

# Part D

## Instructor's Guide

<b>Course: Steam Turbine Engine Training Course</b>			<b>Competence:</b> Manage the operation of propulsion plant machinery		
			<b>Knowledge, Understanding and Proficiency (KUP):</b> Design features and operative mechanism of the following machinery and associated auxiliaries: Marine steam turbine		
			<b>Topics:</b> <b>Course Introduction</b> <b>1. Design features of marine steam turbine</b>		
<b>No. of Trainees:</b> Twelve (12) Trainees			<b>Learning Outcomes:</b> At the end of the lesson, the trainees should be able to: Refer to Part C Course Syllabus for the Intended Learning Outcomes		
<b>Class Layout:</b> Class lay-out suitable for the theoretical part only			<b>Formative Assessment:</b> Written Test		
Time	Phase	Content	Instructor-led Activity	Student Learning Activity	Instructional Materials Used
30 minutes	<b>Course Introduction</b>	<ul style="list-style-type: none"> <li>• House Rules and Regulations</li> <li>• Regulation III/2 and Section A-III/2 of the STCW Convention, 1978, as amended</li> <li>• Introduction to marine steam turbine</li> <li>• Intended Learning Outcomes (ILOs)</li> </ul>	<ul style="list-style-type: none"> <li>• Class orientation/ briefing</li> <li>• Lecture-Discussion or other teaching methods suitable for theoretical aspect</li> <li>• Presentation of the ILOs</li> </ul>	Listening, note taking, inquiring, answering questions, interactive discussion	<ul style="list-style-type: none"> <li>• Visual Presentation</li> <li>• Video presentation (Introduction to marine steam turbine)</li> </ul>

Time	Phase	Content	Instructor-led Activity	Student Learning Activity	Instructional Materials Used
25 minutes	<b>Core Elements</b>	<p><b>1. Design features of marine steam turbine</b></p> <ul style="list-style-type: none"> <li>• parts of marine steam turbine</li> <li>• impulse and reaction steam turbines, including its: <ul style="list-style-type: none"> <li>- construction &amp; design</li> <li>- utilization of steam energy</li> <li>- advantages and disadvantage</li> </ul> </li> </ul>	Interactive Lecture-Discussion or other method teaching methods suitable for theoretical aspect	Participating in the discussion, answering questions, interact with co-trainees, writing down notes	<ul style="list-style-type: none"> <li>• Visual presentation</li> <li>• Video presentation (working principle of impulse and reaction steam turbine)</li> <li>• Photo/ illustration of impulse and reaction steam turbine</li> </ul>
5 minutes	<b>Conclusion</b>	<ul style="list-style-type: none"> <li>• Regulation III/2 and Section A-III/2 of the STCW Convention, 1978, as amended</li> <li>• Design features of marine steam turbine</li> </ul>	<ul style="list-style-type: none"> <li>• Make generalizations and abstraction about the lessons</li> <li>• Assess the learning which may come from any of the following: <ul style="list-style-type: none"> <li>- Formative Test</li> <li>- Oral Examination</li> <li>- Assignment</li> <li>- Other activities to check the retention of learning</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Participating, sharing insights and learning gained</li> <li>• Answering and asking</li> </ul>	Visual Presentation

<b>Course: Steam Turbine Engine Training Course</b>		<b>Competence:</b> Manage the operation of propulsion plant machinery			
		<b>Knowledge, Understanding and Proficiency (KUP):</b> Design features and operative mechanism of the following machinery and associated auxiliaries: Marine steam turbine			
		<b>Topics:</b> <b>2. Operative mechanism of marine steam turbine</b>			
<b>No. of Trainees:</b> Twelve (12) Trainees		<b>Learning Outcomes:</b> At the end of the lesson, the trainees should be able to: Refer to Part C Course Syllabus for the Intended Learning Outcomes			
<b>Class Layout:</b> Class lay-out suitable for the theoretical part only		<b>Formative Assessment:</b> Written Test			
Time	Phase	Content	Instructor-led Activity	Student Learning Activity	Instructional Materials Used
5 minutes	<b>Introduction</b>	<ul style="list-style-type: none"> <li>Design features of marine steam turbine</li> <li>Intended Learning Outcomes (ILOs)</li> </ul>	<ul style="list-style-type: none"> <li>Review of previous lesson</li> <li>Presentation of the ILOs or other activities to motivate the trainees</li> </ul>	Listening, note taking, answering questions, interactive discussion	Visual presentation
50 minutes	<b>Core Elements</b>	<b>2. Operative mechanism of the components of marine steam turbine:</b> <ul style="list-style-type: none"> <li>high pressure turbine</li> <li>low pressure turbine</li> <li>astern turbine</li> <li>astern guardian valve</li> <li>maneuvering valve</li> </ul>	Interactive Lecture-Discussion or other method teaching methods suitable for theoretical aspect	Participating in the discussion, answering questions, interact with co-trainees, writing down notes	<ul style="list-style-type: none"> <li>Visual presentation</li> <li>Photo/ illustration of marine steam turbine with its major components</li> </ul>

