar gain
- Passive cooling
- Thermal mass
- Impact of moisture on building fabric
- Climate influences on design and future climate change considerations for this
- Quantification of building performance
- Embodied energy and carbon of building materials
- Building energy management
- Aspects of human health and wellbeing in relation to above topics of study
- Societal benefits of energy efficient buildings

This module will be able to demonstrate at least one of the following examples/ exposures

Live, applied project ☒
Company/engagement visits ☒
Company/industry sector endorsement/badging/sponsorship/award ☐

Learning Outcomes for the module

Where a LO meets one of the UEL core competencies, please put a code next to the LO that links to the competence.

- *Digital Proficiency - Code = (DP)*
- *Industry Connections - Code = (IC)*
- *Social & Emotional Intelligence - Code = (SEI)*
- *Physical Intelligence - Code = (PI)*
- *Cultural Intelligence - Code = (CI)*
- *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:

Knowledge

1. Demonstrate a clear understanding of the principles of occupant comfort in the context of energy efficient design of the built environment under an adaptation and sustainability remit (COI) (CI)

2. Evidence a critical understanding of the general principles of heat transfers and ventilation in buildings in the context of the design of buildings under an adaptation and sustainability remit (COI)

Thinking skills

3. Demonstrate skills in numerical analysis applied to energy flows in buildings (COI)

Subject-based practical skills

4. Critically evaluate a building's design in terms of effectiveness in providing for occupant comfort, energy efficiency, wider environmental impacts, and resilience to climate change (COI)

Skills for life and work (general skills)

5. Effectively communicate (written) to a wider audience (DP) (COI).

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:
For students studying onsite and by distance learning:

The factual content of the module is taught through lectures, seminars, practical workshops, presentations, demonstrations and tutorials, and throughout this process an active exchange of views and opinions is encouraged. Students have access to MS Teams where they can access recorded and written support material, meet with their peers and a tutor to discuss any academic issue. Both theoretical and practical aspects are covered both onsite and through interactive sessions on Teams.

There is a formative learning element to the module to allow the students to receive critical feedback on their work without the pressure of marked assessment.

For distance learning (DL) students, learning will be supported through streamed and recorded Internet-based lectures (of the onsite lectures), situation related practical exercises, seminars and tutorials.

Lectures onsite and through MS Teams highlight key concepts, models and frameworks, and integrate additional resources (such as journal articles). They encourage deep learning through the use of self-assessment questions which encourage students to engage with the topic, to help students understand new topics and skills. All students also have access to online discussion boards and interactive virtual seminars.

Assessment methods which enable students to demonstrate the learning outcomes for the module; please define as necessary:	**Weighting:**	**Learning Outcomes demonstrated:**
1. Essay (1800 words max)	60%	1,2,4,5
2. Numerical analysis (1200 words equivalent)	40%	2,3,4,5

Reading and resources for the module:
These must be up to date and presented in correct Harvard format unless a Professional Body specifically requires a different format
Core

McMullan, R., (2017) *Environmental Science in Building* 8th Edition, London: Palgrave Macmillan.

Recommended

Chartered Institute of Building Services Engineers (CIBSE), 2019, Environmental Design – CIBSE Guide A, London

Roaf, S. (2009) *Adapting buildings and cities for climate change: a 21st century survival guide.* 2nd ed. Oxford: Elsevier. (*)

Buildings for extreme environments: Arid Chartered Institution of Building Services Engineers, 2014

Buildings for extreme environments: tropical Chartered Institution of Building Services Engineers, 2017

Buildings for extreme environments: cold climates Chartered Institution of Building Services Engineers, 2017

HMGov NBS, 2015 Ventilation (2010 edition incorporating 2010 and 2013 amendments) (For use in England) Building Regulations 2010: Approved Documents F ISBN 9781859466797

Further relevant journals, websites and other relevant resources, including student dissertations, will be provided within reading materials that are made available for the module.

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

Live, applied project –

As a module that is primarily introductory in scope, the focus is on learning underpinning theory in preparation for later modules. Within this, students are set short live projects exploring characteristics of their surrounding built environment using monitoring equipment and presenting back their findings.
Students are referred to recent live and applied dissertation work for extension of their understanding of the scope and application of this field.

Company/engagement visits

Within the module we try to have a lecture/visit from one or more of our graduates working in the field. Over the past few years, these have been:
Vicki March, working in social housing provision, with a focus on low energy homes
Stephen Barratt, working in calculating and reporting embodied carbon in buildings

Company/industry sector endorsement/badging/sponsorship/award

Indicative learning and teaching time **(10 hrs per credit):**	**Activity**
1. Student/tutor interaction:	Lectures, seminars, tutorials, presentations, practicals / demonstrations **30 hours**
2. Student self learning and research time:	Seminar reading and preparation, assignment preparation, background reading, and research activities. **120 hours**
Total hours:	**150 hours**

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

Assessment Pattern for Unistats KIS (Key Information Sets)	**Weighting:**
Coursework *(written assignment, dissertation, portfolio, project output)*	

Practical Exam *(oral assessment, presentation, practical skills assessment)*	
Written Exam	

HECoS Code:	
UEL Department:	