

Liverpool John Moores University

Title: INTRODUCTION TO CLIMATOLOGY AND METEOROLOGY
Status: Definitive
Code: **4401NATSCI** (127323)
Version Start Date: 01-08-2021

Owning School/Faculty: Biological and Environmental Sciences
Teaching School/Faculty: Biological and Environmental Sciences

| Team | Leader |
|------------------|--------|
| Alexandre Gagnon | Y |

Academic Level: FHEQ4
Credit Value: 20
Total Delivered Hours: 60
Total Learning Hours: 200
Private Study: 140

Delivery Options

Course typically offered: Semester 2

| Component | Contact Hours |
|-----------|---------------|
| Lecture | 26 |
| Practical | 24 |
| Seminar | 4 |
| Workshop | 4 |

Grading Basis: 40 %

Assessment Details

| Category | Short Description | Description | Weighting (%) | Exam Duration |
|----------|-------------------|---|---------------|---------------|
| Report | Report | Analysing of current climate change data, interpretation of the results and putting the results in the context of published papers in the field | 40 | |
| Exam | Exam | Multiple choice, true and false, and short answers questions; there is no essay to write in this exam | 60 | 2 |

Aims

This module aims to provides an overview of the physical and dynamic nature of climatology, meteorology, and related aspects of oceanography.

Learning Outcomes

After completing the module the student should be able to:

- 1 Develop an in-depth understanding of the components of the Earth's climate system and their interactions.
- 2 Understand the concept of weather forecasting and its main principles.
- 3 Develop skills in acquiring and interpreting climatic data from observations and climate models.
- 4 Evaluate how the earth's climate has changed during the instrumental period, to explain the factors responsible for this change, and to put this change in the context of the longer-term palaeoclimatic record.
- 5 Develop the ability to critique issues related to climatology, including the scientific evidence of climate change.

Learning Outcomes of Assessments

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

| | | | | |
|--------------------------------|---|---|---|--|
| Data analysis & interpretation | 3 | 5 | | |
| Exam | 1 | 2 | 4 | |

Outline Syllabus

Climatology in the world today
Physical basis for Earth's climate system
Atmospheric temperatures
Moisture in the atmosphere
Atmosphere-ocean interactions
Weather systems of the mid-latitudes (air mass and synoptic climatology)
Introduction to Meteorology
Tropical climatology
Detection of contemporary climate change and attribution of causes
Glaciers as evidence of climate change
Natural causes of climate change
Reconstruction of past climates
Greenhouse gases, climate models and climate change projections
Climate change and the physical environment and climate change and the living world
Applied climatology

Learning Activities

The learning activities of this module comprise lectures, practicals, seminars and workshops. The practicals are developed to help the students grasp the concepts and ideas taught in class while the seminars aim at developing critical thinking and development of opinions informed by scientific evidence. Investigations during the practicals lead the student through analysis and interpretation of current climatological data. The workshops are aimed for the students to revise the material taught in class and ask questions in preparation for the report and exam.

Notes

This module examines the main components of the Earth's climate system and their interactions as well as the principles of weather forecasting. It then discusses the applications of climatological principles on different societal sectors. Given the importance of global climate change on society this module provides an introduction to the many facets of contemporary climate change from a physical science perspective.

Major topics include: atmospheric radiation, atmospheric moisture and precipitation distribution, atmospheric motions including air masses, front formation and cyclones, weather forecasting, extreme events, climate change and applied climatology. For the latter, the focus is on climate indices and the utility of applied climatology for purposes such as approximating heating and cooling costs and issues related to climate comfort, i.e., how humans have adapted to living in different climates through various home designs. Knowledge and understanding of the physical causes of contemporary climate change is provided in the module component on climate change, and this is set within a longer-term palaeoclimate context. Hence, climate change is explored with proxy records from the past, observations in the present, and with climate models into the future, looking at both natural and human influence.