Time	Phase	Content	Instructor-led Activity	Student Learning Activity	Instructional Materials Used
5 minutes	<b>Conclusion</b>	Operative mechanism of marine steam turbine	<ul style="list-style-type: none"> <li>• Make generalizations and abstraction about the lessons</li> <li>• Assess the learning which may come from any of the following:               <ul style="list-style-type: none"> <li>- Formative Test</li> <li>- Oral Examination</li> <li>- Assignment</li> <li>- Other activities to check the retention of learning</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Participate, share insights and learning gained</li> <li>• Answering and asking</li> </ul>	Visual Presentation

<b>Course: Steam Turbine Engine Training Course</b>			<b>Competence:</b>		
			<ul style="list-style-type: none"> <li>Plan and schedule operations</li> <li>Operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery</li> </ul>		
			<b>Knowledge, Understanding and Proficiency (KUP):</b>		
			<ul style="list-style-type: none"> <li>Theoretical knowledge on Thermodynamics and heat transmission</li> <li>Heat cycle, thermal efficiency and heat balance of the following: .2 marine steam turbine</li> </ul>		
			<b>Topics:</b>		
			<b>3. Thermodynamics and heat transmission in marine steam turbine propulsion plant</b>		
<b>No. of Trainees:</b> Twelve (12) Trainees			<b>Learning Outcomes:</b>		
			At the end of the lesson, the trainees should be able to: Refer to Part C Course Syllabus for the Intended Learning Outcomes		
<b>Class Layout:</b> Class lay-out suitable for the theoretical part only			<b>Formative Assessment:</b> Written Test		
Time	Phase	Content	Instructor-led Activity	Student Learning Activity	Instructional Materials Used
5 minutes	<b>Introduction</b>	<ul style="list-style-type: none"> <li>Operative mechanism of marine steam turbine</li> <li>Intended Learning Outcomes (ILOs)</li> </ul>	<ul style="list-style-type: none"> <li>Review of previous lesson</li> <li>Presentation of the ILOs or other activities to motivate the trainees</li> </ul>	Listening, note taking, answering questions, interactive discussion	Visual presentation

Time	Phase	Content	Instructor-led Activity	Student Learning Activity	Instructional
------	-------	---------	-------------------------	---------------------------	---------------

					<b>Materials Used</b>
1 hour and 20 minutes	<b>Core Elements</b>	<b>3. Thermodynamics and heat transmission in marine steam turbine propulsion plant</b> <ul style="list-style-type: none"> <li>principles of thermodynamics and heat transmission applied in marine steam turbine propulsion plant</li> <li>properties of steam</li> <li>steam cycle</li> <li>relationship of sea water temperature and main condenser vacuum</li> </ul>	Interactive Lecture-Discussion or other method teaching methods suitable for theoretical aspect	Participating in the discussion, answering questions, interact with co-trainees, writing down notes	<ul style="list-style-type: none"> <li>Visual presentation</li> <li>Heat transmission diagram</li> <li>Sea water temperature vs main condenser vacuum graph</li> </ul>
5 minutes	<b>Conclusion</b>	Thermodynamics and heat transmission in marine steam turbine propulsion plant	<ul style="list-style-type: none"> <li>Make generalizations and abstraction about the lessons</li> <li>Assess the learning which may come from any of the following: <ul style="list-style-type: none"> <li>Formative Test</li> <li>Oral Examination</li> <li>Assignment</li> <li>Other activities to check the retention of learning</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Participating, sharing insights and learning gained</li> <li>Answering and asking</li> </ul>	Visual Presentation

