Proposal to modernise the Methodology of Teaching, Assessment/ Examination

ETO - STCW III/6 CoC	Name of respondent, organisation, and role:		
Competency/ Module: DC and AC Principles			
Knowledge, understanding and proficiency	**Recommendation of working group regarding the outcome and objective.**	**Rationale**	**Action required**
Outcome 1: Solve problems involving basic electrical concepts and theorems	Keep	Essential	None
1.1 Electrostatic and magnetic fields	Modernise	We need to include future technologies for modern shipping solutions. (Hybrid systems, storage of batteries, etc)	Include power storage and distribution in this outcome.
1.2 Electrical quantities (charge, current, emf, voltage, resistance, inductance and capacitance)	Keep	Relevant	None
1.3 Waveforms	Keep	Relevant	None
1.4 Ohm's Law (applied to dc circuits only)	Keep	Relevant	None
1.5 Kirchhoff's Law (applied to dc circuits only)	Keep	Relevant	None
1.6 Circuit reduction techniques (as applied to combinations of series and parallel resistors only)	Keep	Relevant	None
1.7 Circuit reduction techniques (as applied to combinations of series and parallel capacitors only)	Keep	Relevant	None

1.8 Voltage and current division	Keep	Relevant	None
1.9 Energy and power (in dc circuits only)	Keep	Relevant	None
1.10 Network theorems (Superposition, Thevenin's, Norton's, Maximum Power Transfer)	Add	Suggestion from industry consultation to provide a sound understanding of network theorems.	Add this outcome
Outcome 2: Solve single-phase ac circuit problems using complex notation	Keep	Relevant	None
2.1 Circuit responses to the sudden application or removal of a dc voltage to an R – L series circuit	Keep	Relevant	None
2.2 Calculation of impedance, current and voltages in a R - L - C series circuit using complex notation	Keep	Relevant	None
2.3 Phasor (Argand) diagram representation of current and voltage quantities associated with an R - L - C series circuit	Keep	Relevant	None
2.4 Calculation of apparent, active and reactive powers and power factor associated with an R - L - C series circuit	Keep	Relevant	None
2.5 Determination of total circuit impedance and supply current in a series-parallel circuit using complex notation and circuit reduction techniques	Keep	Relevant	None
2.6 Calculation of branch currents in a parallel circuit using current division	Keep	Relevant	None

2.7 Calculation of apparent, active and reactive powers and power factor associated with a series parallel circuit	Keep	Relevant	None
Outcome 3: Demonstrate Knowledge of electromagnetic field concepts and circuits	**Add**	**Suggestion from industry consultation to provide a sound understanding of electrical machines and magnetic curves**	**Add this outcome**
3.1 Magnetic quantities (MMF, Flux and Reluctance)	Add	Suggestion from industry consultation to provide a sound understanding of electrical machines and magnetic curves	Add this outcome
3.2 Simple magnetic circuit calculations	Add	Suggestion from industry consultation to provide a sound understanding of electrical machines and magnetic curves	Add this outcome
3.3 Composite magnetic circuits	Add	Suggestion from industry consultation to provide a sound understanding of electrical machines and magnetic curves	Add this outcome
3.4 Induced emf and current	Add	Suggestion from industry consultation to provide a sound understanding of electrical machines and magnetic curves	Add this outcome
3.5 Leakage fluxes	Add	Suggestion from industry consultation to provide a sound understanding of electrical machines and magnetic curves	Add this outcome
3.6 Magnetic losses	Add	Suggestion from industry consultation to provide a sound understanding of electrical machines and magnetic curves	Add this outcome
3.7 Pulsating and rotating MMFs	Add	Suggestion from industry consultation to provide a sound understanding of electrical machines and magnetic curves	Add this outcome

Outcome 4: Solve problems involving resonating passive circuits	**Add**	**Suggestion from industry consultation that resonating circuits are needed for applications such as radio transmission, signal processing and communication.**	**Add this outcome**
4.1 Resonant frequency and dynamic impedance in an Resistor (R)- Inductor (L) – Capacitor (C) series circuit	Add	Suggestion from industry consultation that resonating circuits are needed for applications such as radio transmission, signal processing and communication.	Add this outcome
4.2 Q-Factor and bandwidth in an R-L-C series circuit	Add	Suggestion from industry consultation that resonating circuits are needed for applications such as radio transmission, signal processing and communication.	Add this outcome
4.3 Impedance/ frequency graphs and current/ frequency graphs associated with an R-L-C series circuit	Add	Suggestion from industry consultation that resonating circuits are needed for applications such as radio transmission, signal processing and communication.	Add this outcome
4.4 Resonant frequency and dynamic impedance in an R-L in parallel with C circuit	Add	Suggestion from industry consultation that resonating circuits are needed for applications such as radio transmission, signal processing and communication.	Add this outcome
4.5 Q-Factor and dynamic impedance in an R-L in parallel with C circuit	Add	Suggestion from industry consultation that resonating circuits are needed for applications such as radio transmission, signal processing and communication.	Add this outcome
4.6 Impedance/ frequency graphs and current/ frequency graphs associated with an R-L in parallel with C circuit	Add	Suggestion from industry consultation that resonating circuits are needed for applications such as radio transmission, signal processing and communication.	Add this outcome

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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.
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.