Further Electrical Machines and Drives

Module Information

2022.01, Approved

Summary Information

Module Code	5512NCCG
Formal Module Title	Further Electrical Machines and Drives
Owning School	Engineering
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 5
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
LJMU Partner Taught

Partner Teaching Institution

Institution Name
Nelson and Colne College Group

Learning Methods

Learning Method Type	Hours
Lecture	48
Practical	12

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
APR-PAR	PAR	April	12 Weeks
JAN-PAR	PAR	January	12 Weeks

SEP-PAR	PAR	September	12 Weeks
SEP_NS-PAR	PAR	September (Non-standard start date)	12 Weeks

Aims and Outcomes

Aims	The aim of this module is to continue developing the skills in the use and application of electrical machines, particularly direct current (DC) and alternating current (AC) drives. Among the topics included in this module are: an introduction to electrical machines and drives, and their characteristics, starting and braking, loading conditions, ratings, and their control. On successful completion of this module students will be able to explain the operation of different motors used in industry, describe the different types of industrial drives used in various disciplines, assess the importance of electrical machines and their drives for a given industrial application, analyse their performances and suggest appropriate solutions using a variety of possible methods.

After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Explore the principles of operation and the characteristics of electrical machines and their industrial applications.
MLO2	2	Illustrate the fundamentals of power electronics converters used in power processing units for electric drives.
MLO3	3	Demonstrate an understanding of the fundamentals of DC drives and their industrial applications.
MLO4	4	Demonstrate an understanding of the fundamentals of AC drives and their industrial applications.

Module Content

Outline Syllabus	Principles of operation and characteristics: DC machines, three-phase induction machines, synchronous machines, introduction to special machines Fundamentals of power electronics converters used: concepts of electrical drives and their classification, DC to DC converters, AC to DC converters, DC to AC converters, AC to AC convertersSimulation using Matlab/Simulink or similar softwareFundamentals of DC drives and their industrial applications: introduction to DC drives, operating modes of DC drives, drives for single-phase AC, drives from 3-phase AC, chopper drives, two/four quadrant operation drives, closed loop control of DC drivesFundamentals of AC drives and their industrial applications: introduction to AC drivesInduction motor drives: voltage controls, frequency controls, current controls, voltage, current and frequency control, and closed loop control induction motor Synchronous motor drives: frequency control and closed loop control of synchronous motor drives
Module Overview	
Additional Information	

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Essay	Assignment	100	0	MLO2, MLO3, MLO4

Competency	NCC Group Pass/Fail			MLO1

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Christian Matthews	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings