

Part D

Instructor's Guide

Instructions: The Instructor's Guide (I.G.) also known as lesson plan is developed by the instructor which serves as a road map of what the trainees need to learn and how it will be done effectively. The format below shall be used to ensure uniformity. However, the MTI is required to specify teaching and learning activities, and develop appropriate Instructional Materials suitable for the learning outcomes.

Course: Management Level Course for Marine Engineer Officers (Function 2)		Competence: Manage operation of electrical and electronic control equipment			
		Knowledge, Understanding and Proficiency: Marine electrotechnology, electronics, power electronics, automatic control engineering and safety devices			
		Topics: Course Introduction 1. Marine electrotechnology, electronics, power electronics, automatic control engineering and safety devices			
Lecture: Twenty-Four (24) Trainees		Learning Outcome/s: At the end of the session, the trainees should be able to: Refer to Part C Course Syllabus for the Intended Learning Outcomes			
Class Layout: Layout suitable theoretical part		Formative Assessment: Written and Practical Test			
Time	Phase	Content	Instructor-led Activity	Trainee's Learning Activity	Instructional Materials Used
1 hour	Introduction	Course Introduction <ul style="list-style-type: none"> ● Requirements in Regulation III/2 in relation to Section A-III/2, Table A-III/2 ● Competences and KUPs in Table A-III/2 ● Objectives of the course ● Course requirements ● Introduction to leadership skills that a 	<ul style="list-style-type: none"> ● Class orientation/ briefing ● Lecture/Discussion or other teaching methods suitable for theoretical aspect ● Presentation of the ILOs or other activities to motivate the trainees 	Listening, note taking, inquiring, answering questions, interactive discussion	<ul style="list-style-type: none"> ● Visual presentation ● STCW Convention

Time	Phase	Content	Instructor-led Activity	Trainee's Learning Activity	Instructional Materials Used
		management level should possess ● Intended Learning Outcome (ILO)			
6 hours and 30 minutes	Core Elements	1. Marine electro technology, electronics, power electronics, automatic control engineering and safety devices	The MTI is required to specify suitable activities for the delivery of the topics.	The MTI is required to specify suitable learning activities.	<ul style="list-style-type: none"> ● Visual presentation ● Training Video ● SOLAS Convention ● Sample operating manual
3 hours		Practical Exercise 1 Manage the operation of electrical and electronic equipment and system, and safety devices	Practical Exercise 1 The MTI is required to specify suitable activities for the conduct of practical exercises in Managing the operation of electrical and electronic equipment and system, and safety devices	Practical Exercise 1 Participating in the practical exercise on managing the operation of electrical and electronic equipment and systems, and safety devices	<ul style="list-style-type: none"> ● Exercise Sheet A4.1 ● Sample operating manual ● Engine Room Simulator (ERS)
30 minutes	Conclusion	Marine electro technology, electronics, power electronics, automatic control engineering and safety devices	<ul style="list-style-type: none"> ● Make generalization and abstraction of the lesson ● Assess the learning which may come from any of the following: <ul style="list-style-type: none"> - Formative test; - Oral Examination; - Assignment; ● Other activities to check the retention of learning 	<ul style="list-style-type: none"> ● Participating, sharing insights, and learning gained ● Answering/asking questions 	Visual presentation

