

## Liverpool John Moores University

Title: Power Systems Protection  
Status: Definitive  
Code: **7002ENGEAT** (117640)  
Version Start Date: 01-08-2016

Owning School/Faculty: Maritime and Mechanical Engineering  
Teaching School/Faculty: EA Technology

Team	Leader
Christian Matthews	Y

**Academic Level:** FHEQ7      **Credit Value:** 10      **Total Delivered Hours:** 21  
**Total Learning Hours:** 100      **Private Study:** 79

### Delivery Options

Course typically offered: Non Standard Year Long

Component	Contact Hours
Lecture	12
Tutorial	6

**Grading Basis:** 40 %

### Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	Exam		70	3
Practice	Practice		30	

### Aims

*To introduce the principles of power system protection for network protection from 33,000 volts to 230/410 volts*

### Learning Outcomes

After completing the module the student should be able to:

- 1 Understand the legislative requirements of power system protection
- 2 Demonstrate an understanding of the basic types of high voltage and low voltage protection
- 3 Explain protection diversity and grading
- 4 Demonstrate an understanding of the basic protection applied to the supplier - customer interface

## Learning Outcomes of Assessments

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

Exam	1	2	3
Design of HV/LV protect system	2	4	

## Outline Syllabus

- *Legislation details, safety issues, specifications calculations and definitions*
- *Fault calculations, basic network protection*
- *Protection Devices:*
  - o *Fuses characteristics and construction,*
  - o *MCB characteristics and construction and*
  - o *relay Relay characteristics and construction.*
- *High voltage and low voltage grading*
- *Cable sizing, calculations and criteria for installation*
- *Low voltage network protection from supply to distribution board*
- *High voltage protection from 33,000 volts to 11,000 volts*
- *Maintenance and audit requirements to maintain protection to ensure optimum performance*
- *Fault detection and condition monitoring*
  - o *SCADA*
  - o *The role of IEC61850 in substation automation.*

## Learning Activities

Lectures supported by tutorials and case studies.

## Notes

This module is delivered in a block release format and will require full-time attendance from all students for the duration of the scheduled delivery period.

The module introduces the principles of power system protection design, equipment, legislation and grading to enable students to fully understand protection systems

associated with high and low voltage networks.