COURSE OUTLINE

1. GENERAL INFORMATION

FACULTY/SCHOOL	School of Applied Biology and Biotechnology		
DEPARTMENT	Biotechnology		
LEVEL OF STUDY	Undergraduate (Elective)		
COURSE UNIT CODE	2585	**Semester:**	2nd
COURSE TITLE	Bioclimatology		
INDEPENDENT TEACHING ACTIVITIES *in case credits are awarded for separate components/parts of the course, e.g. in lectures, laboratory exercises, etc. If credits are awarded for the entire course, give the weekly teaching hours and the total credits*		**WEEKLY TEACHNG HOURS**	**ECTS**
Lectures		3	3
Laboratory Exercises		2	2
Add rows if necessary. The organization of teaching and the teaching methods used are described in detail under section 4			
COURSE TYPE *Background knowledge, Scientific expertise, General knowledge, Skills Development*	*Scientific expertise*		
PREREQUISITE COURSES:			
LANGUAGE OF INSTRUCTION:	Greek		
LANGUAGE OF EXAMINATION/ASSESSMENT:			
THE COURSE IS OFFERED TO ERASMUS STUDENTS	YES (in English)		
COURSE WEBSITE (URL)			

2. LEARNING OUTCOMES

Learning Outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate (certain) level, which students will acquire upon successful completion of the course, are described in detail. It is necessary to consult:

APPENDIX A

- *Description of the level of learning outcomes for each level of study, in accordance with the European Higher Education Qualifications' Framework.*
- *Descriptive indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and*

APPENDIX B

- *Guidelines for writing Learning Outcomes*

The course aims to describe and analyse the interactions of the atmospheric environment with biological systems. The introductory concepts of climatology and bioclimatology and the processes between climate and living

organisms (vegetation, animals and humans) are included. Climate variability, global climate variability/change, extreme weather events and their impacts are analysed. The microclimatic and biometeorological/bioclimatic conditions in outdoor planted and uncovered areas, greenhouses and warehouses, and plant-covered areas for the incubation of productive livestock are analysed and described. Emphasis is placed on the phenology of biota in relation to climatic conditions and the vegetation-climate relationship, basic climatic and bioclimatic classifications and climatic and bioclimatic-biometeorological indicators. Bioclimate is analysed using classical and new techniques and methods, and modern systems for automatic monitoring, acquisition, transmission, and processing of bioclimatic parameters are described. Specific topics, such as the assessment of the meteorological risk of fire initiation and the dispersion of pollutants in natural and agricultural areas, are also described.

The laboratory exercises are carried out both in the laboratory classroom and in the field in vegetated and non-vegetated areas. These exercises aim to gain fluency and experience in acquiring, processing, and managing bioregulatory and bioclimatic data in agricultural, natural, and urban areas. After completing the exercises, the student can manage bioclimatic and biometeorological data for research or professional applications.

Upon successful completion of the course, the student will be able to:

- Understand the link between atmospheric conditions and the biological agent.
- Has gained a general but complete understanding of living organisms' quantitative and qualitative interactions with the climate.
- They have an understanding of the specificities of the climatic context of the Greek region. Thus, he will be able to use the knowledge provided in studies and frameworks of proposals for the development and protection of the agricultural and natural environment.
- He has the necessary knowledge to be able to delve further into specialised issues concerning the interactions of bioclimatic conditions on plant capital, the human organism and the animal kingdom.
- Use data processing methods and techniques to prepare studies related to the management of agricultural land and natural areas (forests and protected areas) to avoid the adverse effects of climate change.

Upon successful completion of the course, the student will be able to:

- Have an understanding of the specificities of the climatic context of the Greek region. Thus, the student will be able to use the knowledge provided in their professional life in studies-framework proposals for the protection of the agricultural and natural environment in the Greek territory.
- possess the necessary knowledge to be able to delve further into specialised topics concerning the interactions of bioclimatic conditions on plant capital, the human organism and the animal kingdom.
- uses data processing methodologies to draw up studies relating to managing agricultural land and natural areas (forests and protected areas) to avoid the adverse effects of climate change.

General Competences

Taking into consideration the general competences that students/graduates must acquire (as those are described in the Diploma Supplement and are mentioned below), at which of the following does the course attendance aim?

Search for, analysis and synthesis of data and information by the use of appropriate technologies,	*Project planning and management*
Adapting to new situations	*Respect for diversity and multiculturalism*
Decision-making	*Environmental awareness*
Individual/Independent work	*Social, professional and ethical responsibility and sensitivity to gender issues*
Group/Team work	*Critical thinking*
Working in an international environment	*Development of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Introduction of innovative research	*(Other…….citizenship, spiritual freedom, social awareness, altruism etc.)*
	…….

Search, analysis and synthesis of data and information using the necessary technologies.

3. COURSE CONTENT

The syllabus per week of the course is as follows:

- Historical development and scope of bioclimatology/biometeorology. Macro- Meso- Local and Microscale of the Climate. Global climate change and extreme weather events. Importance of atmospheric conditions on biological systems.