Course: Management Level Course for Marine Engineer Officers (Function 2)		Competence 1: Manage operation of electrical and electronic control equipment			
		Knowledge, Understanding and Proficiency: Design features and system configurations of automatic control equipment and safety devices for main engine, generator and distribution system, and steam boiler			
		Topic: 2. Design features and system configurations of automatic control equipment and safety devices for main engine, generator and distribution system, and steam boiler			
Lecture: Twenty-Four (24) Trainees		Learning Outcome/s: At the end of the session, the trainees should be able to: Refer to Part C Course Syllabus for the Intended Learning Outcomes			
Class Layout: Layout suitable for the theoretical part		Formative Assessment: Written and Practical Test			
Time	Phase	Content	Instructor-led Activity	Trainee's Learning Activity	Instructional Materials Used
30 minutes	Introduction	<ul style="list-style-type: none"> Marine electro technology, electronics, power electronics, automatic control engineering and safety devices Intended Learning Outcomes (ILO) 	<ul style="list-style-type: none"> Review of previous lessons Presentation of the Training Outcomes, Course Content, and ILOs 	Listening, note taking, inquiring, answering questions, interactive discussion	Visual presentation
8 hours	Core Elements	2. Design features and system configurations of automatic control equipment and safety devices for main engine, generator and distribution system, and steam boiler	The MTI is required to specify suitable activities for the delivery of the topics.	Participating, note taking, watching video clips, sharing insights and learning gained, asking and answering questions,	<ul style="list-style-type: none"> Visual presentation Training Videos SOLAS Convention Sample operating manual
		Practical Exercise 2 Manage the operation of the automatic control	Practical Exercises 2 and 3	Practical Exercises 2 and 3	<ul style="list-style-type: none"> Exercise Sheet A4.2 and A4.3

Time	Phase	Content	Instructor-led Activity	Trainee's Learning Activity	Instructional Materials Used
4 hours		equipment and safety devices for main engine, generator and distribution system, and steam boiler	The MTI is required to specify suitable activities for the conduct of practical exercises on the following: <ul style="list-style-type: none"> - Managing the operation of the automatic control equipment and safety devices for main engine, generator and distribution system, and steam boiler - Carrying out Assessment and adjustment of the automatic control equipment and safety devices for main engine, generator and its distribution system, and steam boiler 	Participating in the practical exercises in: <ul style="list-style-type: none"> - Managing the operation of the automatic control equipment and safety devices for main engine, generator and distribution system, and steam boiler - Carrying out assessment and adjustment of the automatic control equipment and safety devices for main engine, generator and its distribution system, and steam boiler 	<ul style="list-style-type: none"> ● ERS ● Sample Operating manual
		Practical Exercise 3 Carry our assessment and adjustment of the automatic control equipment and safety devices for main engine, generator and its distribution system, and steam boiler			
30 minutes	Conclusion	Design features and system configurations of automatic control equipment and safety devices for main engine, generator and distribution system, and steam boiler	<ul style="list-style-type: none"> ● Make generalization and abstraction about the lesson ● Assess the learning which may come from any of the following: <ul style="list-style-type: none"> - Formative test; - Oral Examination; - Assignment; 	<ul style="list-style-type: none"> ● Participating, sharing insights and learning gained ● Answering/asking questions 	Visual presentation

Time	Phase	Content	Instructor-led Activity	Trainee's Learning Activity	Instructional Materials Used
			<ul style="list-style-type: none">• Other activities to check the retention of learning		

Course: Management Level Course for Marine Engineer Officers (Function 2)		Competence: Manage operation of electrical and electronic control equipment			
		Knowledge, Understanding and Proficiency: Design features and system configurations of operational control equipment for electrical motors			
		Topic: 3. Design features and system configurations of operational control equipment for electrical motors			
Lecture: Twenty-Four (24) Trainees		Learning Outcome/s: At the end of the session, the trainees should be able to: Refer to Part C Course Syllabus for the Intended Learning Outcomes			
Class Layout: Layout suitable for the theoretical part		Formative Assessment: Written and Practical Test			
Time	Phase	Content	Instructor-led Activity	Trainee's Learning Activity	Instructional Materials Used
30 minutes	Introduction	<ul style="list-style-type: none"> Design features and system configurations of automatic control equipment and safety devices for main engine, generator and distribution system, and steam boiler Intended Learning Outcomes (ILO) 	<ul style="list-style-type: none"> Review of previous lessons Presentation of the Training Outcomes, Course Content, and ILOs 	Listening, note taking, inquiring, answering questions, interactive discussion	Visual presentation
7 hours	Core Elements	3. Design features and system configurations of operational control equipment for electrical motors	The MTI is required to specify suitable activities for the delivery of the topics.	Participating, note taking, sharing insights and learning gained, asking and answering questions	<ul style="list-style-type: none"> Visual presentation; Training Videos; SOLAS Convention Sample operating manual
3 hours		Practical Exercise 4 Manage the operational control equipment system for electrical motors	Practical Exercises 4 and 5 The MTI is required to specify suitable activities for the conduct of practical exercises on the following:	Practical Exercises 4 and 5 Participating in the practical exercises in: - managing the operation of control equipment	<ul style="list-style-type: none"> Exercise Sheet A4.4 and A4.5 Electrical and electronic trainer Sample operating manual
		Practical Exercise:			

