

## Liverpool John Moores University

Title: Power Generation and Transmission  
Status: Definitive  
Code: **7009ENGEAT** (117668)  
Version Start Date: 01-08-2016

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

Team	Leader
Christian Matthews	Y
Martin Jones	

**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
Essay	Essay		30	

### Aims

*To develop an understanding of power system component modelling, relating to the generation and transmission of electrical power.*

### Learning Outcomes

After completing the module the student should be able to:

- 1 Evaluate different types of power generation system and analyse their operation.
- 2 Formulate mathematical models of power system components and employ them in power system modelling.
- 3 Apply power system component models in design of power system simulation programmes.
- 4 Evaluate the role of power electronic converters in transmission systems

### **Learning Outcomes of Assessments**

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

Exam	1	2	4
Power system analysis	3		

### **Outline Syllabus**

*Modelling of power system components:*

*Load modelling (constant impedance representation) and modelling of reactive power compensators. Star-delta and delta-star impedance transformation.*

*Impedance drop, voltage drop and voltage regulation.*

*Modelling of two-winding and three-winding three-phase transformers.*

*Modelling of short and medium-length overhead transmission lines, cable modelling.*

*Modelling of synchronous generators (turbo- and hydro-machinery).*

*Per unit system and representation of the power system components in per unit.*

*Power electronic converters in power systems: HVDC transmission, Flexible AC transmission systems (FACTS).*

### **Learning Activities**

A series of lectures, tutorials and laboratory sessions

### **Notes**

This level 7 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 teaching and learning activities in this module will be supported by the research activities of Professor Emil Levi and Dr Martin Jones of the LJMU Research Center for Electrical and Electronic Engineering (RCEEE).