

Proposal to modernise the Methodology of Teaching, Assessment/ Examination

ETO - STCW III / 6 CoC			
Competency/ Module: Principles of Power Electronics			
Knowledge, understanding and proficiency	Recommendation of working group regarding the outcome and objective.	Rationale	Action required
Outcome 1: Principles and characteristics of power electronic devices	Keep	Relevant	None
1.1 Diode	Keep	Relevant	None
1.2 Diac	Keep	Relevant	None
1.3 Thyristor	Keep	Relevant	None
1.4 Gate Turn-Off Thyristor 4	Keep	Relevant	None
1.5 Triac	Keep	Relevant	None
1.6 Power MOSFET	Keep	Relevant	None
1.7 Insulated Gate Bipolar Transistor	Keep	Relevant	None
1.8 Smart Power Devices	Keep	Relevant	None
Outcome 2: Outline arrangements for the protection of and the dissipation of heat from power electronic devices	Keep	Relevant	None
2.1 Overcurrent protection (eg fuses, crowbar circuit)	Keep	Relevant	None
2.2 Overvoltage protection	Keep	Relevant	None
2.3 Heat transfer paths	Keep	Relevant	None
2.4 Thermal characteristics of heat transfer process	Modernise	This outcome should be contextualised as it is important to make sure candidates clearly understand how the outcome relates to work at sea and it	Introduce different environmental conditions and cooling systems.

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		is essential to make sure that this context is given with reference to current and future seagoing technologies and practices.	
2.5 Use of heatsinks	Keep	Relevant	None
Outcome 3: Analyse the operation and applications of single phase and three phase converters	Keep	Relevant	None
3.1 Difference between half-wave and full-wave rectifier circuits	Keep	Relevant	None
3.2 Difference between no control, half control and full control converters	Keep	Relevant	None
3.3 One to Four Quadrant Operation	Keep	Relevant	None
3.4 Full-wave, half-controlled bridge circuit with resistive load	Keep	Relevant	None
3.5 Full-wave, half-controlled bridge circuit with inductive load and flywheel diode	Keep	Relevant	None
3.6 Full-wave, fully controlled bridge circuit with inductive load	Keep	Relevant	None
3.7 Typical applications of single phase converters	Keep	Relevant	None
3.8 Laboratory exercise involving a single phase converter	Keep	Relevant	None

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Outcome 4: Construction features and operation of dc to dc choppers	Keep	Relevant	None
4.1 Step-down chopper with resistive load	Keep	Relevant	None
4.2 Step-down chopper with inductive load	Keep	Relevant	None
4.3 Typical applications of step-down chopper circuits	Keep	Relevant	None
4.4 Step-up chopper 1	Keep	Relevant	None
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 and Modernisation Working Group	Include an outcome on DC Drives.	Many modern diesel electric vessels require knowledge of DC drives, it is a technology that is now fully embedded in the industry so understanding how to control these systems is essential.	Include an outcome regarding up-to-date technology on DC drives.
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	A specific topic will need to be introduced to improve Cadets' Data Science skills. Practical application of data science skills

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		<p>syllabus. A further, specific focus on these skills needs to be taught where relevant.</p>	<p>should be highlighted throughout the syllabus. Not every template has Data Science recommendations but please do add any you feel may have been missed.</p>
<p>Cadet Training & Modernisation Working Group</p>	<p>Ensure all outcomes are contextualised to help Cadets understand what they are learning in relation to what they will experience at sea.</p>	<p>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.</p>	<p>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.</p>