Environmental Analysis

Module Information

2022.01, Approved

Summary Information

Module Code	6501ICBTBS
Formal Module Title	Environmental Analysis
Owning School	Civil Engineering and Built Environment
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 6
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
LJMU Partner Taught

Partner Teaching Institution

Institution Name
International College of Business and Technology

Learning Methods

Learning Method Type	Hours
Lecture	20
Tutorial	20

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
SEP-PAR	PAR	September	12 Weeks

Aims and Outcomes

Aims	To develop an understanding of the theory, principles and practices of building energy systems modelling and simulation techniques and to use analytical approaches to the appraisal of environments and design proposals.

After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Critically analyse the various complex heat and mass transfer processes occurring in buildings and associated practical engineering applications.
MLO2	2	Critically analyse air flow processes typically taking place in buildings to produce practical natural ventilation solutions.
MLO3	3	Critically analyse the aural environment in buildings with particular regard to noise and vibration caused by building engineering plant and systems.
MLO4	4	Utilise industry standard modelling and simulation software to analyse complex buildings.
MLO5	5	Demonstrate an understanding of the entrepreneurial process to establish innovative solutions to industry problems.

Module Content

Outline Syllabus	Thermal Analysis: Evaluation of Building energy flow-paths, including transient and storage effects.Demonstration and application of energy modelling principles and techniques including steady state, dynamic (admittance) and numerical analysis.Analysis of the concepts and theorems underlying air flow behaviour. These include fluid mechanics and convective heat/mass transfer. Associated techniques include ventilation & air flow prediction using computational fluid dynamics as well as empirical and simplified approaches for determining building air change rate for plant sizing, principles of single/ multi- zonal approaches for the prediction of air/smoke movement within buildings and indoor pollution distribution.Interpretation and application of acoustics and noise control; measurement of sound levels, insulation, absorption, attenuation for a building services engineering context. Evaluation of acoustic characteristics of building materials and systems and consequent analysis of noise control in buildings. This includes summarization and application of techniques affected by vibration; simple harmonic motion, modes of vibration, characteristics of springs, static and dynamic modulus of materials and natural frequency, vibration isolation and control in buildings.Evaluation and analysis of building performance, energy efficiency, comfort levels and life-cycle analysis using dynamic simulation modelling software. Evaluation of consequent influences and constraints on building electrical power/lighting and fossil fuel use with implications for facilities management.
Module Overview	
Additional Information	This module is designed to contrast the traditional longhand calculation and estimation methods of analysing building internal environments and engineering processes with modern innovations in building thermal and energy modelling, and building information modelling.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Report	BUILDING SIMULATION REPORT	50	0	MLO4, MLO5

Essay	TIME CONTROLLED ASSIGNMENT	50	0	MLO1, MLO2, MLO3

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Alison Cotgrave	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings