Liverpool John Moores University

Title:	POWER ELECTRONICS, DRIVES AND SYSTEMS
Status:	Definitive
Code:	**6009ENG** (106214)
Version Start Date:	01-08-2016
Owning School/Faculty:	Electronics and Electrical Engineering
Teaching School/Faculty:	Electronics and Electrical Engineering

Team	Leader
Emil Levi	Y

Academic Level:	FHEQ6	**Credit Value:**	24	**Total Delivered Hours:**	87
Total Learning Hours:	240	**Private Study:**	153		

Delivery Options
Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	48
Practical	12
Tutorial	24

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Examination	70	3
Essay	AS2	Coursework	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	Present models of power system components and employ them in power system modelling
5	Apply power system component models in design of power system simulation programmes
6	Analyse and assess power system behaviour under various operating conditions

Learning Outcomes of Assessments

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

EXAM	1	2	4	6
CW	3	5		

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. The power flow problem.
Symmetrical component theory, symmetrical and asymmetrical fault analysis.
Computer applications in power system analysis.
Fundamentals of power system protection.
Alternative energy sources (wind and solar power), embedded generation.
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.