GENERAL OBJECTIVES	SPECIFIC OBJECTIVES	CONTENTS	STRATEGIES	TIME FRAME	VALUES/SKILLS	EV
PRELIM						
At the end of the period the students should be able to:						
I. • To understand the composition and the vertical divisions of the atmosphere. • To learn the relationship of temperature with attitude, show clearly the location of the troposphere, stratosphere, mesosphere and thermosphere.	• Define: Meteorology • Define the composition of dry air below an altitude of about 80 km. • Describe the processes by which carbon dioxide enters and leaves the atmosphere. • Outline brief notes on upper limit of the atmosphere, ionization. • Identify the composition of the thermosphere.	I. • Composition of Dry Air 1.1 Nitrogen 1.2 Oxygen 1.3 Argon 1.4 Carbon Dioxide 1.5 Neon 1.6 Helium 1.7 Ozone 1.8 Hydrogen and etc.	Lecture Lecture	1 hr. 1 hr.	Research Appreciation of Concept	
II. • To understand the vertical dimension of the atmosphere.	• Identify the vertical dimension of the atmosphere. • Write brief notes on exosphere.	II. • Vertical Dimensions II.1 Troposphere II.2 Startosphere II.3 Mesosphere II.4 Thermosphere II. Exosphere	Lecture Visual Aids	1 hr.	Appreciation of Concept	Q
III. • To learn the Heat Exchange Processes of the atmosphere	• Distinguish the temperature characteristics of the atmosphere. • Explain the absorption, reflection and scattering of solar radiation by the atmosphere. • Define: Terrestial radiation • Distinguish sensible Heat and Latent Heat • Write brief notes on Albedo and Atmospheric Window	III III.1 Solar Radiation III.2 Terrestial Radiation III.3 Conduction III.4 Convection III.5 Sensible Heat III.6 Albedo	Lecture Lecture	1 hr. 1 hr.	Appreciation of Concept Resource Fullness	

GENERAL OBJECTIVES	SPECIFIC OBJECTIVES	CONTENTS	STRATEGIES	TIME FRAME	VALUES/SKILLS	EVALUATION
IV. • To learn the basic principles of temperature measurement on board the vessel.	• Write down formulas use for converting Fahrenheit temperature to Celsius temperature. • Define surface air temperature and ground temperature.	IV. • Thermometer IV.1 Wet Bulb Thermometer IV.2 Dry Bulb Thermometer IV.3 Pyrometer IV.4 Celsius IV.5 Fahrenheit IV.6 Kelvin Scale	Lecture Educational Field Trip (PAGASA)	1 hr. 1 hr.	Analysis	
V. • To understand and learn the basic principles of atmospheric pressure of the atmosphere in relation to navigation.	• Define-Standard Atmosphere • Describe the structure and operation of aneroid barometer and sources of error.	V. • Meteorological V.1 Barometer V.2 Micro – Barograph V.3 Aneroid Barometer	Lecture Field Trip (PAGASA)	1 hr.	Analysis	Quiz
• To learn the classification of pressure system. • To learn and understand the Buy's Ballot law on Both Hemisphere.	• Explain the corrections made to mercury barometer reading. • Write brief notes on the following: a.) ICAO standard atmosphere b.) Semi-diumal variation of pressure c.) Altimeter Adjustment d.) Pressure Gradient • Define * Cyclone * Anticyclone * Trough * Ridge * Col	• Standard scale on altimeter • Based on the dry air • Charts (Meteo) • Maps etc.	Lecture Plotting	1 hr. 1 hr.	Analysis Analysis	Quiz Prelim Exam.

GENERAL OBJECTIVES	SPECIFIC OBJECTIVES	CONTENTS	STRATEGIES	TIME FRAME	VALUES/SKILLS	EVALUATION
MID-TERM						
VI. • To understand how the surface wind is measured and considers some of its important characteristics.	• Write brief notes of the following: a) Standard exposure of Wind Instrument b) Veering of Wind c) Squall • Write brief notes with the aid of diagrams the Geotropic wind Hemisphere. • Define: Gradient Wind Flow • Define – Cyclonic Flow • Explain the forces affecting the wind	VI. VI.1 Wind VI.2 Wind Speed VI.3 Wind Direction VI.4 Pressure Gradient Force VI.5 Veering Wind VI.6 Backing Wind VI.7 Gustiness of Wind VI.8 Wind Vane VI.9 Azimuth Method VI.10 Compass Method VI.11 Friction Force VI.12 Pressure Gradient VI.13 Centrifugal Force VI.14 Cariolis Force	Lecture Field Trip With use of Map, Meteo Charts Lecture	1 hr. 1 hr. 1 hr.	Analysis Plotting of Map Analysis	Quiz Seatwork Quiz Quiz Seatwork
• To understand local winds of various types which are responsible for many characteristic features of weather in localities.	• Explain the local wind systems	VI.15 Sea Breeze VI.16 Land Breeze VI.17 Valley VI.18 Mountain Breeze VI.19 Monsoon a) North East Monsoon b) South West Monsoon	Lecture Diagram	1 hr.	Graphs & Diagrams	Quiz