<b>Course: Steam Turbine Engine Training Course</b>			<b>Competence:</b>		
			<ul style="list-style-type: none"> <li>Plan and schedule operations</li> <li>Operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery</li> </ul>		
			<b>Knowledge, Understanding and Proficiency (KUP):</b> Theoretical knowledge on Mechanics and hydromechanics		
<b>No. of Trainees:</b> Twelve (12) Trainees			<b>Learning Outcomes:</b> At the end of the lesson, the trainees should be able to: Refer to Part C Course Syllabus for the Intended Learning Outcomes		
<b>Class Layout:</b> Class lay-out suitable for the theoretical part only			<b>Formative Assessment:</b> Written Test		
Time	Phase	Content	Instructor-led Activity	Student Learning Activity	Instructional Materials Used
5 minutes	<b>Introduction</b>	<ul style="list-style-type: none"> <li>Thermodynamics and heat transmission in marine steam turbine propulsion plant</li> <li>Intended Learning Outcomes (ILOs)</li> </ul>	<ul style="list-style-type: none"> <li>Review of previous lesson</li> <li>Presentation of the ILOs or other activities to motivate trainees</li> </ul>	<ul style="list-style-type: none"> <li>Listening, note taking, answering questions, interactive discussion</li> </ul>	Visual presentation
50 minutes	<b>Core Elements</b>	<b>4. Mechanics and Hydromechanics</b> <ul style="list-style-type: none"> <li>The principles and applications of mechanics and hydromechanics applied in marine steam turbine</li> </ul>	Interactive Lecture-Discussion or other method teaching methods suitable for theoretical aspect	Participating in the discussion, answering questions, interact with co-trainees, writing down notes	<ul style="list-style-type: none"> <li>Visual presentation</li> <li>Video presentation (How marine steam turbine works?)</li> </ul>

Time	Phase	Content	Instructor-led Activity	Student Learning Activity	Instructional Materials Used
5 minutes	<b>Conclusion</b>	Mechanics and Hydromechanics as applied in marine steam turbine	<ul style="list-style-type: none"> <li>• Make generalizations and abstraction about the lessons</li> <li>• Assess the learning which may come from any of the following:               <ul style="list-style-type: none"> <li>- Formative Test</li> <li>- Oral Examination</li> <li>- Assignment</li> <li>- Other activities to check the retention of learning</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Participating, sharing insights and learning gained</li> <li>• Answering and asking</li> </ul>	Visual presentation



<b>Course: Steam Turbine Engine Training Course</b>			<b>Competence:</b>		
			<ul style="list-style-type: none"> <li>Plan and schedule operations</li> <li>Operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery</li> </ul>		
			<b>Knowledge, Understanding and Proficiency (KUP):</b>		
			Propulsive characteristics of steam turbine, including speed, output and fuel consumption		
			<b>Topics:</b>		
			<b>5. Propulsive characteristic of marine steam turbine, including speed, output and fuel consumption</b>		
<b>No. of Trainees:</b> Twelve (12) Trainees			<b>Learning Outcomes:</b>		
			At the end of the lesson, the trainees should be able to: Refer to Part C Course Syllabus for the Intended Learning Outcomes		
<b>Class Layout:</b> Class lay-out suitable for the theoretical part only			<b>Formative Assessment:</b> Written Test		
Time	Phase	Content	Instructor-led Activity	Student Learning Activity	Instructional Materials Used
5 minutes	<b>Introduction</b>	<ul style="list-style-type: none"> <li>Mechanics and hydromechanics</li> <li>Intended Learning Outcomes (ILO)</li> </ul>	<ul style="list-style-type: none"> <li>Review of the previous lesson</li> <li>Presentation of the ILOs or other activities to motivate trainees</li> </ul>	<ul style="list-style-type: none"> <li>Listening, note taking, answering questions, interactive discussion</li> </ul>	Visual presentation
1 hour and 20 minutes	<b>Core Elements</b>	<b>5. Propulsive characteristic of marine steam turbine, including speed, output and fuel consumption</b>	Interactive Lecture-Discussion or other method teaching methods suitable for theoretical aspect	Participating in the discussion, answering questions, interact with co-trainees, writing down notes	<ul style="list-style-type: none"> <li>Visual presentation</li> <li>Performance graph curve (diesel vs. turbine)</li> </ul>
Time	Phase	Content	Instructor-led Activity	Student Learning Activity	Instructional