Time	Phase	Content	Instructor-led Activity	Trainee's Learning Activity	Instructional Materials Used
		Assess the performance level of control equipment system for electrical motors	<ul style="list-style-type: none"> - Managing the operational control equipment system for electrical motors - Assessing the performance level of control equipment system for electrical motors 	<ul style="list-style-type: none"> - system for electrical motors - assessing the performance level of control equipment system for electrical motors 	
30 minutes	Conclusion	Design features and system configurations of operational control equipment for electrical motors	<ul style="list-style-type: none"> ● Make generalization and abstraction about the lesson ● Assess the learning which may come from any of the following: <ul style="list-style-type: none"> - Formative test; - Oral Examination; - Assignment; ● Other activities to check the retention of learning 	<ul style="list-style-type: none"> ● Participating, sharing insights and learning gained ● Answering/asking questions 	Visual presentation

Course: Management Level Course for Marine Engineer Officers (Function 2)			Competence: Manage operation of electrical and electronic control equipment		
			Knowledge, Understanding and Proficiency: Design features of high-voltage installation		
			Topic: 4. Design features of high-voltage installation		
Lecture: Twenty-Four (24) Trainees			Learning Outcome/s: At the end of the session, the trainees should be able to: Refer to Part C Course Syllabus for the Intended Learning Outcomes		
Class Layout: Layout suitable for the theoretical part			Formative Assessment: Written and Practical Test		
Time	Phase	Content	Instructor-led Activity	Trainee's Learning Activity	Instructional Materials Used
10 minutes	Introduction	<ul style="list-style-type: none"> Design features and system configurations of operational control equipment for electrical motors Intended Learning Outcomes (ILO) 	<ul style="list-style-type: none"> Review of previous lessons Presentation of the Training Outcomes, Course Content, and ILOs 	Listening, note taking, inquiring, answering questions, interactive discussion	Visual presentation
2 hours and 40 minutes	Core Elements	4. Design features of high-voltage installation	The MTI is required to specify suitable activities for the delivery of the topics.	Participating, note taking, watching video clips, sharing insights and learning gained, asking and answering questions	<ul style="list-style-type: none"> Visual presentation; SOLAS Convention; Training Videos; Sample operating manual
2 hours		Practical Exercise 6 Manage the operation of high-voltage installations	Practical Exercise 6 The MTI is required to specify suitable activities for the conduct of practical exercise in managing the operation of high-voltage installations	Practical Exercise 6 Participating in the practical exercise in managing the operation of high-voltage installations	<ul style="list-style-type: none"> Exercise Sheet A4.6 Stand-alone High Voltage Simulator or ERS (capable of operating and maintaining power systems over 1,000 volts) Sample operating manual

Time	Phase	Content	Instructor-led Activity	Trainee's Learning Activity	Instructional Materials Used
10 minutes	Conclusion	Design features and system configurations of operational control equipment for electrical motors	<ul style="list-style-type: none"> ● Make generalization and abstraction about the lesson ● Assess the learning which may come from any of the following: <ul style="list-style-type: none"> - Formative test; - Oral Examination; - Assignment; ● Other activities to check the retention of learning 	<ul style="list-style-type: none"> ● Participating, sharing insights and learning gained ● Answering/asking questions 	Visual presentation

