Course Description Form

Basic Course Specifications					
Course Title	:	**Marine Electrical Engineering**			
Course Code	:	**EE320**			
Program on which the course is given	:	❒ **Bachelor**	❒ **Diploma**	☐ **Master**	☐**Pre- PhD**
Academic year	:				
Specialization (units of study)	:	Theoretical 15 (hrs.)	Simulator (hrs.)	Practical 15 (hrs.)	
Pre-Requisites	:	None			

Overall Course Objectives

This syllabus covers the requirements of STCW 78 convention chapter III section AIII/I .
This fundamental element provides the detailed knowledge to support the training outcomes related to Electrical Marine System, we demonstrate a knowledge and understanding of :
Electro-Technology and electrical AC Generators Theory.
Electrical Power Distribution Boards and Electrical Equipment.
Fundamentals of Power Electronics.
Instrumentation, Alarm and Monitoring Systems.
Electrical AC Drives.

Intended Learning Outcomes

Knowledge and Understanding

At the end of the course, students should be able to:

a.1 Understand the AC generators and the different in manufacturing in AC generator types and the problems that can happen in generators in general

a.2 Understanding the various types of circuit breakers and the safety devices used to protect the power distribution system mainly the most expensive components

a.3 Understanding the parallel connections of power sources in general and specially for generators if we have multi power sources.

a.4 Understanding the motors theory of operation and the different types of motors specially the common types used in industry (such as AC induction motors) and the different types for connecting the motor coils (delta or star connections).

a.5 Understanding the alarm system and the various types of sensors that cause or used to give alarms.

a.6 Know how to make control circuits for any AC instruments (like motors).

a.7 Understanding how to convert from AC power source to DC power source and the use of the DC power sources generally in control and power panels.

Intellectual Skills

At the end of the course, students should be able to:

b.1 All the students gain the ability to recognize the power distribution systems, all the machine the generate power and all the instruments that use to step down this power for different uses like transformers.

b.2 All know how to compare between the components of AC control circuits panels and familiarized with the readings of all measuring instrument devices

b.3 All know and familiar with the variation in normal operation for induction machines and know the reasons and the solutions and able to do it easily without additional heap and in safety way.

Professional and Practical skills

At the end of the course, students should be able to:

c.1 Know the problems that happens in generators in general and how to solve the problems and replacing the default components that cause the problems.

c.2 Know how to choose the circuit breakers according to loads and how to replace the default one by another new one.

c.3 Know and control the parallel connections for generators when put in parallel and students must have the ability to overcome problems happens in one generators in parallel with others.

c.4 Observe and explain what happens in motors when operate and how to connect them in different connection as want according to power or loads

c.5 Recognize and overcome the troubles happens in AC starter control panels and have the ability to change the component of these panels by right and safety way and if want to modify the control circuit how to make this without affection the operation of the circuit

c.6 Must know and dealing with the alarm circuits and how to measure these signals

General and Transferable skills

At the end of the course, students should be able to:

d.1 All students must know and recognize the measuring instruments for measure all electrical values and must know the shape of all electrical circuit components and the shape of all sensors and how to connect the terminal of wires to all the component

d.2 They all must know how to connect batteries to give power instead of main power sources.

	Course content				
Lect. WK.#	**Topic**	**Hrs.#**	**Theoretical**	**Practical**	**Simulator**
1	• Familrization		0.5		
2	• AC generators (Theory of operation– circuit diagram)	2	1	1	
3	• AC generators (maintenance and troubleshooting)	2	1	1	
4	• Dismantle of AC generators	1	1		
5	• Main circuit breakers (types and safety devices)	2	1	1	
6	• Main switch board	2	1	1	
7	• Parallel operation of generators	3	2	1	
8	• Dismantle of main circuit breakers	1		1	
9	• Parallel operation practical	1		1	
10	• The operation theory AC motors	2	1	1	
11	• AC motors	2	1	1	
12	• Star- Delta Connection	1	1		
13	• Starter panels	2	1	1	
14	• Em.Generator	2	1	1	
15	• Alarm system and Electronic circuit	2	1	1	
16	• Sources of power on board	2	1	1	
17	• Emergency batteries	1.5	1	0.5	
18	• illumination systems	1.5	1	0.5	
19	• Final exam	1	1		

Teaching & learning methods
Explanation of the lesson contents – discussing and asking questions to interact with students – audio-visual presentation – practical work-problem solving.

Facilities required for Teaching & learning methods				
❒ **Projector**	❒ **Overhead Slide**	❒ **Books &Guided sea training book**	❒ **Video**	❒ **Electric equipment**

Students Assessment Methods	
Assessment submission Schedule	
Assessment#1 Written-Oral-Practical	(2nd trip summary submit by end of 2nd trip)
Assessment#2 Written-Oral-Practical	(4th trip summary submit by began of 5th trip)
Assessment#3 Oral	(course summary submit by two weeks after final exam date)

Grading Method		
Attendance	❒	**10 Marks**
Mid Term Examination	❒	**20 Marks**
Presentations	❒	**5 Marks**
Assignments		**None**
Projects		**None**
Participation	❒	**5 Marks**
Oral Examination	❒	**20 Marks**
Final Examination	❒	**40 Marks**
		Total 100%
*Assessment criteria shall meet the standards of the STCW 78 convention "as amended""; and in the light of the related IMO model courses		

List of References		
Course Notes		
Description	:	Guided sea training book & Lecturer notes
Essential Books		
Description	:	• B.L Theraja "Fundamentals of Electrical Engineering and Electronics"
Periodicals and publications		
Description	:	• Service manuals of training ship
IMO Reference		
Description	:	• International Convention on Standards of Training, Certification and Watch Keeping for Seafarers (STCW78) as amended.

Matrix of knowledge and skills of the Educational Course

University/ Academy	:	**AASTMT**	**Course name:** **Marine Electrical Engineering.**
College/ Institute	:	**Sea Training Institute**	**Course code:** **EE320**
Department	:	**Engineering Guided Sea Training Department.**	

Week	Course Contents	Knowledge	Intellectual Skills	Professional Skills	General Skills
1	Familrization				
2	AC generators (Theory of operation– circuit diagram)	a.1	b.1-b.2	c.1	
3	AC generators (maintenance and troubleshooting)	a.1	b.1-b.2	c.1	d.1
4	Dismantle of AC generators	a.1		c.1	d.1
5	Main circuit breakers (types and safety devices)	a.2	b.1	c.2-c.6	
6	Main switch board		b.1-b.2		
7	Parallel operation of generators	a.3	b.1	c.3	
9	Dismantle of main circuit breakers	a.2		c.2	d.1
10	Parallel operation practical	a.3	b.1	c.3	
11	The operation theory AC motors	a.4-a.6	b.3		
12	AC motors	a.4-a.6	b.1-b.2-b.3	c.4	
13	Star- Delta Connection	a.4	b.2	c.4	
14	Starter panels	a.4	b.2	c.4-c.5	
15	Em.Generator	a.7	b.1		
16	Alarm system and Electronic circuit	a.5	b.2	c.5-c.6	
17	Sources of power on board	a.7	b.1	c.3	d.2
18	Emergency batteries	a.7	b.1		d.2

Instructor **Dean**