					<b>Materials Used</b>
5 minute s	<b>Conclusion</b>	Propulsive characteristic of marine steam turbine, including speed, output and fuel consumption	<ul style="list-style-type: none"> <li>• Make generalizations and abstraction about the lessons</li> <li>• Assess the learning which may come from any of the following:                             <ul style="list-style-type: none"> <li>- Formative Test</li> <li>- Oral Examination</li> <li>- Assignment</li> <li>- Other activities to check the retention of learning</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Participating, interactive discussion</li> <li>• Asking and answering</li> </ul>	Visual presentation

<b>Course: Steam Turbine Engine Training Course</b>	<b>Competence:</b>
---	--------------------

			<ul style="list-style-type: none"> <li>Plan and schedule operations</li> <li>Operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery</li> </ul>		
			<b>Knowledge, Understanding and Proficiency (KUP):</b> Theoretical knowledge on Heat cycle, thermal efficiency and heat balance of marine steam turbine		
			<b>Topics:</b> <b>6. Heat cycle, thermal efficiency and heat balance of marine steam turbine</b>		
<b>No. of Trainees:</b> Twelve (12) Trainees			<b>Learning Outcomes:</b> At the end of the lesson, the trainees should be able to: Refer to Part C Course Syllabus for the Intended Learning Outcomes		
<b>Class Layout:</b> Class lay-out suitable for the theoretical part only			<b>Formative Assessment:</b> Written Test		
Time	Phase	Content	Instructor-led Activity	Student Learning Activity	Instructional Materials Used
5 minutes	<b>Introduction</b>	<ul style="list-style-type: none"> <li>Propulsive characteristics of marine steam turbine, including speed, output and fuel consumption</li> <li>Intended Learning Outcomes (ILOs)</li> </ul>	<ul style="list-style-type: none"> <li>Review of previous lesson</li> <li>Presentation of the ILOs or other activities to motivate trainees</li> </ul>	<ul style="list-style-type: none"> <li>Listening, note taking, answering questions, interactive discussion</li> </ul>	Visual presentation

Time	Phase	Content	Instructor-led Activity	Student Learning Activity	Instructional Materials Used
1 hour and 20 minutes	<b>Core Elements</b>	<b>6. Heat cycle, thermal efficiency and heat balance of marine steam turbine propulsion plant</b> <ul style="list-style-type: none"> <li>Rankine cycle</li> </ul>	Interactive Lecture-Discussion or other method teaching methods suitable for theoretical aspect	Participating in the discussion, answering questions, interact with co-trainees, writing down notes	<ul style="list-style-type: none"> <li>Visual presentation</li> <li>Heat Balance Diagram</li> <li>Video presentation (Rankine cycle)</li> </ul>
5 minutes	<b>Conclusion</b>	Heat cycle, thermal efficiency and heat balance of marine steam turbine	<ul style="list-style-type: none"> <li>Make generalizations and abstraction about the lessons</li> <li>Assess the learning which may come from any of the following: <ul style="list-style-type: none"> <li>Formative Test</li> <li>Oral Examination</li> <li>Assignment</li> <li>Other activities to check the retention of learning</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Participating, sharing insights and learning gained</li> <li>Asking and answering</li> </ul>	<ul style="list-style-type: none"> <li>Visual presentation</li> </ul>

<b>Course: Steam Turbine Engine Training Course</b>			<b>Competence:</b>		
			<ul style="list-style-type: none"> <li>Plan and schedule operations</li> <li>Operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery</li> </ul>		
			<b>Knowledge, Understanding and Proficiency (KUP):</b>		
Operating limits of propulsion plant			<b>Topic:</b>		
7. Operating limits of marine steam turbine propulsion plant			<b>Learning Outcomes:</b>		
No. of Trainees: Twelve (12) trainees			At the end of the lesson, the trainees should be able to: Refer to Part C Course Syllabus for the Intended Learning Outcomes		
Class Layout: Class lay-out suitable for the theoretical part only			<b>Formative Assessment:</b> Written and Practical Test		
Time	Phase	Content	Instructor-led Activity	Student Learning Activity	Instructional Materials Used
5 minutes	Introduction	<ul style="list-style-type: none"> <li>Heat cycle, thermal efficiency and heat balance of marine steam turbine</li> <li>Intended Learning Outcomes (ILOs)</li> </ul>	<ul style="list-style-type: none"> <li>Review of the previous lesson</li> <li>Presentation of the ILOs or other activities to motivate trainees</li> </ul>	Listening, note taking, answering questions, interactive discussion	Visual presentation
1 hour and 50 minutes	Core Elements	<b>7. Operating limits of marine steam turbine propulsion plant</b> <ul style="list-style-type: none"> <li>warm up criteria (key instructions and piping system)</li> </ul>	Interactive Lecture-Discussion or other method teaching methods suitable for theoretical aspect	Participating in the discussion, answering questions, interact with co-trainees, writing down notes	<ul style="list-style-type: none"> <li>Visual presentation</li> <li>Piping Diagram (warm up of marine steam turbine plant)</li> <li>Engine data sheet</li> </ul>