- Climate and bioclimatic classifications. Climatic and bioclimatic-biometeorological indicators. Climate change and changes in ecosystems and agriculture.

- Types of climate zones, climate regions of the earth, climate of Greece.

- Topoclimate - microclimate. The climate of crop fields and tree-covered areas.

- Microclimatic conditions of enclosed spaces (greenhouses, warehouses, storage areas, instability).

- Urban climate. Peculiarities of urban climate and effects on humans.

- Study of bioclimate by classical and new methods. Systems for automatic monitoring, acquisition, transmission and processing of bioclimatic parameters. Available bioclimatic data and their management for the study of ecosystems and species distribution.

- Spatio-temporal distribution of atmospheric parameters and thermal stress on living organisms. Meteorological/climatic conditions as a factor in the spread of pathogens.

- Assessment of meteorological risk of fire initiation in urban, peri-urban, agricultural and forest areas.

- Climate and vegetation. Impact of climate change on vegetation in natural and agricultural areas.

- Phenology and climate. Phenological observations, their processing and use.

- Climatology of air pollution. Qualitative and quantitative description of pollutant dispersion in the atmospheric boundary layer. Effects on biological systems and assessment models.

- Utilization of bioclimatic/biometeorological parameters in the planning of rural and non-rural areas. Analysis of critical bioclimatic/biometeorological parameters and study of their spatio-temporal distribution.

4. TEACHING METHODS--ASSESSMENT

MODES OF DELIVERY *Face-to-face, in-class lecturing, distance teaching and distance learning etc.*	In the classroom, laboratory classroom, field (classic and automatic university campus weather station sites) and selected outdoor vegetated and non-covered areas.
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY *Use of ICT in teaching, Laboratory Education, communication with students*	Use of Powerpoint type slides, communication with students via e-mail and meetings with students in small groups to work on assignments. Use of the eclass and Microsoft Teams platform.
COURSE DESIGN *Description of teaching techniques, practices and methods:* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, Internship, Art Workshop, Interactive teaching, Educational visits, projects, Essay writing, Artistic creativity, etc.* *The study hours for each learning activity as well as the hours of self-directed study are given following the principles of the ECTS.*	

Activity/ Method	Semester workload
Lectures	39
Laboratory practice	26
Individual laboratory project (data processing and commenting)	12
Fieldtrips/ Field exercises	80
Personal Study	40
Total	125

STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS *Detailed description of the evaluation procedures:* *Language of evaluation, assessment methods, formative or summative (conclusive), multiple choice tests, short- answer questions, open-ended questions, problem solving, written work, essay/report, oral exam, presentation, laboratory work,* *other……etc.* *Specifically defined evaluation criteria are stated, as well as if and where they are accessible by the students.*	I. Written final examination on the theory of the course. II. The examination in the laboratory part of the course is composed of: - Preparation of individual projects - Laboratory exercise involving calculations of characteristic climate parameters and indices - Final written examination (multiple choice)

5. SUGGESTED BIBLIOGRAPHY:

English Language

- Adams J., 2010. Vegetation-Climate Interaction. Springer Science + Business Media B.V., USA.
- Breckle S.W. 2002. Walter's Vegetation of the Earth. The ecological systems of Geo-Biosphere. Springer Verlag Heildeberg. Germany.
- Ebi K.L., 2009. Biometeorology for adaptation to climate variability and change. Springer Science + Business Media B.V., USA.
- Eagleson, P. 2005. Ecohydrology: Darwinian Expression of Vegetation Form and Function. Cambridge University Press.

Greek Language

- Χρονοπούλου - Σερέλη Α., Τσίρος Ι. , Καμούτσης Α., Ματσούκης Α., Δρούλια Φ., Χαραλαμπόπουλος Ι. και Χρονόπουλος Κ., 2012. Γενικά και Ειδικά Θέματα Βιοκλιματολογίας. Εφαρμογές – Ασκήσεις. Εκδόσεις Ζήτη, Θεσσαλονίκη (Κωδικός Βιβλίου στον Εύδοξο: 32997875).
- Barry G.R. and Hall-McKim E.A. 2022. Κλιματολογία και Κλιματική Αλλαγή (Επιστημονική Επιμέλεια: Π. Νάστος). Εκδόσεις Τζιόλα, Θεσσαλονίκη.

6. TEACHERS:

Theory
Ioannis Tsiros, Professor
Athanasios Kamoutsis, Assistant Professor
Fotoula Droulia, Laboratory Teaching Staff
Aristidis Matsoukis, Laboratory Teaching Staff
Ioannis Charalampopoulos, Laboratory Teaching Staff

Laboratory Tutoring/ Teaching
Ioannis Tsiros, Professor
Athanasios Kamoutsis, Assistant Professor
Fotoula Droulia, Laboratory Teaching Staff
Aristidis Matsoukis, Laboratory Teaching Staff
Ioannis Charalampopoulos, Laboratory Teaching Staff