Buildings, Energy and Sustainability

Module Information

2022.01, Approved

Summary Information

Module Code	6222BEUG
Formal Module Title	Buildings, Energy and Sustainability
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
Civil Engineering and Built Environment

Learning Methods

Learning Method Type	Hours
Lecture	20
Tutorial	20

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
JAN-CTY	CTY	January	12 Weeks

Aims and Outcomes

Aims	To investigate the environmental consequences of energy use in buildings with particular reference to building engineering systems and services.To critically evaluate the environmental and economic benefits which are consequent on the specification of various building engineering systems and appropriate low and near zero carbon technologies.To examine processes for the assessment of building energy loads at feasibility and post construction stages.

After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Evaluate the practicality, appropriateness and energy use implications of various types of building engineering systems which are used to control the internal environments of buildings.
MLO2	2	Evaluate the practicality of various low and zero carbon technologies in different construction scenarios.
MLO3	3	Investigate strategies for obtaining optimum building performance by passive means.
MLO4	4	Critically examine the energy and environmental performance rating of buildings and make comparisons with established performance indicators and targets.
MLO5	5	Investigate processes for waste heat recovery in building systems and energy generation plant.

Module Content

Outline Syllabus	Climate Change and Depletion of Natural Resources:How energy is derived, generated and transported. Energy utilisation and environmental impact. Water resource demands of building services. The need for conservation and reform. International environmental agreements and protocols. The role of building engineering professionals in meeting the objectives of the climate change programme.Energy sources and sustainability of alternative energy sources:Sustainability in the generation and utilisation of energy and water. Application and economics of renewable energy sources; conventional solar systems, photovoltaic, active and passive solar energy systems. Hydro-electric, wind, bio-mass, waste incineration, combined heat and power. Ground source heat pumps, use of ground water as an energy medium or for domestic water usage. Rainwater harvesting, use of water recovery or grey water schemes.Energy efficient design:Role of building engineering professionals within the building design team. Energy efficient solutions for maintaining the internal environment. Designing for reduced energy requirements and carbon emissions. Heat recovery technologies and opportunities. Technology, application and economics of CHP. Sizing and selection of M&E building services plant and equipment to minimise energy requirement and environmental impact. Techniques for cooling load reduction. Free and passive cooling techniques, applications and strategies. Role of controls, BMS, commissioning and hand over procedures in energy reduction.Energy Audit and Performance RatingDetermining the energy utilisation, performance and running costs for commercial buildings. Assessing the energy and CO2 performance of buildings and their services against legislative requirements, energy performance indicators and benchmarks. Strategies, procedures and techniques for assessing carbon emission. Carbon Trading, creating a low carbon economy.
Module Overview	The aim of this module is to investigate the environmental consequences of energy use in buildings with particular reference to building engineering systems and services. You will critically evaluate the environmental and economic benefits which are consequent on the specification of various building engineering systems and appropriate low and near zero carbon technologies. The module provides an understanding of the environmental consequences of energy use in general and via building services installations in particular.
Additional Information	The module provides an understanding of the environmental consequences of energy use in general and via building services installations in particular. It also provides the knowledge and skills to critically evaluate the environmental and economic benefits of various strategies and technologies for reducing the energy usage and environmental impact of building engineering systems.In this module, the knowledge learning outcomes are K4.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Portfolio	Report	50	0	MLO2, MLO3, MLO1
Centralised Exam	Examination	50	2	MLO3, MLO4, MLO5

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Hu Du	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings