

Liverpool John Moores University

Title: ENERGY MANAGEMENT
Status: Definitive
Code: **5502ICBTBS** (126987)
Version Start Date: 01-08-2021

Owning School/Faculty: Civil Engineering and Built Environment
Teaching School/Faculty: ICBT, Colombo

Team	Leader
Alison Cotgrave	Y

Academic Level: FHEQ5 **Credit Value:** 15 **Total Delivered Hours:** 62
Total Learning Hours: 150 **Private Study:** 88

Delivery Options

Course typically offered: Semester 1

Component	Contact Hours
Lecture	45
Tutorial	15

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Report	AS1	Project based report (1500 words)	30	
Exam	As2	Written Examination (Closed Book)	70	2

Aims

Aim of this module is to develop skills and capacity for effective energy management through the usage of energy conservation techniques and tools in order to minimize the operational cost of a particular building

Learning Outcomes

After completing the module the student should be able to:

- 1 Demonstrate an understanding of the importance of Energy Efficiency and its current trends
- 2 Apply knowledge on the key areas of applications of energy efficiency in buildings, principal strategies and technologies
- 3 Evaluate the financial benefits of Energy Efficiency Applications
- 4 Demonstrate an understanding of Energy inspection surveys and Renewable Energy Sources

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Project based report	2	3	1	4
Written Examination	2	3	1	4

Outline Syllabus

Introduction to building energy efficiency, facts & figures related to building stock energy use, impact of building energy use, local & international trends in building energy efficiency – Conventional, Energy Efficient and Green buildings, codes & standards

*Energy Efficiency aspects related to Building Envelop
Elements of the building envelop, Energy efficient aspects of building envelop elements – Roof, Walls, Windows/Glazing, Floors/Slabs from design, material & operational perspectives, Envelop shading, prescriptive compliances from codes & standards*

*Energy Efficiency in Building HVAC System
Aspects of design, equipment selection, operational & maintenance selection of HVAC equipment – minimizing cooling/heating loads, selection of equipment with minimum acceptable efficiencies (chillers, pumps, fans & blowers, cooling towers, boilers), energy efficient operational & maintenance strategies, prescriptive compliances of minimum efficiencies of equipment, emerging technologies*

*Energy Efficiency in Building Electrical & Lighting System
Aspects of design, equipment selection, operational & maintenance selection of electrical equipment - load reduction, equipment selection, load shifting & demand management (motors, transformers, connecting gear), prescriptive compliances of minimum efficiencies of equipment Selection of appropriate & efficient light sources, lighting controls, use of daylight Selection of efficient motors, lifts*

*Energy Efficiency in Building Steam/Hot Water Generation
Aspects of equipment selection, operational & maintenance selection of steam/hot*

water generation equipment – air/fuel ratio, burners, flue gas heat recovery, economizers, combustion preheating, condensate recovery, control gear

Basic Economic aspects of Energy Efficiency in Buildings

Use of simple payback, IRR, NPV in the financial evaluation of an energy efficiency application

Introduction to Building Energy Auditing

Basics of energy auditing, description and steps of a walk-through audit, benefits of walk-through audits

Introduction to Renewable Energy Sources

Overview to renewable energy technologies, common principles and trends Wind energy, solar energy, bio energy, and other renewable energy technologies (hydropower, geo thermal, fuel cells)

Learning Activities

Students will be supported in their learning, to achieve the above learning outcomes, in the following ways:

By a series of lectures and theoretical approach together with numerous tutorials Workshops and occasional site visits will be organised to provide the hands on experience for the students regarding the electrical systems of buildings.

A recommended resource list - indicating key reading, virtual and physical learning assistance, is provided to help enable students to undertake self-directed study.

Notes

.