Steam COC at Singapore Maritime Academy
Course Details & Time-table
For the
4~6 weeks Full-time Course
Cohort - 004

Duration: 4~6 Weeks - Total 120 hours.
Breakdown of 120 hours:
a) Day time: Five times a week – Two 3-hour sessions each day for 20 days [120 hours]
Minimum period for completion is four weeks. All the In Course Assessments (ICA) have to be completed before taking the End of Course Assessments (ECA).

Course Start Date: 3rd March 2007.

Course Fee: S$2696.40 (inclusive of 7% GST)

More Course Information at: http://lngsteam.blogspot.com/

Course Time Table

Item No.	**Topics** [hours] Total hours – 120 9am to 12am & 13pm to 16pm each day	**Start Date** **End Date**
A	**Steam Boilers** [26 hrs]	
1.	Describe the steam boilers used in marine practice, relating various components of these boilers, their functions, the associated boiler mountings and the safety devices.	3rd March. 08 7th March. 08
1.100	Classify marine propulsion boilers and enumerate their constructional differences.	
1.200	Identify the following components in boiler, label the significant parts, and describe the function of the components, their constructional details and operational importance in the steam cycle.	
1.201	• Water and steam drums	
1.202	• Tubes	
1.203	• Headers	3rd Mar. – 6h
1.204	• Downcomers & Risers	4th Mar. – 6h
1.205	• Membrane walls	5th Mar. – 6h
1.206	• Refractory	6th Mar. – 6h
1.207	• Furnaces	7th Mar. – 2h
1.208	• Economisers	
1.209	• Superheaters	
1.210	• Attemperators	
1.211	• FD Fans	
1.212	• Air preheaters	
1.213	• Boiler mountings	
1.214	• Safety devices	
1.215	• Soot blowers	
1.300	Describe the principles involved in boiler automation and control system and enumerate the functions and working of following sub systems:	
1.301	• Overall steam load-based control for boiler	
1.302	• Combustion and draft control	
1.303	• Feed water and level control	
1.304	• Steam temperature control	
1.305	• Fuel oil & fuel gas control	
1.400	Explain the needs for boiler & feed water treatment.	
1.401	Describe the types of boiler & feed water treatment undertaken on board.	
1.402	Relate the test carried out to ascertain the condition of boiler water.	
1.403	Explain the purpose of blowdown and distinguish the difference between surface blowdown and bottom blowdown.	
1.405	Enumerate the problems which could be encountered if the boiler water treatment is not monitored and dosed.	

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B	**Combustion Theory & Practice** [11 hrs]	
2.	Understand the basic combustion process, air-fuel ratio, fuel oil/gas burning and associated combustion equipment.	7th March. 08 11th March.08
2.100	Define conditions which must be satisfied for proper chemical reactions take place in the combustion process.	
2.101	Describe the processes by which residual fuel oil/gas is burnt in a boiler furnace.	
2.102	Identify & describe the following • Air-steam atomizing oil burners • Gas burners • Dual Fuel Oil-gas burners	7th Mar. – 4h 10th Mar. – 6h 11th Mar. – 1h
2.103	Explain the working of the burner flame safeguard system with the associated flame detection systems, interlocks, and relays which will sense the presence of a proper flame in the furnace if a hazardous situation develops.	
2.104	Discuss the monitoring devices, which could ascertain the conditions of combustion in the furnace.	
C	**Main Condensate & Feed Water System** [11 hrs]	
3.	Understand the basic combustion process, air-fuel ratio, fuel oil/gas burning and associated combustion equipment.	11th March.08 12th March.08
3.100	Differentiate between open and closed feed systems.	
3.101	Draw and explain the working of a typical marine closed feed system which includes a steam dumping system.	
3.102	Explain the working principles of a deaerator in the main feed system.	
3.103	Describe a typical main condenser, list out the functions and regular maintenance required for its proper functioning.	
3.104	Describe the working of a main condensate pump explaining the conditions under which it operates and the additional attentions required for such operating conditions.	11th Mar. – 5h 12th Mar. – 6h
3.105	Sketch a main feed pump and explain its salient features.	
3.106	Explain the purpose of a feed heater and discuss the design dilemma while deciding on the number of feed heaters in the feed cycle.	
3.107	Sketch and describe a gland sealing steam circuit.	
3.108	Explain the working of a typical distiller on a steam ship.	
3.109	Sketch and describe a typical condensate drain system, including contaminated drains from fuel tanks.	
3.110	Describe the working of various types of steam traps in the drain system and explain why traps could improve the cycle efficiency.	

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D	**Steam Turbines** [26 hrs]	
4.	Understand the basic classification of steam turbines, construction of these classes of turbines and associated reduction gearing.	13th March.08 19th March.08
4.100	Describe the working of the following steam turbines: • Reaction turbine • Impulse and Impulse-reaction turbines	
4.101	Sketch and describe the construction of the following components of turbines: • Rotors • Stators • Blades • Glands • Bearings • Flexible couplings • Gearings	13th Mar. – 6h 14th Mar. – 6h 17th Mar. – 6h 18th Mar. – 6h 19th Mar. – 2h
4.102	Describe the main propulsion turbine lubricating oil system and explain its safety features.	
4.103	Enumerate the various safety systems on the propulsion turbines and state how these are kept n good working condition.	
4.104	Describe the turbine manoueuvring valve arrangement and how the speed control is accomplished.	
E	**LNG System** [8 hrs]	
5.	Understand the method of LNG cargo carriage, its need to be burnt in the boiler and how the overall system is managed safely.	19th March.08 20th March.08
5.100	Describe the methods of cargo carriage in LNG vessels including the various tank arrangements and insulation system.	
5.102	Describe how a nitrogen generator works and how the inter-barrier spaces are safeguarded.	
5.103	List out the pressure settings in cargo tanks during ballast and laden voyages and state the normal operating range and when the tank protection control is activated.	19th Mar. – 4h 20th Mar. – 4h
5.104	Explain why there is a requirement to burn LNG in boilers during the passage of LNG carriage.	
5.105	Compute the gas flow rate, which is necessary to achieve a zero tank pressure increase rate on an LNG carrier.	
5.106	Explain the function of LD Compressor, demister and the BOG heater.	
5.107	Explain the functions of forcing vaporizer and stripping/spray pumps.	

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F	**Plant Operation** [38 hrs] – Simulation-based	
6.	Able to operate a steam propulsion steam plant using LNG and fuel oil.	20th March.08 1st April.08
6.100	Show an acceptable level of proficiency in undertaking the relevant procedures for the following tasks:	
6.101	• Plant-up procedure for a steam propulsion plant.	
6.102	• Plant-down procedure for steam propulsion plant	
6.103	• Warming up procedures of a main propulsion turbine	20th Mar. – 2h 24th Mar. – 6h
6.104	• Starting a propulsion boiler from cold	25th Mar. – 6h
6.105	• Procedures for one boiler operation	26th Mar. – 6h
6.106	• Procedures for emergency turbine operation	**~~27th Mar. 6h~~
6.107	• Procedures for starting turbo generator	28th Mar. – 6h
6.108	• Procedures for starting turbo feed pump	**29th Mar.– 6 h
6.109	• Procedures for keeping watch in a steam turbine plant	1st Apr. – 6h
6.110	• Procedures for fault-finding on steam systems	
	+++**1st Steam COC End of Course Assessment** +++**2nd Steam COC End of Course Assessment**	**2nd Apr. 08** **11th Apr. 08**
+++	ECA can be taken only after completion of all the In Course Assessment (ICA) components	
**	27th March changed to 29th March due to SMA paper presentation at Asia Pacific Maritime 2008	