

Liverpool John Moores University

Title: METEOROLOGY AND MATHEMATICS
Status: Definitive
Code: **4202NAU** (121929)
Version Start Date: 01-08-2022

Owning School/Faculty: Engineering
Teaching School/Faculty: Engineering

| Team | Leader |
|-----------------|--------|
| Jonathan Warren | Y |

Academic Level: FHEQ4 **Credit Value:** 20 **Total Delivered Hours:** 62
Total Learning Hours: 200 **Private Study:** 138

Delivery Options

Course typically offered: S1 & S2 & Summer

| Component | Contact Hours |
|-----------|---------------|
| Lecture | 50 |
| Tutorial | 10 |

Grading Basis: 40 %

Assessment Details

| Category | Short Description | Description | Weighting (%) | Exam Duration |
|-----------|-------------------|-------------|---------------|---------------|
| Exam | AS1 | Examination | 60 | 2 |
| Portfolio | AS2 | Portfolio | 40 | |

Aims

To provide an introduction to the principles of meteorology and climate together with an appreciation of meteorological processes and observing methods, codes and weather services to the marine community. To provide underpinning knowledge of mathematics as required by an Officer of the Watch.

Learning Outcomes

After completing the module the student should be able to:

- 1 Use meteorological observing methods, World Meteorological Organisation (WMO) codes and describe weather services available to marine community.
- 2 Evaluate meteorological processes for marine applications.
- 3 Identify and describe the weather associated with the main features of a synoptic chart.
- 4 Demonstrate an appreciation of the general circulation of the atmosphere, the main climatic zones over the oceans and the ocean currents of the world.
- 5 Manipulate algebraic expressions and solve equations.
- 6 Apply the principles of basic trigonometry.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

| | | | | |
|-----------|---|---|---|---|
| Exam | 1 | 2 | 3 | 4 |
| Portfolio | 5 | 6 | | |

Outline Syllabus

Atmosphere: Structure and composition.

Atmospheric Pressure: Definitions, standard atmospheric conditions and diurnal range.

Temperature: Solar and terrestrial radiation. Methods of heating and cooling of the troposphere.

Wind: Forces, general circulation, geostrophic wind, localised effects and local winds.

Water Vapour: Water phases, Humidity and Dew Point.

Instruments: Barometer, Hygrometer, Thermometer, Anemometer and other instruments.

Clouds: Atmospheric stability and instability, cloud formation, cloud types and thunderstorm

Precipitation: Formation and types of precipitation and the causes of reduced visibility.

Organisation and Operation of Meteorological Services: Meteorological observations and W.M.O. codes, coding and de-coding, Weather services available to shipping

Main synoptic patterns and air masses: Air masses and the weather associated with each including fronts and other patterns. Monsoons, ITCZ and TRS

Ocean currents: Description and evaluation. Characteristics. Ice conditions.

Basic Algebraic Functions and Trigonometry.

Learning Activities

Formal lectures and videos

Weather observation - including using meteorological equipment.

Practical exercises to code weather and understand the production of forecasts.

Extensive use of on-line Mathematics Tutorial Software.

Notes

This module delivers the knowledge necessary to understand the meteorological and climate as prescribed by STCW for Deck Officers. Provides the underpinning Mathematics for other modules,