COURSE DATA

DATA SUBJECT

Code: 33085
Name: Meteorology and climatology
Cycle: Undergraduate Studies
ECTS Credits: 4.5
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1104 - Degree in Environmental Sciences	Facultat de Ciències Biològiques	2	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1104 - Degree in Environmental Sciences	Meteorology and climatology	COMPULSORY

COORDINATION

ESTELLES LEAL VICTOR

SUMMARY

Introduction

The subject **Meteorology and Climatology** is taught, as a compulsory subject, in the first quarter of the second year of the **Degree in Environmental Sciences**.

Meteorology and **Climatology** are key disciplines in the training of future graduates in **Environmental Sciences**. The course develops a basic theme area that is a great help in planning, understanding, analyzing and solving problems related to phenomena and natural processes and anthropogenic actions that shape and affect the Environment. The subject of **Meteorology and Climatology** relates on the one hand, with some specific matters of first-year courses such as Physics, Chemistry and Geology, mainly. In fact, these subjects along with Mathematics, are essential for its better understanding and use. On the other hand, in subsequent courses, **Meteorology and Climatology** provides a knowledge base and is related to other subjects such as Soil Science and Continental and Marine Hydrology, Contamination Assessment,

Geographic Information Systems and Fundamentals of Environmental Engineering, among others

- ***General Objectives***

The general objectives of the **Meteorology and Climatology** course, as a subject of general education and complementary to other subjects of the Grade include:

(i) Enhance the capacity of analysis and synthesis of the students

(ii) Develop the ability to access and evaluate information sources, taking their reliability into account

(iii) Exercise the ability to interpret both qualitative and quantitative weather and climate information

(iv) Develop the ability to integrate and make connections between theoretical and practical knowledge

(v) Encourage independent work of students in terms of information search and data processing

(vi) Hand in reports and memoranda both orally and in writing

(vii)Promote teamwork

- ***Specific Objectives***

(i) Acquire an overview of the atmosphere and the processes occurring in it and their relationships with the other components of the climate system

(ii) Understand the concepts of climate and climate system and the mechanisms and processes that shape them

(iii) Analyze and explore the various parameters that define weather and climate, their role played in the climate system and their measurement and observation techniques. Acquire knowledge of their typical values as well as of their associated errors and uncertainties

(iv) Know the basic aspects concerning the interaction of radiation with the atmosphere and the radiation balance of the Earth – Atmosphere System

(v) Analyze and interpret the basic meteorological and climatological processes. Know the characteristics of the most significant weather phenomena at different scales, from local to synoptic and global, and understand their dynamic and thermodynamic fundamental aspects

(vi) Know the basics of thermodynamics of the atmosphere necessary for understanding the processes associated with cloud formation and precipitation

(vii)Understand the processes related to atmospheric dynamics

(viii) Understand the role of atmospheric and oceanic circulation in shaping global climat

(ix) Know the origins of climate variability and its relation to climate change

(x) Know how to assess the anthropogenic effect on climate

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

It is essential that in this subject students have the basic knowledge provided by the other Mathematics and Physics courses, the latter as well as basic knowledge for the measurement of meteorological parameters. It is also desirable that the students know spreadsheet programs and conventional statistical analysis such as Excel or OpenOffice .

COMPETENCES / LEARNING OUTCOMES

1104 - Degree in Environmental Sciences

Analizar e interpretar procesos meteorológicos.

Comprender y manejar diferentes escalas espaciales y temporales en la interpretación de los sistemas naturales.

Conocer las características de los diferentes climas.

Conocer los principales impactos humanos sobre los sistemas naturales.

DESCRIPTION OF CONTENTS

1. Radiation and the atmosphere

Introduction: weather and climate. Composition and structure of the atmosphere. Solar radiation and its spatial and temporal variation. Radiative processes in the atmosphere.

2. Meteorology

Insolation and temperature. Evaporation and humidity of the air. Atmospheric pressure. Thermodynamic processes and atmospheric stability. Mists and clouds. Winds. Planetary circulation. Weather systems.

3. Climatology

Climate zones and classifications. Climate change. Global warming.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Tutorials	2,00
Theory	28,00
Laboratory	15,00
Total hours	**45,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	10,00
Independent study and work	15,50
Preparation of lessons	16,00
Preparation for assessment activities	26,00
Resolution of case studies	0,00
Total hours	**67,50**

TEACHING METHODOLOGY

The subject consists of several parts, with different and distinct methodology. For each part a specific development and methodology follows:

• ***Theoretical-Practical Lectures***

Two classes a week, of theoretical - practical content (theory and conceptual exercises and problems), in varying proportions depending on the subject, according to the schedule developed in section 6 above **Description of the Contents** that is divided into three Units

In these lectures, the lecturerimparts the theoretical topicsleaning on materials (books, notes, slides, figures and diagrams) to be provided to students through the *Aula Virtual*. This material is only for guidance and at no time should be seen as the only material to be used by the student. In each of the theoretical topics, practical exercises will be developedthat help students to understand the matter explained. In many cases, the theoretical topics will beintroducedindicating the content scope, hoping that the student complete the details of the matter in their individual study.

• Laboratory Classes (Practicals)

Four laboratory sessions are taught in small subgroups, with a teacher assigned to each subgroup. In the sessions, students in pairs, perform the four practicals that are described in section 6 on **Description of Contents(Lab I** to **Lab IV)**. For each practical, each pair of students must submit a report for the collection of experimental data and their treatment (errors, graphs, mathematical fittings and correlations), the results obtained and the conclusions reached. Emphasis is placed on the use of data processing software, for which suitable computer equipment is provided in the laboratory. The laboratory is compulsory and, therefore, not recoverable, in accordance with the provisions of article 6.5 of the Evaluation and Qualification Regulations of the UV for Bachelor's and Master's degrees.

• Supervised Working Tasks

It will consist of practical exercises in class. Alternatively, visits to own or external facilities may be scheduled. In any case, attendance at this activity is mandatory

EVALUATION

The evaluation of the subject is made taking into account its various different parts which are separately evaluated according to the criteria detailed below:

-Assessment of the Theoretical and Practical Knowledge: The evaluation of this part of the course will be based on a written exam

-Evaluation of the Laboratory: The laboratory work is evaluated based on the laboratory reports (and oral presentations) made by the students for each of the practicals performed during the course. It is compulsory to carry out all the laboratory practicals

-Assessment of Supervised Work: This work is evaluated based on the exercises/reports made by the students. To be evaluated, it is required to attend this class-scientific visit.

The evaluation of the subject will be made with the following criteria:

(i)70 points: theoretical and practical knowledge through the written final exam

(ii)20 points: work performed in the laboratory through evaluation of laboratory reports and eventual questionnaires

(iii)5 points: supervised work through the assessment of reports and exercises proposed in the lectures

(iv)5 points: assessment of class participation.

The final mark will be obtained from the sum of the scores of the preceding paragraphs, provided in paragraph (i) obtain a minimum of 30 points and in (ii) a minimum of 8 points. The final score needed to pass the course will be 50 points.

In order to apply for advancement of the examination session of this subject, students should be awaere that mandatory activities outlined in the teaching guide should have previously been carried out. See also section on Teaching methodology, laboratory classes (Practicals), and supervised working tasks.

REFERENCES

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