

# Proposal to modernise the Methodology of Teaching, Assessment/ Examination

<b>ETO STCW III/6 CoC</b>	<b>Name of respondent, role and organisation:</b>		
<b>Competency/ Module: Mathematics for Engineering 1</b>			
<b>Knowledge, understanding and proficiency</b>	<b>Recommendation of working group regarding the outcome and objective.</b>	<b>Rationale</b>	<b>Action required</b>
<b>Outcome 1: Solve problems involving functions and trigonometric equations.</b>	Keep	Remains relevant	See sub-outcomes
1.1 Properties of functions	Keep	The mathematical theory needs to be understood in a maritime context.	Contextualise application in respect of other engineering units.
1.2 Inverse functions	Keep	The mathematical theory needs to be understood in a maritime context.	Contextualise application in respect of other engineering units.
1.3 Composite Functions	Keep	The mathematical theory needs to be understood in a maritime context.	Contextualise application in respect of other engineering units.
1.4 Trigonometric equations	Keep	The mathematical theory needs to be understood in a maritime context.	Contextualise application in respect of other engineering units.
<b>Outcome 2: Solve problems involving exponential and logarithmic equations</b>	Keep	Remains relevant	See sub-outcomes

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2.1 Evaluation of logarithmic and exponential expressions	Keep	The mathematical theory needs to be understood in a maritime context.	Contextualise application in respect of other engineering units.
2.2 Transposition from logarithmic to exponential form and vice versa	Keep	The mathematical theory needs to be understood in a maritime context.	Contextualise application in respect of other engineering units.
2.3 Laws of logarithms	Keep	The mathematical theory needs to be understood in a maritime context.	Contextualise application in respect of other engineering units.
2.4 Graphics of logarithmic and exponential functions	Keep	The mathematical theory needs to be understood in a maritime context.	Contextualise application in respect of other engineering units.
<b>Outcome 3: Evaluate the strength of materials in a range of engineering environments</b>	Keep	Remains relevant	See sub-outcomes
3.1 Collinearity	Keep	The mathematical theory needs to be understood in a maritime context.	Contextualise application in respect of other engineering units.
3.2 Addition, subtraction and scalar multiplication of vectors	Keep	The mathematical theory needs to be understood in a maritime context.	Contextualise application in respect of other engineering units.
3.3 Scalar product	Keep	The mathematical theory needs to be understood in a maritime context.	Contextualise application in respect of other engineering units.
3.4 Conversion of complex numbers between rectangular and polar form	Keep	The mathematical theory needs to be understood in a maritime context.	Contextualise application in respect of other engineering units.

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Addition and subtraction of complex numbers			
3.5 Multiplication and division of complex numbers	Keep	The mathematical theory needs to be understood in a maritime context.	Contextualise application in respect of other engineering units.
3.6 Representation of complex numbers on an Argand Diagram	Keep	The mathematical theory needs to be understood in a maritime context.	Contextualise application in respect of other engineering units.
3.7 Use of polar and rectangular forms of complex numbers	Add	More relevant to this topic than the Electro-Technology module.	Contextualise application in respect of other engineering units. Remove this outcome from Module 7a. "Electro-Technology"
<b>Proposal submitted by:</b>	<b>Any other outcomes for this competency, above and beyond STCW which would be needed due to use of modern technology and impact of future fuels onboard:</b>		
	<b>Objective</b>	<b>Reason Why</b>	<b>Action required</b>
Cadet Training & Modernisation Working Group	Include Human Element Factors throughout the syllabus	To provide seafarers with a contextualised understanding of the Human Element in the maritime industry, showing how they can put theory into practice in the work they carry out at sea.	Raise awareness throughout the Cadet's training of the areas in which human element factors will have an impact. Recommendations on where this can be included have been noted throughout the entire syllabus. Not every template has Human Element Factor

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			recommendations but please do add any you feel may have been missed.
Cadet Training & Modernisation Working Group	Include Data Science skills throughout the syllabus	Data Science Skills (Comprehension, Analysis, Presentation, etc...) are already required within much of the syllabus. A further, specific focus on these skills needs to be taught where relevant.	A specific topic will need to be introduced to improve Cadets' Data Science skills. Practical application of data science skills should be highlighted throughout the syllabus. Not every template has Data Science recommendations but please do add any you feel may have been missed.
Cadet Training & Modernisation Working Group	Ensure all outcomes are contextualised to help Cadets understand what they are learning in relation to what they will experience at sea.	While some outcomes are intrinsically linked to work carried out at sea, some need to be contextualised to show how they apply to work on board. Where this is the case, it is important to make sure Cadets clearly understand how the outcome relates to work at sea and it is essential to make sure that this context is given with reference to current and future seagoing technologies and practices.	Where outcomes do not specifically cover a topic which relates to work carried out at sea, more must be done to contextualise the outcome and make it relevant to the maritime industry, giving specific shipping examples of how the outcome may be applied in a modern shipping context. Not every template has contextualisation recommendations but please do add any you feel may have been missed.