

**ANNEX B OF CMO NO. 20, SERIES OF 2015  
BACHELOR OF SCIENCE IN MARINE ENGINEERING  
COURSE SPECIFICATIONS**

|  |   |   |
|--|---|---|
| <b>Course Code</b>                       | : | EWK   |
| <b>Course Descriptive Title</b>          | : | Engine Watchkeeping with Resource Management  |
| <b>Course Credits</b>                    | : | 3 units   |
| <b>Lecture Contact Hours per Week</b>    | : | 3 hours   |
| <b>Laboratory Contact Hours per Week</b> | : | 1 hours   |
| ○ <b>Prerequisite</b>                    | : | None  |
| <b>Reference/s</b>                       | : | <ul style="list-style-type: none"> <li>○ Table A-III/1 Function: Marine Engineering</li> <li>○ STCW Section A-VIII</li> <li>○ STCW'78 as amended</li> <li>○ Annex A of CMO No. 20, Series of 2015 (Curriculum Mapping for BSMarE)</li> <li>○ IMO Model Course 7.04</li> </ul> |

| COMPETENCE                               | KNOWLEDGE, UNDERSTANDING AND PROFICIENCY   | PERFORMANCE  | APPROX HOURS |
|--|--|--|--------------|
| Maintain a safe engineering watch        | <p>Thorough knowledge of principles to be observed in keeping an engineering watch, including:</p> <ul style="list-style-type: none"> <li>.1 duties associated with taking over and accepting a watch</li> <li>.2 routine duties undertaken during a watch</li> <li>.3 maintenance of the machinery space logs and the significance of the readings taken</li> <li>.4 duties associated with handing over a watch</li> </ul> | <ul style="list-style-type: none"> <li>- Explains principles to be observed in an engineering watch at sea and in port, including following based on the provisions concerned in the STCW Code Ch VIII, Section A-VIII/1, A-VIII/2 and B-VIII/2</li> <li>- duties associated with taking over a watch and accepting a watch</li> <li>- routine duties undertaken during a watch</li> <li>- maintenance of the machinery space logs and the significance of the reading taken</li> <li>- duties associated with handing over a watch</li> <li>- Explains standards/regulations for watchkeeping in a national law if any</li> <li>- States the importance, ordinance and arrangements of watchkeeping, and the need to: <ul style="list-style-type: none"> <li>- wear appropriate clothes, safety shoes and a safety helmet;</li> <li>- carry a torch lamp;</li> <li>- maintain bodily functions;</li> </ul> </li> </ul> <p>be awake and highly consciousness</p>   | 7 Hours      |
| Maintain a safe engineering watch (cont) | <p>Safety and emergency procedures; change-over of remote/automatic to local control of all systems</p> <p>Safety and emergency procedures; change-over of remote/automatic to local control of all systems (cont)</p>   | <ul style="list-style-type: none"> <li>- States what is meant by emergency in accordance with components of the machinery</li> <li>- States that the type of impact of the emergency should be promptly identified and countermeasures conforming to the emergency procedures and contingency plans established beforehand, should be taken</li> <li>- States that changeover of remote/automatic control to local operation of all systems has to be almost always done in case of emergency to take actions necessary for maintaining a safe operation</li> <li>- States that each component/installation constructing propulsion machinery can be isolated from the entire system and can be run manually</li> </ul> <p>Explains remedial/emergency procedures and conditions in accordance with components of the machinery in such an event of power failure</p> <ul style="list-style-type: none"> <li>- Explains necessary procedures/measures with isolation of the component/installation of major machinery, taking examples such as arrangements/managements of piping systems, control systems and other elements concerned</li> <li>- States procedures for recovery and malfunctions considered to be likely occurred in steering gears in case of blackout and other causes including procedures for</li> </ul> | 8 Hours      |

| COMPETENCE                               | KNOWLEDGE, UNDERSTANDING AND PROFICIENCY  | PERFORMANCE  | APPROX HOURS |
|--|---|--|--------------|
| Maintain a safe engineering watch (cont) | Safety precautions to be observed during a watch and immediate actions to be taken in the event of fire or accident, with particular reference to oil systems | <p>changeover of remote-auto to electric hydraulic driven at machine side and hand pump hydraulic driven at machine side respectively</p> <ul style="list-style-type: none"> <li>- Explains the importance of engine room rounds before taking over the watch and periodic rounds during the watch</li> <li>- Explains the need to be at places where communication with bridge and chief engineer is always available except engine room rounds or carrying communication means</li> <li>- Explains the need to have an incentive and positive mental attitude emphasizing that officers in charge of the engineering watch assume a great responsibility in the safe navigation</li> <li>- Explains the need to pay continuous attention to all the running parameters of machinery and to what tasks are being carried out by other personnel concerned</li> <li>- Explains the need to be well-versed in structure of the engine room including evacuation route and installations/equipment for emergency</li> <li>- States that arrangements of fire-extinguishing installations should be clearly understood including sorts and number of fire-extinguisher in accordance with types of ship</li> <li>- States immediate actions to be taken in the event of accidents such as fire, a person overboard, oil spill and flooded, emphasizing that the appropriate immediate actions minimize damage</li> </ul> <p>Explains necessary measures to contain oil spreading in the event of oil spill including communicating information/report, preparation of the dedicated apparatus against oil spill, plugging of scupper pipes and stopping oil systems</p> | 8 Hours      |
| Maintain a safe engineering watch (cont) | Engine-room resource Management   | <ul style="list-style-type: none"> <li>- Explains ERM principles based on Bridge Resource Management (BRM)/ERM principles described in STCW Code Ch VIII Section A-VIII/2, Part 3 paragraph 8</li> <li>- Explains ERM in terms of maintaining the safe engineering watch including why ERM is necessary</li> <li>- Explains the resources considered to be included in ERM</li> <li>- Explains the resource management in a specific manner taking examples such as personnel management, information management and management of installations/equipment</li> <li>- Explains what is necessary to practice ERM</li> <li>- Explains what is meant by the following in practicing ERM</li> <li>- allocation, assignment and prioritization of the resources</li> <li>- effective communication</li> <li>- assertiveness and leadership</li> </ul>  | 8 Hours      |

