

Liverpool John Moores University

Title: Marine Electrical Systems
Status: Definitive
Code: **4554SAM** (122673)
Version Start Date: 01-08-2020

Owning School/Faculty: Engineering
Teaching School/Faculty: Springdale Academy Of Maritime Education (SAMET)

Team	Leader
Geraint Phylip-Jones	Y

Academic Level: FHEQ4 **Credit Value:** 20 **Total Delivered Hours:** 76
Total Learning Hours: 200 **Private Study:** 124

Delivery Options

Course typically offered: Runs Twice - S1 & S2

Component	Contact Hours
Lecture	44
Practical	8
Tutorial	22

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS2	Examination	60	2
Report	AS1	Laboratory log book and report	40	

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.

Learning Outcomes

After completing the module the student should be able to:

- 1 Analyse circuits which include passive electrical components.
- 2 Select appropriate sensors and actuators for an application and demonstrate an understanding of their characteristics and practical requirements.
- 3 Explain the principles of magnetism and electromagnetism induction and solve related problems
- 4 Demonstrate knowledge of the principles and application of dc, ac motors and generators and solve related problems
- 5 Discuss typical arrangements of marine dc and ac distribution systems and solve related problems

Learning Outcomes of Assessments

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

Examination	2	3	4	5
Laboratories	1	2	3	5

Outline Syllabus

Electrical Principles;

- *Charge, Current and Voltage*
- *Conductivity & Resistance*
- *Power & Dissipation of Losses*
- *Capacitance*
- *Magnetism & Inductance*
- *Motor and generator effects*
- *Batteries*
- *Semi-conductors*
- *Basic Operational Amplifiers*
- *Fundamentals of AC*

Electrical Circuits;

- *Kirchhoff's Voltage and Current Laws*
- *Resistive circuits in series and parallel*
- *Simple inductive and capacitive circuits*
- *Active Electrical Circuits*

Instrumentation sensors, measurement and actuators;

- *Measured Physical Quantity*
- *Transducer types*
- *Signal type*
- *Signal characteristics*

- *Actuator types and mechanisms*

Marine power generation and distribution;

- *AC waveform, phasor diagrams and power factor*
- *Single phase and three phase ac circuits*
- *Principles of electromagnetic induction*
- *AC and DC motors*
- *AC generators*
- *Switch boards, distribution and protection arrangements of marine DC and AC systems*
- *Transformers*

Learning Activities

A series of lectures, tutorials and practicals.

Notes

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. The laboratory assessment will include a comprehensive log book documenting 4 experiments completed over the module and handed in two weeks before module ends. One experiment will be chosen by the module leader to be written as a formal report with a guide length of 1000 words.