Time	Phase	Content	Instructor-led Activity	Student Learning Activity	Instructional Materials Used
2 hours		Technical specification of marine steam turbine per agreed work plan	Practical Exercise	<ul style="list-style-type: none"> <li>• Check the operating limits of marine steam turbine propulsion plant during start up and warm up period in accordance with technical specification and agreed work plan</li> <li>• Analyze the result form the checked parameters and take appropriate actions</li> </ul>	<ul style="list-style-type: none"> <li>• Exercise sheet</li> <li>• Familiarization Checklist</li> <li>• Simulator</li> <li>• Manufacturer's instruction manual for marine steam turbine</li> </ul>
5 minutes	<b>Conclusion</b>	Operating limits of marine steam turbine propulsion plant	<ul style="list-style-type: none"> <li>• Make generalizations and abstraction about the lessons</li> <li>• Assess the learning which may come from any of the following: <ul style="list-style-type: none"> <li>- Formative Test</li> <li>- Oral Examination</li> <li>- Assignment</li> <li>- Other activities to check the retention of learning</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Participating, sharing insights and learning gained</li> <li>• Asking and answering</li> </ul>	Visual Presentation

<b>Course: Steam Turbine Engine Training Course</b>			<b>Competence:</b>		
			<ul style="list-style-type: none"> <li>Plan and schedule operations</li> <li>Operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery</li> </ul>		
			<b>Knowledge, Understanding and Proficiency (KUP):</b>		
			Functions and mechanism of automatic control for main engine		
			<b>Topics:</b>		
			<b>8. Function and mechanism of automatic control for marine steam turbine propulsion plant.</b>		
<b>No. of Trainees:</b> Twelve (12) trainees			<b>Learning Outcomes:</b>		
			At the end of the lesson, the trainees should be able to: Refer to Part C Course Syllabus for the Intended Learning Outcomes		
<b>Class Layout:</b> Class lay-out suitable for the theoretical part only			<b>Formative Assessment:</b> Written Test		
Time	Phase	Content	Instructor-led Activity	Student Learning Activity	Instructional Materials Used
5 minutes	Introduction	<ul style="list-style-type: none"> <li>Operating limits of marine steam turbine propulsion plant</li> <li>Intended Learning Outcomes (ILOs)</li> </ul>	<ul style="list-style-type: none"> <li>Review of the previous lessons</li> <li>Presentation of the ILOs or other activities to motivate trainees</li> </ul>	<ul style="list-style-type: none"> <li>Listening, note taking, answering questions, interactive discussion</li> </ul>	Visual presentation
1 hour and 20 minutes	Core Elements	<b>8. Function and mechanism of the following automatic controls for marine steam turbine propulsion plant:</b> <ul style="list-style-type: none"> <li>rpm control</li> <li>program control</li> <li>direct control</li> <li>lever control</li> <li>nozzle lift control</li> </ul>	Interactive Lecture-Discussion or other method teaching methods suitable for theoretical aspect	Participating in the discussion, answering questions, interact with co-trainees, writing down notes	<ul style="list-style-type: none"> <li>Visual presentation</li> <li>Control mechanism (stop) diagram</li> </ul>

Time	Phase	Content	Instructor-led Activity	Student Learning Activity	Instructional Materials Used
5 minutes	<b>Conclusion</b>	Function and mechanism of automatic control for marine steam turbine propulsion plant	<ul style="list-style-type: none"><li>• Make generalizations and abstraction about the lessons</li><li>• Assess the learning which may come from any of the following:<ul style="list-style-type: none"><li>- Formative Test</li><li>- Oral Examination</li><li>- Assignment</li><li>- Other activities to check the retention of learning</li></ul></li></ul>	<ul style="list-style-type: none"><li>• Participating, sharing insights and learning gained</li><li>• Asking and answering</li></ul>	Visual presentation