GENERAL OBJECTIVES	SPECIFIC OBJECTIVES	CONTENTS	STRATEGIES	TIME FRAME	VALUES/SKILLS	EVALUATION
• To understand the general circulation of the atmosphere as a whole and over a long period of time.	• Explain what is: a) General Circulation of the atmosphere b) Sub-polar low c) Sub-tropical high d) Mean Zonal winds e) Semi Permanent anticyclone	VI.20 Equatorial Belt Doldrum VI.21 Trade Wind Belt VI.22 Subtropical High Pressure Belt VI.23 Belt of Prevailing Westerlies VI.24 The Polar Low Anticyclones				
• To understand law of the storm in Northern and Southern Hemisphere.	• To master the Law of Storm	• Provisions containing one to seventeen provisions.	Lecture	1 hr.	Analysis	Quiz Seatwork
VII. • To learn the different cloud classification, cloud names, cloud genera.	• To be able to distinguish the ten main groups of clouds. • Distinguish between: a) Cumuliform cloud b) Stratiform cloud • Define a) Cirrostratus b) Altostartus c) Stratus	VII. 10 Clouds a) Cirrus b) Cirrocumulus c) Cirrostratus d) Altocumulus e) Nimbustratus f) Stratocumulus g) Stratus h) Cumulus i)Cumulonimbus	Lecture Field Trip (PAGASA)	1 hr.	Cloud Observation in the Atmosphere	Quiz Oral Exam
VIII. • To learn the characteristics and physical processes associated with some of the more common types of Severe local storms.	• Discuss the physical characteristics of a thunderstorm from the following point of view. a) Source of energy b) Separation of electrical changes in clouds • Define: a) Growing Stage b) Mature Stage c) Dying Stage • Initial requirement for the development of a thunderstorm.	VIII. 8.1 Thunderstorm 8.2 Tornados 8.3 Lightning Flash 8.4 High Winds 8.5 Water Spout	Lecture Diagram	1 hr.	Analysis	Quiz Midterm Exar

GENERAL OBJECTIVES	SPECIFIC OBJECTIVES	CONTENTS	STRATEGIES	TIME	VALUES/SKILLS	EVALUATION
SEMI-FINAL						
IX. • To know weather reports, report weather forecast, and observation.	• Describe the source of weather information available to shipping. • Describe information generally needed from ships to meteorological offices. • Describe the type of information received by facsimile machine.	IX. IX.1 Daily Weather Forecast IX.2 Typhoon Warnings & Signals IX.3 Charts IX.4 Maps	Lecture Diagram Plotting Maps & Coordinates	1 hr.	Analysis	Quiz Seatwork
• To understand the nature of weather forecasting in relation to navigation.	• Comprehend Shipping Forecast • To interpret typhoon warning forecast • Explain how weather observation from a ship can be used to improve the forecast derived from synoptic and prognostic charts.	IX.5 Weather Chart IX.6 Synoptic Chart IX. Ditto Map	Lecture Diagram Plotting	1 hr.	Analysis	Quiz Seatwork
X. • To understand Surface weather reports from ships based on meteorological coding and decoding.	• Explain the meaning of symbolic letters, which may occur in surface report from a ship in full form. • To interpret surface report from ships in reduced form and special weather report from ship.	X.1 FM21.D Surface report from ship in full form X.2 FR22.D Surface Report from ship in abbreviated form X.3 FM23.D Surface Report from ship in Reduced Form X.4 FM26.D Surface Weather report from ship.	Lecture Diagram Decoding Coding Interpretation of Weather Code	1 hr.	Analysis	Quiz Seatwork
• Marine Observations	• To explain the observations related to those made at land stations.	• Observations related to those made at land stations.	Lecture	1 hr.	Analysis	Quiz
	• Explain the methods and description of methods used for measuring sea temperature.	• Measurement of Sea Temperature • Description of Methods used for measuring Sea Temperature • Ocean waves: General Characteristics	Lecture	1 hr.	Analysis	Quiz

GENERAL OBJECTIVES	SPECIFIC OBJECTIVES	CONTENTS	STRATEGIES	TIME FRAME	VALUES/SKILLS	EVALUATION
* Marine Observation	• Explain a) Waves in Shallow Water b) Types and observation of characteristics	• Speed of Ocean Waves • Waves in Shallow Water • Types of Ocean Wave Observations • Methods of Observing Characteristics of Separate Wave System				
	• Explain the height and mean period of wave system	• Measuring the mean Period and height of a Wave System. • Observation from ordinary Merchant Ships.	Lecture	1 hr.	Analysis	Quiz Seatwork
• Marine Observation	• Explain the observations made from ocean stations and Special Ships. • Define: a) Swell b) Swell Waves c) Sea Ice	• Observation from Ocean station and special ships. • Measurement of waves from coastal stations.	Lecture	1 hr.	Analysis	Quiz
	• Explain the observation of Special Phenomena	• Specification for Sea and Swell Waves • Observation of Special Phenomena • Sea Ice Observation	Lecture	1 hr.	Analysis	Quiz