| COMPETENCE  | KNOWLEDGE, UNDERSTANDING AND PROFICIENCY   | PERFORMANCE  | APPROX HOURS                                 |
|---|--|--|--|
|   |  | <ul style="list-style-type: none"> <li>- obtaining and maintaining situational awareness</li> <li>- consideration of team experience</li> </ul>  |  |
| Use internal communication systems                                  | Operation of all internal communication systems on board   | <ul style="list-style-type: none"> <li>- States the importance of:</li> <li>- communicating effectively in all circumstances</li> <li>- orders, instructions, reports and exchange of information being clear, accurate and concise</li> <li>- using accepted marine terminology, and proper methods are employed</li> <li>- chief or second Engineer being kept informed as required</li> <li>- the bridge being informed and consulted as required</li> </ul>  | 5 Hours                                      |
| Operate main and auxiliary machinery and associated control systems | Safety and emergency procedures for operation of propulsion plant machinery, including control systems | <p>Main Engine Auto-slow down and Shut down</p> <ul style="list-style-type: none"> <li>- Explains main engine auto-slow down and shut down taking a typical system as an example in terms of the following: <ul style="list-style-type: none"> <li>-specific conditions</li> <li>-processes appeared until slow-slow down/shut down</li> <li>-transient phenomenon of the plant</li> <li>-procedures for recovery (changeover of maneuvering position, maneuverings method, eliminating causes and etc.)</li> <li>-main engine control system</li> </ul> </li> <li>- Explains main engine manual emergency slow down and shut down in terms of the following, taking a typical system as an example <ul style="list-style-type: none"> <li>-specific conditions</li> <li>-impacts on the plant</li> <li>-procedures for recovery</li> </ul> </li> </ul> <p>Main Boiler Auto-shut down</p> <ul style="list-style-type: none"> <li>- Explains main boiler auto-shut down taking a typical system as an example in terms of the following: <ul style="list-style-type: none"> <li>-specific conditions</li> <li>-processes appeared until shut down</li> <li>-impacts on the plant under way and in port</li> <li>-procedures for recovery (eliminating causes, reigniting burner and etc)</li> <li>-main boiler control system (changeover of control system, position and etc.)</li> </ul> </li> </ul> <p>Power Failure (Blackout)</p> <ul style="list-style-type: none"> <li>- Explains briefly power supply system on board ships and its backup system</li> <li>- Explains specific conditions of blackout and procedures for recovery responding to their causes taking a typical system as an example, including the following:</li> </ul> | <p>10 hrs</p> <p>10 Hours</p> <p>5 Hours</p> |

| COMPETENCE   | KNOWLEDGE, UNDERSTANDING AND PROFICIENCY                                 | PERFORMANCE   | APPROX HOURS |
|--|--|---|--------------|
| Operate main and auxiliary machinery and associated control systems (cont) | Safety and emergency procedures for operation of propulsion plant (cont) | <ul style="list-style-type: none"> <li>-transient phenomenon of the plant</li> <li>-equipment/installations to be promptly addressed</li> <li>-sequential restarting auxiliaries</li> <li>-auxiliaries to be manually restarted</li> <li>-generator control system and power distributing system</li> </ul>   |              |
|  |  | <p>Emergency Procedures for Other Equipment/Installations</p> <ul style="list-style-type: none"> <li>- 1) Emergency steering</li> <li>- Describes how the system can be controlled from: <ul style="list-style-type: none"> <li>-a local position in the steering compartment at the rudder head</li> <li>-an emergency steering position on deck</li> </ul> </li> <li>- Describes alternative systems of steering that can be used in an emergency</li> <li>- Others</li> <li>- Explains precautions/procedures to be taken for the following: <ul style="list-style-type: none"> <li>-operation of purifiers in case of blackout</li> <li>-heat exchangers under blackout</li> <li>-backup in case of control air failure</li> <li>-cooling seawater system in case of air ingress</li> </ul> </li> </ul> | 5 Hours      |
| Total No. of Hours   |  |   | 66 Hours     |

\* discrepancy between course specifications and course map of the total number of hours is intended for assessment