<b>Course: Steam Turbine Engine Training Course</b>			<b>Competence:</b>		
			<ul style="list-style-type: none"> <li>Plan and schedule operations</li> <li>Operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery</li> </ul>		
			<b>Knowledge, Understanding and Proficiency (KUP):</b>		
The efficient operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery			<b>Topics:</b>		
The efficient operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery			<b>9. Operation of marine steam turbine propulsion plant</b>		
<b>No. of Trainees:</b> Twelve (12) trainees			<b>Learning Outcomes:</b>		
At the end of the lesson, the trainees should be able to: Refer to Part C Course Syllabus for the Intended Learning Outcomes			<b>Formative Assessment:</b> Written and Practical Test		
<b>Class Layout:</b> Class lay-out suitable for the theoretical part only			<b>Formative Assessment:</b> Written and Practical Test		
Time	Phase	Content	Instructor-led Activity	Student Learning Activity	Instructional Materials Used
5 minutes	<b>Introduction</b>	<ul style="list-style-type: none"> <li>Function and mechanism of automatic control for marine steam turbine propulsion plant</li> <li>Intended Learning Outcomes (ILOs)</li> </ul>	<ul style="list-style-type: none"> <li>Review of the previous lesson</li> <li>Presentation of the ILOs or other activities to motivate trainees</li> </ul>	Listening, note taking, answering questions, interactive discussion	Visual presentation
3 hours and 20 minutes	<b>Core Elements</b>	<b>9. Operation of marine steam turbine propulsion plant</b> <ul style="list-style-type: none"> <li>functions and locations of each component of marine steam turbine propulsion plant</li> </ul>	Interactive Lecture-Discussion or other method teaching methods suitable for theoretical aspect	Participating in the discussion, answering questions, interact with co-trainees, writing down notes	<ul style="list-style-type: none"> <li>Visual presentation</li> <li>Video presentation (Working principle of marine boiler)</li> <li>Piping diagrams</li> </ul>
Time	Phase	Content	Instructor-led Activity	Student Learning Activity	Instructional Materials

					<b>Used</b>
		<ul style="list-style-type: none"> <li>• safety precautions in operating the marine steam turbine plant</li> <li>• procedures for arrival, in port and departure</li> </ul>			
6 hours		Arrival and departure operation of marine steam turbine	Practical exercise	Operate marine steam turbine for arrival and departure using a simulator	<ul style="list-style-type: none"> <li>• Exercise sheet</li> <li>• Simulator</li> <li>• Manufacturer's instruction manual for marine steam turbine</li> </ul>
5 minutes	<b>Conclusion</b>	Operation of marine steam turbine propulsion plant	<ul style="list-style-type: none"> <li>• Make generalizations and abstraction about the lessons</li> <li>• Assess the learning which may come from any of the following: <ul style="list-style-type: none"> <li>- Formative Test</li> <li>- Oral Examination</li> <li>- Assignment</li> <li>- Other activities to check the retention of learning</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Participating, sharing insights and learning gained</li> <li>• Asking and answering</li> </ul>	Visual presentation

<b>Course: Steam Turbine Engine Training Course</b>			<b>Competence:</b>		
			<ul style="list-style-type: none"> <li>Plan and schedule operations</li> <li>Operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery</li> </ul>		
			<b>Knowledge, Understanding and Proficiency (KUP):</b>		
Start up and shut down main propulsion and auxiliary machinery, including associated systems			<b>Topics:</b>		
10. Plant up and Plant down of main propulsion and auxiliary machinery			<b>Learning Outcomes:</b>		
No. of Trainees: Twelve (12) trainees			At the end of the lesson, the trainees should be able to: Refer to Part C Course Syllabus for the Intended Learning Outcomes		
Class Layout: Class lay-out suitable for the theoretical part only			Formative Assessment: Written and Practical Test		
Time	Phase	Content	Instructor-led Activity	Student Learning Activity	Instructional Materials Used
5 minutes	Introduction	<ul style="list-style-type: none"> <li>Operation of marine steam turbine</li> <li>Intended Learning Outcomes (ILOs)</li> </ul>	<ul style="list-style-type: none"> <li>Review of the previous lesson</li> <li>Presentation of the ILOs or other activities to motivate trainees</li> </ul>	Listening, note taking, answering questions, interactive discussion	Visual presentation
20 minutes	Core Elements	<b>10. Plant up and Plant down of marine steam turbine propulsion plant</b>	Interactive Lecture-Discussion or other method teaching methods suitable for theoretical aspect	Participating in the discussion, answering questions, interact with co-trainees, writing down notes	Visual presentation