Course: Management Level Course for Marine Engineer Officers (Function 2)			Competence: Manage operation of electrical and electronic control equipment		
			Knowledge, Understanding and Proficiency: Features of hydraulic and pneumatic control equipment		
			Topic: 5. Features of hydraulic and pneumatic control equipment		
Lecture: Twenty-Four (24) Trainees			Learning Outcome/s: At the end of the session, the trainees should be able to: Refer to Part C Course Syllabus for the Intended Learning Outcomes		
Class Layout: Layout suitable for the theoretical part			Formative Assessment: Written and Practical Test		
Time	Phase	Content	Instructor-led Activity	Trainee's Learning Activity	Instructional Materials Used
10 minutes	Introduction	<ul style="list-style-type: none"> Design features and system configurations of operational control equipment for electrical motors Intended Learning Outcomes (ILO) 	<ul style="list-style-type: none"> Review of previous lessons Presentation of the Training Outcomes, Course Content, and ILOs 	Listening, note taking, inquiring, answering questions, interactive discussion	Visual presentation
7 hours and 20 minutes	Core Elements	5. Features of hydraulic and pneumatic control equipment	The MTI is required to specify suitable activities for the delivery of the topics.	Participating, sharing insights and learning gained, asking and answering questions	<ul style="list-style-type: none"> Visual presentation Sample technical Specifications
3 hours		<p>Practical Exercise 7 Manage the operation of hydraulic and pneumatic control equipment</p> <p>Practical Exercise 8 Assess the performance level of hydraulic and pneumatic control equipment</p>	<p>Practical Exercises 7 and 8 The MTI is required to specify suitable activities for the conduct of practical exercises on the following:</p> <ul style="list-style-type: none"> Managing the operation of hydraulic and pneumatic control equipment Assessing the performance level of hydraulic and 	<p>Practical Exercises 7 and 8 Participating in the practical exercises in:</p> <ul style="list-style-type: none"> managing the operation of hydraulic and pneumatic control equipment assessing the performance level of hydraulic and pneumatic 	<ul style="list-style-type: none"> Exercise Sheet A4.7 and A4.8 Hydraulic and pneumatic trainer Sample technical specifications

Time	Phase	Content	Instructor-led Activity	Trainee's Learning Activity	Instructional Materials Used
			pneumatic control equipment	control equipment	
30 minutes	Conclusion	Features of hydraulic and pneumatic control equipment	<ul style="list-style-type: none"> ● Make generalization and abstraction about the lesson ● Assess the learning which may come from any of the following: <ul style="list-style-type: none"> - Formative test; - Oral Examination; - Assignment; ● Other activities to check the retention of learning 	<ul style="list-style-type: none"> ● Participating, sharing insights and learning gained ● Answering/asking questions 	Visual presentation

Course: Management Level Course for Marine Engineer Officers (Function 2)		Competence: Manage troubleshooting, restoration of electrical and electronic control equipment to operating condition			
		Knowledge, Understanding and Proficiency: Troubleshooting of electrical and electronic control equipment			
		Topic: 6. Troubleshooting of electrical and electronic control equipment			
Lecture: Twenty-Four (24) Trainees		Learning Outcome/s: At the end of the session, the trainees should be able to: Refer to Part C Course Syllabus for the Intended Learning Outcomes			
Class Layout: Layout suitable for the theoretical part		Formative Assessment: Written and Practical Test			
Time	Phase	Content	Instructor-led Activity	Trainee's Learning Activity	Instructional Materials Used
10 minutes	Introduction	<ul style="list-style-type: none"> • Features of hydraulic and pneumatic control equipment • Intended Learning Outcomes (ILO) 	<ul style="list-style-type: none"> • Review of previous lessons • Presentation of the Training Outcomes, Course Content, and ILOs 	Listening, note taking, inquiring, answering questions, interactive discussion	Visual presentation
2 hours and 40 minutes	Core Elements	6. Troubleshooting of electrical and electronic control equipment	The MTI is required to specify suitable activities for the delivery of the topics.	Participating, note taking, watching video clips, sharing insights and learning gained, asking and answering questions	<ul style="list-style-type: none"> • Visual presentation • Training Videos
2 hours		Practical Exercise 9 Manage the inspection, troubleshooting, and restoration activities for electrical and electronic control equipment	Practical Exercise 9 The MTI is required to specify suitable activities for the conduct of practical exercises on the inspection, troubleshooting, and restoration activities for electrical and electronic control equipment	Practical Exercise 19 Participating in the practical exercise in managing the inspection, troubleshooting, and restoration activities for electrical and electronic control equipment	<ul style="list-style-type: none"> • Exercise Sheet A4.9; • Electrical and electronic trainer • Sample operating manual

