

## Liverpool John Moores University

Title: ELECTRICAL INSTALLATIONS A  
Status: Definitive  
Code: **4509BEFD** (108447)  
Version Start Date: 01-08-2011

Owning School/Faculty: Built Environment  
Teaching School/Faculty: Liverpool Community College

Team	Leader
Derek King	Y

**Academic Level:** FHEQ4      **Credit Value:** 12.00      **Total Delivered Hours:** 64.00  
**Total Learning Hours:** 120      **Private Study:** 56

### Delivery Options

Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	42.000
Tutorial	12.000
Workshop	7.000

**Grading Basis:** 40 %

### Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Open book controlled assignment under exam conditions	50.0	3.00
Report	AS2	Project based assignment	50.0	

### Aims

*To develop a detailed understanding of the principles and practices of low voltage electrical distribution and associated installations in a wide range of public sector, commercial or industrial buildings.*

*To provide students with the knowledge and skills necessary for them to interpret the needs and requirements of those buildings requiring heating develop practical schemes for a range of environments and evaluate the effectiveness of alternative*

schemes.

## Learning Outcomes

After completing the module the student should be able to:

- 1 Analyse buildings and identify their electrical needs.
- 2 Identify design criteria and constraints and evaluate the application of standards and legislation.
- 3 Produce detailed low voltage electrical distribution system designs to satisfy the needs of complex buildings.
- 4 Select forms of protection against short circuit, over current, and fault current in extra low and low voltage circuits.
- 5 Evaluate the methods of data distribution for large commercial, public and industrial buildings.
- 6 Establish the need for lightning protection and apply the principles for protection.

## Learning Outcomes of Assessments

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

EXAM	3	4	5	6		
REPORT	1	2	3	4	5	6

## Outline Syllabus

*Specification and requirements: analysis of client and building needs, Design criteria: design, designing for health and safety. Alternative approaches. Assessment of electrical load design standards and publications. Accommodation of distribution services: distribution patterns . horizontal, vertical, provision for future development and access. Coordination of services. False floor systems, rising mains, sub-main, bus-bar, trunking, conduit, ducting etc.. Accommodation of HV substations: civil requirements, design and plant layout, access, security and safety. Environmental issues: vibration, noise, thermal, loads. Fundamental requirements for safety,,: periodic inspection; acceptable test percentages, reasons for poor results, format of report, EEBAD for TT and IT supply systems. Applying designers discretion: volts drop, diversity, extending disconnection times, thermal effects, grouping of cables of different csa and load characteristics, sizing of cables for motor circuits: direct on line, star delta, and inverter control. Circuit protection: over current and short circuit protection . protection for variable loads. Determining and protecting against fault currents. Discrimination between protective devices, fuses, MCB, MCCB. Operating time ranges, tripping characteristics. Common types of heavy current fuses. Select fuses, MCB.s, and MCCB.s for various applications from manufacturers data. Data Distribution: Category of circuits, types of distribution, WAN, LAN, Category five*

*and six installations, cable types, clean and dirty earth's, earth loops, interference . emission of heat, vibration, earth leakage currents, data/telecommunication installations, electromagnetic compatibility; conducted, electrostatic, radiated. Lightning protection: determining susceptibility to lightning strike, air termination network, down conductors, earth termination networks, bonding, side flashing, protection of electrical and data equipment within buildings, cable routes and equipment location.*

## Learning Activities

Lectures, tutorials, case studies, workshops, site visits.

## References

<b>Course Material</b>	Book
<b>Author</b>	Bayliss, C.
<b>Publishing Year</b>	1999
<b>Title</b>	Transmission and Distribution in Electrical Engineering
<b>Subtitle</b>	
<b>Edition</b>	
<b>Publisher</b>	Butterworth Heinemann
<b>ISBN</b>	0750640596

<b>Course Material</b>	Book
<b>Author</b>	Hiley, J., Hughes, E. et al
<b>Publishing Year</b>	2004
<b>Title</b>	Electrical and Electronic Technology
<b>Subtitle</b>	
<b>Edition</b>	9th Edition
<b>Publisher</b>	Prentice Hall
<b>ISBN</b>	0131143972

<b>Course Material</b>	Book
<b>Author</b>	Robertson, C.R.
<b>Publishing Year</b>	2001
<b>Title</b>	Electrical and Electronic Principles Volume 1
<b>Subtitle</b>	
<b>Edition</b>	2nd Edition
<b>Publisher</b>	Butterworth Heinemann
<b>ISBN</b>	0750651458

<b>Course Material</b>	Book
<b>Author</b>	BSI
<b>Publishing Year</b>	2004
<b>Title</b>	BS7671 Requirements for Electrical Installations - IEE

	Wiring Regulations
<b>Subtitle</b>	
<b>Edition</b>	16th Edition
<b>Publisher</b>	BSI
<b>ISBN</b>	0863413700

<b>Course Material</b>	Book
<b>Author</b>	CIBSE
<b>Publishing Year</b>	2004
<b>Title</b>	Guide F: Energy Efficiency in Buildings
<b>Subtitle</b>	
<b>Edition</b>	
<b>Publisher</b>	CIBSE
<b>ISBN</b>	190328726X

<b>Course Material</b>	Book
<b>Author</b>	CIBSE
<b>Publishing Year</b>	2005
<b>Title</b>	Guide K: Electricity in Buildings
<b>Subtitle</b>	
<b>Edition</b>	
<b>Publisher</b>	CIBSE
<b>ISBN</b>	190328726X

## Notes

This module is a key component for those students wishing to complete the programme following an 'electrical' building services pathway. It aims to develop the student from a basic awareness of the principles and processes of electrical installations to an in-depth understanding of electrical and data installations in commercial and industrial buildings and the necessity and methodology for lightning protection. This prepares students in readiness for the analytical approach of the more specialised aspects of electrical installations and power supplies at level 2.