Time	Phase	Content	Instructor-led Activity	Student Learning Activity	Instructional Materials Used
6 hours		Plant up and plant down operation of marine steam turbine propulsion plant	Practical exercise	Plant up and plant down marine steam turbine propulsion plant in accordance with manufacturer's manual	<ul style="list-style-type: none"> <li>• Exercise Sheet</li> <li>• Simulator</li> <li>• Manufacturer's instruction manual for marine steam turbine</li> </ul>
5 minutes	<b>Conclusion</b>	Plant up and Plant down of main propulsion and auxiliary machinery	<ul style="list-style-type: none"> <li>• Make generalizations and abstraction about the lessons</li> <li>• Assess the learning which may come from any of the following: <ul style="list-style-type: none"> <li>- Formative Test</li> <li>- Oral Examination</li> <li>- Assignment</li> <li>- Other activities to check the retention of learning</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Participating, sharing insights and learning gained</li> <li>• Asking and answering</li> </ul>	Visual presentation

<b>Course Title: Steam Turbine Engine Training Course</b>			<b>Competence:</b>		
			<ul style="list-style-type: none"> <li>Plan and schedule operations</li> <li>Operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery</li> </ul>		
			<b>Knowledge, Understanding and Proficiency (KUP):</b>		
			The efficient operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery		
			<b>Topics:</b>		
			<b>11. Surveillance, performance assessment and maintaining safety of marine steam turbine propulsion plant</b>		
<b>No. of Trainees:</b> Twelve (12) trainees			<b>Learning Outcomes:</b>		
			At the end of the lesson, the trainees should be able to: Refer to Part C Course Syllabus for the Intended Learning Outcomes		
<b>Class Layout:</b> Class lay-out suitable for the theoretical part only			<b>Formative Assessment:</b> Written and Practical Test		
Time	Phase	Content	Instructor-led Activity	Student Learning Activity	Instructional Materials Used
5 minutes	<b>Introduction</b>	<ul style="list-style-type: none"> <li>Plant up and plant down of main propulsion and auxiliary machinery</li> <li>Intended Learning Outcomes (ILOs)</li> </ul>	<ul style="list-style-type: none"> <li>Review of previous lessons</li> <li>Presentation of the ILOs or other activities to motivate trainees</li> </ul>	Listening, note taking, answering questions, interactive discussion	Visual presentation
50 minutes	<b>Core Elements</b>	<b>11. Surveillance and performance assessment and maintaining safety of marine steam turbine propulsion plant</b>	Interactive Lecture-Discussion or other method teaching methods suitable for theoretical aspect	Participating in the discussion, answering questions, interact with co-trainees, writing down notes	<ul style="list-style-type: none"> <li>Visual presentation</li> <li>Performance Curve Graph</li> </ul>
Time	Phase	Content	Instructor-led Activity	Student Learning Activity	Instructional

					<b>Materials Used</b>
2 hours		Maintaining safe operation of marine steam turbine propulsion plant	Practical Exercise	<ul style="list-style-type: none"> <li>• Conduct surveillance and performance assessment using gathered data</li> <li>• Analyze the result of surveillance and performance assessment conducted and take appropriate action in accordance with technical specifications</li> </ul>	<ul style="list-style-type: none"> <li>• Exercise Sheet</li> <li>• Simulator</li> <li>• Manufacturer's instruction manual for marine steam turbine</li> </ul>
5 minutes	<b>Conclusion</b>	Surveillance, performance assessment and maintaining safety of marine steam turbine propulsion plant	<ul style="list-style-type: none"> <li>• Make generalizations and abstraction about the lessons</li> <li>• Assess the learning which may come from any of the following: <ul style="list-style-type: none"> <li>- Formative Test</li> <li>- Oral Examination</li> <li>- Assignment</li> <li>- Other activities to check the retention of learning</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Participating, sharing insights and learning gained</li> <li>• Asking and answering</li> </ul>	Visual presentation