GENERAL OBJECTIVES	SPECIFIC OBJECTIVES	CONTENTS	STRATEGIES	TIME FRAME	VALUES/SKILLS	EVALUATION
XI. • To learn the theories and formation of Tropical Cyclones in the topics. • To develop measures to mitigate human casualties and properties in times of adverse weather conditions characterized by the passage of strong cyclones.	• Define: Tropical Cyclone • Discuss the Connective theory and Counter Current Theory • Identify the naming of tropical cyclones • Explain the various local terms of tropical cyclones. • Identify tropical cyclone areas and season. • Frequencies of tropical cyclone. • Classification of tropical cyclone. • Explain the life cycle of tropical cyclone. • Prediction of tropical cyclone. • Explain the characteristic of tropical cyclone. • Explain the safety measure or precaution during approach and passage of Tropical Cyclone.	XI.1 Tropical Cyclone XI.2 Auring XI.3 Bebing XI.4 Conching XI.5 Baguio XI.6 Typhoon XI.7Cyclone XI.8 Wily-wily XI.9 May-December West North Pacific Ocean XI.10 June-October West Indies Pacific Ocean XI.11 Dec. – Feb. South Pacific Ocean XI.12 April – October Bay of Bengal & Arabian Sea XI.13 Jan. – March Indian Ocean XI.14 North Pacific 21 per year XI.15 West Indies & North Atlantic 7 typhoon per year XI.17 North Pacific 6 typhoon per year XI.18 Bay of Bengal 6 typhoon per year XI.19 North Indian Ocean 6 typhoon per year XI.20 Arabian Sea 2 typhoon per year XI.21 North West Australia 1 typhoon per year	Lecture Visual Aids Lecture Lecture	1 hr. 1 hr. 1 hr.	Plotting Analyzing Diagram Plotting Diagram Plotting Plotting	Quiz Seatwork Quiz Seatwork Quiz Quiz

GENERAL OBJECTIVES	SPECIFIC OBJECTIVES	CONTENTS	STRATEGIES	TIME FRAME	VALUES/SKILLS	EVALUATION
		XI.22 Tropical Disturbances 0-30 km/hr maximum wind _ LPA XI.23 Tropical Depression wind speed 30 – 60 km/h XI.24 Tropical Storm 60-120 kph XI.25 typhoon or Hurricane 120 – up XI.26 Prognostic Chart XI.27 Barometer XI.28 Weather Chart XI.29 Meteorological Data Chart XI.30 Eye XI.31 Movement XI.32 Pressure etc.	Lecture Lecture Lecture	1 hr. 1 hr. 1 hr.	Diagram Diagram Plotting	Seatwork Quiz Seatwork Quiz
• Law of the Storm	• To explain the laws of storm in the Northern Hemisphere and in the Southern Hemisphere.	• Laws of the Storm	Lecture	1 hr.	Plotting Analyzing	Quiz Seatwork

GENERAL OBJECTIVES	SPECIFIC OBJECTIVES	CONTENTS	STRATEGIES	TIME FRAME	VALUES/SKILLS	EVALUATION
FINAL						
OCEANOGRAPHY I. • To understand the ocean currents and waves.	• Define Oceanography • Discuss the wave formation. • Illustrate tide prediction. • Explain the interrelation between the global wind systems and the current systems of the ocean.	I. I.1 Ocean I.2 Waves I.3 Almanac Table I.4 The World General Surface Current Distribution Map	Lecture Map Tracing on Ocean Current	1 hr.	Diagram Map Tracing	Seatwork Quiz
• To learn the tide tabulation and prediction	• Explain the main causes of ocean currents, wind drift current and gradient currents. • Explain the effect of evaporation and the effect of wind blowing a coastline and how these effects influence the current. • Describe how to observe ocean current. • Explain the various methods of charting ocean currents. • Illustrate the difference between waves and swell. • Explain the danger of sailing in ice and iceberg areas. • Describe the conditions in which accumulation of ice on ship occurs.	Ice Iceberg	Lecture Lecture Lecture	1 hr. 1 hr. 1 hr.	Analysis	Quiz Seatwork Quiz Seatwork Quiz Seatwork
• Tides	• Define: Tide • Explain Tidal current and their generating forces. • Explain the types of tide • To explain how to find the approximate time of high tide • Explain the meteorological effects to tides	• Tides • Tidal Current • Generating Forces on Tides • Types of Tides • Types of Equilibrium Tides • Finding Approximate time of high tide_formula • Meteorological Effects and Formula for Stationary Law	Lecture Lecture Lecture	1 hr. 1 hr. 1 hr.	Analysis Analysis	Quiz Quiz Seatwork