Liverpool John Moores University

Title:	Power Electronics, Drives and Systems
Status:	Definitive
Code:	**6110ENG** (116965)
Version Start Date:	01-08-2018
Owning School/Faculty:	Electronics and Electrical Engineering
Teaching School/Faculty:	Electronics and Electrical Engineering

Team	Leader
Emil Levi	Y

Academic Level:	FHEQ6	**Credit Value:**	20	**Total Delivered Hours:**	76
Total Learning Hours:	200	**Private Study:**	124		

Delivery Options
Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	44
Practical	6
Tutorial	22

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	Exam	Exam 1	40	2
Exam	Exam	Exam 2	30	2
Report	Report	Lab exercise and report	30	

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 engineering.
To develop practical skills in the appropriate use of mathematical methods for modelling and analysing problems and the use of relevant test and measurement

equipment by undertaking experimental laboratory work.

Learning Outcomes

After completing the module the student should be able to:

1	Define types and topologies of power electronic converters and analyse their operation
2	Explain different methods of speed control of dc and induction motor drives
3	Operate and test variable speed drives supplied from power electronic converters
4	Undertake 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
6	Analyse and assess power system behaviour in faulted operating conditions

Learning Outcomes of Assessments

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

Exam	4	5	6
Exam	1	2	
Lab exercise and report	3		

Outline Syllabus

Power semiconductor devices: thyristors, MOSFETs, IGBTs, thyristors, GTOs, MCTs.
Power electronic converters: rectifiers, inverters, dc to dc and ac to ac converters, PWM.
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.
Power systems: generation, transmission and distribution, per unit system.
Modelling of power system components: transmission lines, transformers, synchronous machines.
Admittance and impedance models and network calculations.
Symmetrical component theory, symmetrical and asymmetrical fault analysis.
Power electronic converters in power systems: HVDC transmission, static VAr compensation.

Learning Activities

A series of lectures, tutorials and laboratory sessions.

Notes

The module describes of 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.