Liverpool John Moores University

Title:	Power Electronics, Drives and Systems
Status:	Definitive
Code:	**6305ELE** (121435)
Version Start Date:	01-08-2021
Owning School/Faculty:	Engineering
Teaching School/Faculty:	Engineering

Team	Leader
Obrad Dordevic	Y
Martin Jones	

Academic Level:	FHEQ6	**Credit Value:**	20	**Total Delivered Hours:**	69
Total Learning Hours:	200	**Private Study:**	131		

Delivery Options
Course typically offered: Semester 2

Component	Contact Hours
Lecture	40
Practical	6
Tutorial	20

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	Exam	Final exam	80	3
Report	Report	Lab report	20	

Aims

To develop intellectual ability to select and apply appropriate mathematical methods for modelling and analysing problems and produce solutions to problems through the practical application of electrical power engineering.

Learning Outcomes

After completing the module the student should be able to:

1 Appraise types and topologies of power electronic converters and analyse their operation
2 Assess different methods of speed control of dc and induction motor drives
3 Operate and test variable speed drives supplied from power electronic converters
4 Apply modelling of various components of a power system as required for steady state power system analysis
5 Apply power system component models in analysis of normal power system operation

Learning Outcomes of Assessments

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

Final exam	1	2	4	5
Lab report	3			

Outline Syllabus

1. Power electronic devices and basic converter topologies
Introduction to power electronics and its applications
Thyristors, MOSFETs, IGBTs, thyristors, GTOs, MCTs.
Rectifiers, inverters, dc to dc and ac to ac converters.

2. Variable speed electric drives
Braking, load torque types, constant torque and constant power regions in VSDs.
Speed control methods for d.c. and induction machines.
Applications of power electronic converters in variable speed drives.

3. Power system component modelling
Impedance drop, voltage drop and voltage regulation.
Modelling of power system components: load, transmission lines, cables, transformers, synchronous machines.
Power electronic converters in power systems: HVDC transmission, static VAr compensation.

4. Power system analysis
Per unit system.
Symmetrical component theory.
Symmetrical short circuit analysis.

Learning Activities

A series of lectures, tutorials and lab sessions

Notes

This module describes operation of power electronic converters, methods for variable speed operation of electric drives and examples of application of power electronic converters in electric drives and power systems. Modelling of power system components and power system analysis are also covered.