

Summary Information

Module Code	5335BEUG
Formal Module Title	Electrical Engineering for Buildings
Owning School	Civil Engineering and Built Environment
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 5
Grading Schema	40

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Laurence Brady	Yes	N/A

Module Team Member

Contact Name	Applies to all offerings	Offerings
Jeffrey Cullen	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings
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Teaching Responsibility

LJMU Schools involved in Delivery
Civil Engineering and Built Environment

Learning Methods

Learning Method Type	Hours
Lecture	20
Tutorial	30

Module Offering(s)

Offering Code	Location	Start Month	Duration
SEP-CTY	CTY	September	12 Weeks

Aims and Outcomes

Aims	To further develop an appreciation of electrical principles and relate them to the practical processes applied in the design of electrical engineering services in buildings. To provide students with the skills and knowledge required to appreciate industry standard data and, by its application critically analyse the underpinning theoretical concepts which are incorporated in typical design techniques. To provide students with the background knowledge so that they may complete electrical building engineering design. To enable students to utilise appropriate mathematical methods to solve electrical engineering problems.
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Learning Outcomes

After completing the module the student should be able to:

Code	Description
MLO1	Analyse a variety of buildings ranging from simple domestic buildings to moderately complex commercial and industrial buildings.
MLO2	Identify, evaluate and justify the need for electrical building engineering systems.
MLO3	Evaluate alternative strategies for the electrical building engineering systems across a range of buildings to encourage energy efficiency and sustainable design.
MLO4	Develop the capability to appreciate the relationship between theoretical electrical principles and practical electrical engineering systems.
MLO5	Develop the skills and knowledge to resolve electrical design calculations in accordance with IET Wiring Regulations.

Module Content

Outline Syllabus

Electrical principles which underpin electrical building services engineering design processes: Ohm's Law, AC and DC circuit, Kirchhoff's Laws, single phase series and parallel RLC circuits, power factor, three phase systems, star and delta connection, power, application of complex numbers, transformers. Supply characteristics and distribution, Load assessment and diversity, Single phase and three phase distribution, Star / delta connections and fault levels, Adiabatic equation, Lighting design, Containment fire/intruder alarms, lightning protection. Fundamental requirements for safety, earthing, protection, isolation switching and control, circuit design, special locations, inspection and testing. Protective devices, Over-currents, Selectivity/discrimination Power assessment: load factors, assessment of demand, power for mechanical services. Specification requirements: analysis of client requirements Application of IET Wiring Regulations, IET wiring requirements, Cable sizing/selection, Alternating current fundamentals; period, frequency, angular frequency; peak, rms and instantaneous values; complex representation of sinusoidal quantities, phasors. Electrical networks; single phase AC circuits, quantities in series, parallel and combined RLC networks. Resonant AC circuits; circuit resonance, circuit conditions at resonance for various arrangements of induction coil and capacitor, resonant frequency and dynamic frequency. Power factor; true, reactive and apparent power; power factor correction. Appropriate engineering mathematics associated with the solution of problems in electrical engineering.

Module Overview

This module aims to further develop an appreciation of electrical principles and relate them to the practical processes applied in the design of electrical engineering services in buildings. You will learn the skills and knowledge required to appreciate industry standard data and analyse the underpinning concepts which are incorporated in typical design techniques. This background knowledge will enable you to complete electrical building engineering design and utilise appropriate mathematical methods to solve electrical engineering problems.

Additional Information

This module is designed to run in semester 1 alongside the complementary Mechanical Engineering for Buildings module to provide students with the necessary grounding in the underpinning principles of Electrical Engineering so that they may undertake the appropriate Design Project module in semester 2. Appropriate engineering mathematics is included as required. On the Building Services Engineering Degree Apprenticeship programme, the knowledge learning outcomes are K1, K2, K3, K4, K5, K8, the skills learning outcomes are S1, S2, S3, S4, S7 and S8 and the behaviours learning outcomes are B3 and B6.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Learning Outcome Mapping
Report	Report	30	0	MLO3, MLO2
Centralised Exam	Exam	70	2	MLO4, MLO1, MLO2, MLO5