Time	Phase	Content	Instructor-led Activity	Trainee's Learning Activity	Instructional Materials Used
10 minutes	Conclusion	Troubleshooting of electrical and electronic control equipment	<ul style="list-style-type: none"> ● Make generalization and abstraction about the lesson ● Assess the learning which may come from any of the following: <ul style="list-style-type: none"> - Formative test; - Oral Examination; - Assignment; ● Other activities to check the retention of learning 	<ul style="list-style-type: none"> ● Participating, sharing insights and learning gained ● Answering/asking questions 	Visual presentation

Course: Management Level Course for Marine Engineer Officers (Function 2)		Competence: Manage troubleshooting, restoration of electrical and electronic control equipment to operating condition			
		Knowledge, Understanding and Proficiency: Function test of electrical, electronic control equipment and safety devices			
		Topic: 7. Function test of electrical, electronic control equipment and safety devices			
Lecture: Twenty-Four (24) Trainees		Learning Outcome/s: At the end of the session, the trainees should be able to: Refer to Part C Course Syllabus for the Intended Learning Outcomes			
Class Layout: Layout suitable for the theoretical part		Formative Assessment: Written and Practical Test			
Time	Phase	Content	Instructor-led Activity	Trainee's Learning Activity	Instructional Materials Used
10 minutes	Introduction	<ul style="list-style-type: none"> Troubleshooting of electrical and electronic control equipment Intended Learning Outcomes (ILO) 	<ul style="list-style-type: none"> Review of previous lessons Presentation of the Training Outcomes, Course Content, and ILOs 	Listening, note taking, inquiring, answering questions, interactive discussion	Visual presentation
2 hours and 40 minutes	Core Elements	7. Function test of electrical, electronic control equipment and safety devices	The MTI is required to specify suitable activities for the delivery of the topics.	Participating, sharing insights and learning gained, asking and answering questions	<ul style="list-style-type: none"> Visual presentation; Training Videos; Sample operating manual
2 hours		Practical Exercise 10 Manage the function test of electrical, electronic control equipment and safety devices	Practical Exercise 10 The MTI is required to specify suitable activities for the conduct of practical exercises in managing the function test of electrical, electronic control equipment and safety devices	Practical Exercise 10 Participating in the practical exercise in managing the function test of electrical, electronic control equipment and safety devices	<ul style="list-style-type: none"> Exercise Sheet A4.10 Electrical and electronic trainer Sample operating manual

Time	Phase	Content	Instructor-led Activity	Trainee's Learning Activity	Instructional Materials Used
10 minutes	Conclusion	Function test of electrical, electronic control equipment and safety devices	<ul style="list-style-type: none"> ● Make generalization and abstraction about the lesson ● Assess the learning which may come from any of the following: <ul style="list-style-type: none"> - Formative test; - Oral Examination; - Assignment; ● Other activities to check the retention of learning 	<ul style="list-style-type: none"> ● Participating, sharing insights and learning gained ● Answering/asking questions 	Visual presentation

