

Marine Electrical Systems

Module Information

2022.01, Approved

Summary Information

Module Code	5109MECH
Formal Module Title	Marine Electrical Systems
Owning School	Engineering
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 5
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
Engineering

Learning Methods

Learning Method Type	Hours
Lecture	22
Online	22
Tutorial	22

Module Offering(s)

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

Aims and Outcomes

Aims	The aim of this module is to provide a comprehensive introduction to Marine Instrumentation and Electrical Engineering, the module will concentrate on the principles, construction and operation of marine instrumentation, ac and dc motors and generators, and associated distribution and protection systems.
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After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Select appropriate sensors for an application and demonstrate an understanding of their characteristics and practical interfacing requirements.
MLO2	2	Select appropriate actuators for an application and demonstrate an understanding of their characteristics and drive requirements
MLO3	3	Explain the principles of magnetism and electromagnetism induction and solve elated problems
MLO4	4	Demonstrate knowledge of the principles and application of dc, ac motors and generators and solve related problems
MLO5	5	Discuss typical arrangements of marine dc and ac distribution systems and solve related problems

Module Content

Outline Syllabus	Sensors• Measured Physical Quantity o Temperatureo Position, Displacement and Velocityo Accelerationo Pressure and Forceo Fluid Flow Rates• Transducer Typeso Resistiveo Capacitiveo Inductiveo Piezo Electric• Signal Typeo Analogeo Digital• Characteristicso Range and Spano Sensitivityo Precision, Accuracy, RepeatabilityActuators• Electro-mechanicalo Motorso Solenoids• Pneumatic and Hydraulic• Mechanisms (for connecting loads to actuatorso Screwso Rackso Gearso Linkages• Pumps• Heating and Coolingo Peltier and Thermo-electric deviceso Resistive heaters• Loadingo Mechanical loads on electro-mechanical, pneumatic and hydraulic actuatorso Thermal loads on heaters/coolerso Fluid loads on pumpsPower (10 credits)• AC waveform, phasor diagrams and power factor• Single phase and three phase ac circuits• Principles of electromagnetic induction• AC and DC motorso Typeo Constructiono Operationo Application• AC generatorso Typeo Constructiono Operationo Load/speed controlo Excitationo Protectiono Synchronizing• Switch boards and distribution arrangements of marine dc and ac systems• Transformers
Module Overview	The aim of this module is to provide a comprehensive introduction to Marine Instrumentation and Electrical Engineering. The module will concentrate on the principles, construction and operation of marine instrumentation, ac and dc motors and generators, and associated distribution and protection systems.
Additional Information	The module is designed to give Marine Engineering students a comprehensive understanding of electrical and control equipment and systems heavily utilised in the marine engineering sector.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Centralised Exam	Examination	60	2	MLO1, MLO2, MLO3, MLO4, MLO5

Test	VLE Test	40	0	MLO1, MLO2, MLO3, MLO4, MLO5
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Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Philip Davies	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings
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