

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

ETO - STCW III/6 CoC	Name of respondent, role and organisation:		
Competency/ Module: Analogue electronic Principles	<i>Monitor the operation of electrical, electronic and control systems</i>		
Knowledge, understanding and proficiency	Recommendation of working group regarding the outcome and objective.	Rationale	Action required
Outcome 1: Investigate the operation and characteristics of a range of discrete semiconductor devices	Keep	Essential	See Sub-outcome actions.
1.1 Rectifier, Signal, Zener, Light-Emitting and Photo Diodes	Modernise	Contextualise to include analogue sensors seen onboard.	Thermal, pressure, level, water, and magnetic <b>analogue sensors</b> (such as PT100) shall be introduced as they are often used in many mechanical, electrical and auxiliary systems onboard.
1.2 NPN and PNP Bipolar Junction Transistors	Keep	Essential	None

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1.3 N-Channel and P-Channel JFET	Remove to avoid duplication	This sub-outcome is taught in the Electronics and electrical devices module.	Remove from this outcome and include in the module for Electronics and Electrical Devices.
Outcome 2: Investigate and demonstrate applications of semiconductor diodes	Keep	Essential	See Sub-outcome actions.
2.1 Rectification	Remove to avoid duplication	This sub-outcome is taught in the Electronics and electrical devices module.	Remove from this outcome and include in the module for Electronics and Electrical Devices.
2.2 Voltage Reference Source	Keep	Essential	None
2.3 Clipping	Keep	Essential	None
2.4 Clamping	Keep	Essential	None
2.5 Light-Emitting	Keep	Essential	None

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2.6 Photo Diode	Modernise	Contextualise to highlight use of photo diodes in a circuit.	Teach the use of photo diodes in a circuit board using practical examples.
Outcome 3: Investigate and demonstrate transistor applications	Remove to avoid duplication	This Outcome is taught in the Electronics and electrical devices module.	Remove this outcome and include in the module for Electronics and Electrical Devices.
3.1 Common-Emitter Amplifier	Remove to avoid duplication	This sub-outcome is taught in the Electronics and electrical devices module.	Remove from this outcome and include in the module for Electronics and Electrical Devices.
3.2 Common-Collector Amplifier	Remove to avoid duplication	This sub-outcome is taught in the Electronics and electrical devices module.	Remove from this outcome and include in the module for Electronics and Electrical Devices.

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3.3 Common-Source Ampilifer	Remove to avoid duplication	This sub-outcome is taught in the Electronics and electrical devices module.	Remove from this outcome and include in the module for Electronics and Electrical Devices.
3.4 Common-Drain Amplifier	Remove to avoid duplication	This sub-outcome is taught in the Electronics and electrical devices module.	Remove from this outcome and include in the module for Electronics and Electrical Devices.
3.5 Transistor Switching	Remove to avoid duplication	This sub-outcome is taught in the Electronics and electrical devices module.	Remove from this outcome and include in the module for Electronics and Electrical Devices.
Outcome 4: Investigate and demonstrate linear operational amplifier characteristics and applications	Keep	Essential	See Sub-outcome actions.
4.1 Ideal operational amplifier characteristics	Keep	Essential	None
4.2 Inverting Amplifier	Keep	Essential	None
4.3 Non-inverting Amplifier	Keep	Essential	None
4.4 Voltage Follower	Keep	Essential	None
4.5 Summing Amplifier	Keep	Essential	None
4.6 Difference Amplifier	Keep	Essential	None
<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>		

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	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.