Course: Management Level Course for Marine Engineer Officers (Function 2)		Competence: Manage troubleshooting, restoration of electrical and electronic control equipment to operating condition			
		Knowledge, Understanding and Proficiency: Troubleshooting of monitoring systems			
		Topic: 8. Troubleshooting of monitoring systems			
Lecture: Twenty-Four (24) Trainees		Learning Outcome/s: At the end of the session, the trainees should be able to: Refer to Part C Course Syllabus for the Intended Learning Outcomes			
Class Layout: Layout suitable for the theoretical part		Formative Assessment: Written and Practical Test			
Time	Phase	Content	Instructor-led Activity	Trainee's Learning Activity	Instructional Materials Used
10 minutes	Introduction	<ul style="list-style-type: none"> Function test of electrical, electronic control equipment and safety devices Intended Learning Outcomes (ILO) 	<ul style="list-style-type: none"> Review of previous lessons Presentation of the Training Outcomes, Course Content, and ILOs 	Listening, note taking, inquiring, answering questions, interactive discussion	Visual presentation
3 hours and 40 minutes	Core Elements	8. Troubleshooting of monitoring systems	The MTI is required to specify suitable activities for the delivery of the topics.	Participating, sharing insights and learning gained, asking and answering questions	<ul style="list-style-type: none"> Visual presentation
2 hours		Practical Exercise 11 Manage the troubleshooting activities in monitoring systems (Table-top)	Practical Exercise 11 The MTI is required to specify suitable activities for the conduct of practical exercises in managing the troubleshooting activities in monitoring systems	Practical Exercise 11 Participating in the practical exercise in managing the troubleshooting activities in monitoring systems	<ul style="list-style-type: none"> Exercise Sheet A4.11 Troubleshooting guide
10 minutes	Conclusion	Troubleshooting of monitoring systems	<ul style="list-style-type: none"> Make generalization and abstraction about the lesson Assess the learning which may come 	<ul style="list-style-type: none"> Participating, sharing insights and learning gained Answering/asking questions 	Visual presentation

Time	Phase	Content	Instructor-led Activity	Trainee's Learning Activity	Instructional Materials Used
			from any of the following: <ul style="list-style-type: none"> - Formative test; - Oral Examination; - Assignment; ● Other activities to check the retention of learning 		

Course: Management Level Course for Marine Engineer Officers (Function 2)			Competence: Manage troubleshooting, restoration of electrical and electronic control equipment to operating condition		
			Knowledge, Understanding and Proficiency: Software version control		
			Topic: 9. Software version control		
Lecture: Twenty-Four (24) Trainees			Learning Outcome/s: At the end of the session, the trainees should be able to: Refer to Part C Course Syllabus for the Intended Learning Outcomes		
Class Layout: Layout suitable for the theoretical part			Formative Assessment: Written and Practical Test		
Time	Phase	Content	Instructor-led Activity	Trainee's Learning Activity	Instructional Materials Used
10 minutes	Introduction	<ul style="list-style-type: none"> • Troubleshooting of monitoring systems • Intended Learning Outcomes (ILO) 	<ul style="list-style-type: none"> • Review of previous lessons • Presentation of the Training Outcomes, Course Content, and ILOs 	Listening, note taking, inquiring, answering questions, interactive discussion	Visual presentation
2 hours and 40 minutes	Core Elements	9. Software version control	The MTI is required to specify suitable activities for the delivery of the topics.	Participating, note taking, watching video clips, sharing insights and learning gained, asking and answering questions	<ul style="list-style-type: none"> • Visual presentation • Training Videos • Sample operating manual
2 hours		Practical Exercises 12 and 13 Plan the maintenance and supervise the maintenance and installation activities for updated software version	Practical Exercises 12 and 13 The MTI is required to specify suitable activities for the conduct of practical exercises on maintenance and installation activities for updated software version	Practical Exercises 12 and 13 Participating in the practical exercise in supervising the maintenance and installation activities for updated software version	<ul style="list-style-type: none"> • Exercise Sheet A4.12 and A4.13 • Sample operating manual; • ERS

Time	Phase	Content	Instructor-led Activity	Trainee's Learning Activity	Instructional Materials Used
10 minutes	Conclusion	Software version control	<ul style="list-style-type: none"> ● Make generalization and abstraction about the lesson ● Assess the learning which may come from any of the following: <ul style="list-style-type: none"> - Formative test; - Oral Examination; - Assignment; ● Other activities to check the retention of learning 	<ul style="list-style-type: none"> ● Participating, sharing insights and learning gained ● Answering/asking questions 	Visual presentation