

### Summary Information

Module Code	6305MECH
Formal Module Title	Marine Design and Propulsion
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	44
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 module aims to analyse many of the critical marine systems associated with ships including aspects of safety within the marine industry.
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**After completing the module the student should be able to:**

## Learning Outcomes

Code	Number	Description
MLO1	1	Analyse power transmission systems in terms of engine emissions, engine balancing, gear transmission and coupling, and vibration.
MLO2	2	Select marine plants in terms of matching of engine and propeller, propeller efficiency and economic analysis.
MLO3	3	Predict ship performance and behaviour of ships based on model testing data and analytical techniques.
MLO4	4	Analyse ship surface roughness and marine hazards as well as automatic control systems.

## Module Content

Outline Syllabus	Discuss marine fuels, contamination, combustion, emissions, emission control and regulations. Comment on engine exhaust emissions and state how engines may be adjusted to minimise emissions of NOx, SOx, CO and HC. Analysis of power transmission systems including: engine balancing, gearing, clutches, shafting systems, shaft vibrations, engine balancing, different types of propellers, different types of gear transmission systems, clutches and couplings. Analyse the performance of diesel engines, steam and gas turbines propulsion plants. Determine optimum power transmission for particular installations and select a propulsion system for different types of ships. Estimate main dimensions, tonnages and design coefficients for a vessel. Conduct model testing, ship trial and manoeuvrability. Estimate ship resistance and powering requirements including the effects of surface roughness and protection. Study matching of propeller, propulsion plant and hull. Evaluate design considerations of rudders, propellers, manoeuvring mechanisms and effects on stability. Analyse steering gear and engine speed control systems. Analyse marine hazards and protection.
Module Overview	
Additional Information	To trace the total ship design and redesign processes from setting parameters, to estimate performance and costs to testing the resulting product. To develop an understanding as to the requirements of the marine industry with respect to propulsion and auxiliary plant for ships. To enable an individual to appreciate different types of marine plant and determine the optimum plant for particular installations. This module includes content which relates to the following UN Sustainable Development Goals: SDG7 – This module provides students with knowledge regarding the thermal efficiency of common heat cycles and examines how waste heat may be recovered in order to improve cycle efficiency. SDG10 – This module will consider how engineering designers can consider accessibility when developing new products. SDG14 – This module will consider how ballast water treatment systems should be designed, operated and maintained in order to prevent pollution.

## Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Centralised Exam	Examination	70	2	MLO1, MLO2, MLO3, MLO4
Report	Report	30	0	MLO1, MLO2, MLO3, MLO4

## Module Contacts

### Module Leader

Contact Name	Applies to all offerings	Offerings

Jin Wang	Yes	N/A
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**Partner Module Team**

Contact Name	Applies to all offerings	Offerings
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