

Electrical Engineering for Buildings

Module Information

2022.01, Approved

Summary Information

Module Code	5217BEUG
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

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)

Display Name	Location	Start Month	Duration Number Duration Unit
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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After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Analyse and resolve alternating and direct current circuits containing passive and active components.
MLO2	2	Apply the theory of electrical resistance, inductance, capacitance and consequent reactive effects to practical electrical installations for buildings.
MLO3	3	Select and specify equipment, cable types and associated switchgear for domestic and commercial electrical installations in accordance with the requirements of appropriate standards and legislation.
MLO4	4	Analyse and evaluate methods of determining fault levels in power supply networks in terms of equipment and system protection, protection from electrical shock and protection against undesirable thermal effects.
MLO5	5	Utilise appropriate mathematical methods to solve practical electrical engineering problems.

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. Fundamental requirements for safety, earthing, protection, isolation switching and control, circuit design, special locations, inspection and testing. Power assessment: load factors, assessment of demand, power for mechanical services. Specification requirements: analysis of client requirements. 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	The aim of this module is 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 be provided 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.
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. In this module, the knowledge learning outcomes are K1, K2, K3, K4, K5, K8, the behaviours learning outcomes are B3, B6 and the skills learning outcomes are S1, S2, S3, S4, S7, S8.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Report	Report	50	0	MLO2, MLO3
Test	TIME CONTROLLED OPEN BOOK TEST	50	0	MLO1, MLO2, MLO4, MLO5

Module Contacts

Module Leader

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

Partner Module Team

Contact Name	Applies to all offerings	Offerings
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