Proposal to modernise the Methodology of Teaching, Assessment/ Examination

Marine Engineering - STCW III/ 1 CoC	Name of respondent, organisation, and role:		
Competency/ Module: Electrical Distribution system			
Knowledge, understanding and proficiency	**Recommendation of working group regarding the outcome and objective.**	**Rationale**	**Action required**
Outcome 1: Solve Problems on three phase balanced and unbalanced AC circuits	Modernise	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.	When teaching, we should not require candidates to memorise and use the calculations and instead use software, such as Automation Studio or similar, to understand the basic principles of 3 phase balanced and unbalanced systems with focus on practical exercises.
1.1 Balanced star and/or delta connected three phase AC loads	Modernise	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.	When teaching, we should not require candidates to memorise and use the calculations and instead use software, such as Automation Studio or similar, to understand the basic principles of 3 phase balanced and unbalanced systems with focus on practical exercises.
1.2 Phasor diagrams	Modernise	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.	When teaching, we should not require candidates to memorise and use the calculations and instead use software, such as Automation Studio or similar, to understand the basic principles of 3 phase balanced and unbalanced systems with focus on practical exercises.

1.3 Unbalanced three phase AC loads	Modernise	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.	Reason for the unbalance should be explained, using calculations. However, when teaching, we should not require candidates to memorise and use the calculations and instead use software, such as Automation Studio or similar, to understand the basic principles of 3 phase balanced and unbalanced systems with focus on practical exercises.
Outcome 2: Solve problems on three phase AC motors	Modernise	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.	Understand the principle of how calculations are used to solve the problems. However, the focus should be on troubleshooting and practical problem solving.
2.1 Induction motors	Modernise	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.	Understand the constructional features, principles and speed control methods, use of these motors. Understand the principle of how calculations are used to solve the problems. However, the focus should be on troubleshooting and practical problem solving.
2.2 Synchronous motors	Modernise	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	Understand the constructional features, principles and use of these motors. Understand the principle of how calculations are used to solve the problems. However, the focus

		seagoing technologies and practices.	should be on troubleshooting and practical problem solving.
Outcome 3: Solve problems on Distribution systems and load sharing.	Modernise	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.	Understand the principle of how calculations are used to solve the problems. However, the focus should be on troubleshooting and practical problem solving.
3.1 Distribution system load sharing	Modernise	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.	Include explanation of Power Management Systems to enhance energy efficiency. Understand the principle of how calculations are used to solve the problems. However, the focus should be on troubleshooting and practical problem solving.
3.2 Power factor including its correction	Modernise	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.	Understand the principle of how calculations are used to solve the problems. However, the focus should be on troubleshooting and practical problem solving.
Outcome 4: Explain and solve problems on AC transformers	Modernise	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.	Understand the principle of how calculations are used to solve the problems. However, the focus should be on troubleshooting and practical problem solving.

4.1 Principle of operation and construction	Modernise	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.	Understand the principle of how calculations are used to solve the problems. However, the focus should be on troubleshooting and practical problem solving.
4.2 EMF equation, transformer ratio and VA ratings.	Modernise	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.	Understand the principle of how calculations are used to solve the problems. However, the focus should be on troubleshooting and practical problem solving.
4.3 Phasor diagrams	Modernise	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.	Understand the principle of how calculations are used to solve the problems. However, the focus should be on troubleshooting and practical problem solving.
4.4 Transformer losses and efficiency	Modernise	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.	Understand the principle of how calculations are used to solve the problems. However, the focus should be on troubleshooting and practical problem solving.

4.5 Principle of operation of an autotransformer including applications and circuit diagrams	Modernise	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.	Understand the principle of how calculations are used to solve the problems. However, the focus should be on troubleshooting and practical problem solving.
4.6 Solve problems on autotransformers, involving voltages, turns ratio, and tapping points	Modernise	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.	Include principles and operation of current transformers and voltage transformers. Understand the principle of how calculations are used to solve the problems. However, the focus should be on troubleshooting and practical problem solving.
Proposal submitted by:	**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:**		
	Objective	Reason Why	**Action required**
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 recommendations but please do add any you feel may have been missed.

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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.