Power Electronics, Drives and Systems

Module Information

2022.01, Approved

Summary Information

Module Code	6305ELE
Formal Module Title	Power Electronics, Drives and Systems
Owning School	Engineering
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 6
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
Engineering

Learning Methods

Learning Method Type	Hours
Lecture	40
Practical	6
Tutorial	20

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
JAN-CTY	CTY	January	12 Weeks

Aims and Outcomes

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.

After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Appraise types and topologies of power electronic converters and analyse their operation
MLO2	2	Assess different methods of speed control of dc and induction motor drives
MLO3	3	Operate and test variable speed drives supplied from power electronic converters
MLO4	4	Apply modelling of various components of a power system as required for steady state power system analysis
MLO5	5	Apply power system component models in analysis of normal power system operation

Module Content

Outline Syllabus	1. Power electronic devices and basic converter topologiesIntroduction to power electronics and its applicationsThyristors, MOSFETs, IGBTs, thyristors, GTOs, MCTs.Rectifiers, inverters, dc to dc and ac to ac converters.2. Variable speed electric drivesBraking, 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 modellingImpedance 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 analysisPer unit system.Symmetrical component theory.Symmetrical short circuit analysis.
Module Overview	This module develops your intellectual ability to select and apply appropriate mathematical methods for modelling and analysing problems. You will produce solutions to problems through the practical application of electrical power engineering and learn about the operation of power electronic converters, methods for variable speed operation of electric drives, and examples of power electronic converters in electric drives and power systems.
Additional Information	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.Where this module is part of a Degree Apprenticeship programme, the knowledge learning outcomes are K5, the skills learning outcomes are S5 and S6

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Centralised Exam	Final exam	80	3	MLO1, MLO2, MLO4, MLO5
Report	Lab report	20	0	MLO3

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings

Obrad Dordevic	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings