

Proposal to modernise the Methodology of Teaching, Assessment/ Examination

ETO- STCW III/6 CoC			
Competency/ Module: ETO - Distributed Control Systems (DCS)			
Knowledge, understanding and proficiency	Recommendation of working group regarding the outcome and objective.	Rationale	Action required
Outcome1: Explain the concept of DCS	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.	<p>Add practical elements to assessment to provide shipping context to outcome.</p> <p>Include appreciation how different control mechanisms interact and work together including, Programmable Logic Controllers (PLC), SCADA (Supervisory control and data acquisition), CAN (Controller Area Network) and DCS in a small scale.</p> <p>Include comparisons between centralised control systems and how they interact with DCS.</p>
1.1 DCS layout in terms of communication paths and signal levels	Modernise	See rationale for Main outcome	See action required for Main outcome
1.2 Highway based systems, communications controller and highway redundancy	Modernise	See rationale for Main outcome	See action required for Main outcome
1.3 Distributed system from field devices to commercial data processing	Modernise	See rationale for Main outcome	See action required for Main outcome
1.4 Component parts and their respective functions/specifications	Modernise	See rationale for Main outcome	See action required for Main outcome

Proposal to modernise the Methodology of Teaching, Assessment/ Examination

1.5 High/low level systems	Modernise	See rationale for Main outcome	See action required for Main outcome
Outcome 2: Apply the construction and operation of a DCS controller	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.	Add practical elements to training and assessment to provide shipping context to outcome.
2.1 Control modes; manual, automatic and cascade	Modernise	See rationale for Main outcome	See action required for Main outcome
2.2 Mode attribute; operate and programme	Modernise	See rationale for Main outcome	See action required for Main outcome
2.3 Structure of a DCS controller	Modernise	See rationale for Main outcome	See action required for Main outcome
2.4 Tracking, initialization, past mode recall and alarms	Modernise	See rationale for Main outcome	See action required for Main outcome
2.5 Advance multifunction controller functions and configuration words	Modernise	See rationale for Main outcome	See action required for Main outcome
2.6 Diagnostic methods used in multifunction controllers	Modernise	See rationale for Main outcome	See action required for Main outcome
2.7 Primary and reserve controllers and the use of uninterrupted automatic control	Modernise	See rationale for Main outcome	See action required for Main outcome
2.8 Configuration to meet loop detail specification for feedback, feedforward, cascade, ratio systems	Modernise	See rationale for Main outcome	See action required for Main outcome

Proposal to modernise the Methodology of Teaching, Assessment/ Examination

Outcome 3: Explain operator interfaces	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.	Add practical elements to training and assessment to provide shipping context to outcome.
3.1 Operator interface and associated hardware	Modernise	See rationale for Main outcome	See action required for Main outcome
3.2 Ergonomic considerations	Modernise	See rationale for Main outcome	See action required for Main outcome
3.3 Multiple operator stations	Modernise	See rationale for Main outcome	See action required for Main outcome
3.4 Highway and media connections	Modernise	See rationale for Main outcome	See action required for Main outcome
Outcome 4: Explain reporting systems	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.	Add practical elements to training and assessment to provide shipping context to outcome.
4.1 Data point ownership	Modernise	See rationale for Main outcome	See action required for Main outcome
4.2 Alarms – generation, reporting, acceptance and time stamped	Modernise	See rationale for Main outcome	See action required for Main outcome
4.3 Alarms – configuration of priority action, setting and suppression	Modernise	See rationale for Main outcome	See action required for Main outcome
4.4 Types of logs and reports, configurable on DCS	Modernise	See rationale for Main outcome	See action required for Main outcome
4.5 Cross screen invocation and user defined keys	Modernise	See rationale for Main outcome	See action required for Main outcome

Proposal to modernise the Methodology of Teaching, Assessment/ Examination

Outcome 5: Apply maintenance considerations	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.	Add practical elements to training and assessment to provide shipping context to outcome.
5.1 Hardware reliability – mean time between failures, mean time to repair and availability	Modernise	See rationale for Main outcome	See action required for Main outcome
5.2 Diagnostic and maintenance routines – self diagnostics, module start up and failure messages	Modernise	See rationale for Main outcome	See action required for Main outcome
5.3 Requirements of uninterruptible power supplies (UPS) and their application	Modernise	See rationale for Main outcome	See action required for Main outcome
5.4 Recovery of DCS after power outage	Modernise	See rationale for Main outcome	See action required for Main outcome
Outcome 6: Apply DCS applications and implementation	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.	Add practical elements to training and assessment to provide shipping context to outcome.
6.1 Examples of process control – from highway level, main computer level and mainframe computer level	Modernise	See rationale for Main outcome	See action required for Main outcome

Proposal to modernise the Methodology of Teaching, Assessment/ Examination

6.2 DCS in different control environments – paper/pulp , boiler controls, petrol/chemical and gas processing	Modernise and remove	See rationale for Main outcome	See action required for Main outcome Remove Paper/ Pulp
6.3 System strategy and automation plan – architecture, vendor, system requirements and system integrator and toolkit	Modernise	See rationale for Main outcome	See action required for Main outcome
6.4 Project implementation phases – requirements definition, design, implementation, testing and start up, continuous improvement decommissioning	Modernise	See rationale for Main outcome	See action required for Main outcome
6.5 Process life cycle versus system life cycle	Modernise	See rationale for Main outcome	See action required for Main outcome
Outcome 7: Apply future DCS	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.	Add practical elements to training and assessment to provide shipping context to outcome.
7.1 Open systems – choice of hardware/software and communication systems	Modernise	See rationale for Main outcome	See action required for Main outcome
7.2 OPC - Data transfer between different vendor systems	Modernise	See rationale for Main outcome	See action required for Main outcome
7.3 Industrial communications – Fieldbus and Ethernet standards needed for intrinsic safety	Modernise	See rationale for Main outcome	See action required for Main outcome

Proposal to modernise the Methodology of Teaching, Assessment/ Examination

7.4 Safety and shutdown systems – TMR systems and safety functions to DCS	Modernise	See rationale for Main outcome	See action required for Main outcome
7.5 Embedding of EN 61511 and EN 61508	Modernise	See rationale for Main outcome	See action required for Main outcome
7.6 Integration with business systems – E commerce for process control systems, web browser and applications	Modernise	See rationale for Main outcome	See action required for Main outcome
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	While some outcomes are intrinsically linked to work carried out at sea, some need to be contextualised to show how	Where outcomes do not specifically cover a topic which relates to work carried out at sea, more must be done to contextualise

Proposal to modernise the Methodology of Teaching, Assessment/ Examination

	learning in relation to what they will experience at sea.	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.	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.
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