

Proposal to modernise the Methodology of Teaching, Assessment/ Examination

ETO - STCW III/6 CoC			
Competency/ Module: Radio Communications			
Knowledge, understanding and proficiency	Recommendation of working group regarding the outcome and objective.	Rationale	Action required
Outcome1: Analyse amplitude and angle modulation	Keep	Relevant	None
1.1 Waveform and modulation index for an amplitude modulated (AM) waveform	Keep	Relevant	None
1.2 Signal spectrum of an AM waveform	Keep	Relevant	None
1.1 Power in each frequency component of a radiated AM waveform	Keep	Relevant	None
1.4 Operation of an AM envelope detector	Keep	Relevant	None
1.5 Signal spectrum of a single sideband (SSB) transmitter at key points	Keep	Relevant	None
1.6 Modulation index and frequency deviation of a frequency modulated (FM) waveform	Keep	Relevant	None
1.7 Signal spectrum of an FM waveform	Keep	Relevant	None
1.8 Frequency deviation and the use of pre-emphasis and de-emphasis in a FM context	Keep	Relevant	None

Proposal to modernise the Methodology of Teaching, Assessment/ Examination

1.9 The applications of FM and AM	Keep	Relevant	None
Outcome 2: Explain the principles of radiation and propagation of transverse electromagnetic waves in the bands very low frequency (VLF) to extra high frequency (EHF)	Keep	Relevant	None
2.1 Fundamentals of electromagnetic waves	Keep	Relevant	None
2.2 Radiation and reception of electromagnetic waves	Keep	Relevant	None
2.3 Properties of aerials for electromagnetic waves	Keep	Relevant	None
2.4 The electromagnetic spectrum.	Keep	Relevant	None
2.5 Bandwidth, classification, application of radio bands	Keep	Relevant	None
2.6 Modes of propagation of radio waves of different frequencies	Keep	Relevant	None
2.7 Errors and losses within the propagation of radio waves	Keep	Relevant	None
2.8 Radio horizon	Keep	Relevant	None
2.9 Anomalous propagation	Keep	Relevant	None
Outcome 3: Investigate and evaluate the principles and operation of radio transmitters	Contextualise	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 practical use of radio equipment to link theory and practice.

Proposal to modernise the Methodology of Teaching, Assessment/ Examination

3.1 The legal requirements for transmitter operation	Keep	Relevant	None
3.2 The operating principles of an amplitude-modulated (AM) transmitter	Keep	Relevant	None
3.3 The function of the stages of an AM transmitter	Keep	Relevant	None
3.4 The operating principles of a frequency-modulated (FM) transmitter	Keep	Relevant	None
3.5 The function of the stages of an FM transmitter	Keep	Relevant	None
3.6 Carrier frequency generation	Keep	Relevant	None
3.7 Digital modulation techniques and transmission	Add	This is more commonly found on board vessels due to the advances in radio technology. It should be covered in this outcome.	Add the outcome, "Digital modulation techniques and transmission"
Outcome 4: Investigate and evaluate the principles and operation of radio receivers	Contextualise	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 practical use of radio equipment to link theory and practice.
4.1 The operation of an AM tuned-radio frequency (TRF) receiver	Keep	Relevant	None
4.2 The disadvantages of TRF	Keep	Relevant	None
4.3 The operating principles of the superheterodyne receiver	Keep	Relevant	None
4.4 The operation of a superheterodyne receiver	Keep	Relevant	None

Proposal to modernise the Methodology of Teaching, Assessment/ Examination

4.5 The operation of a superheterodyne receiver	Remove	Duplication of 4.3	Remove this outcome and retain outcome 4.3.
4.6 Signal processing techniques	Add	Seafarers must know how different devices on board process signals, understanding signal to noise ratio (SNR).	Add this outcome
Outcome 5: Outline Satellite communication principles	Keep	Relevant	None
5.1 Principles of operation of satellite communication systems and antennas	Keep	Relevant	None
5.2 Maritime satellite communication systems	Keep	Relevant	None
5.3 Satellite communication system antennas.	Keep	Relevant	None
5.4 Modulation techniques	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 & 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.

Proposal to modernise the Methodology of Teaching, Assessment/ Examination

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.