



AIX CENTER OF HUMANITIES AND SOCIAL SCIENCES

SEM 3 - 22/23

ENS 200

3 CREDITS

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Ecology of the Mediterranean

CLASS TIME – MONDAY – FRIDAY 14H00-17H25

I. COURSE DESCRIPTION

The Mediterranean biome covers *ca.* 2.0% of the global lands, making of it the smallest terrestrial biome. Field surveys, however, reveal the presence of some 48 thousand species of vascular plants, *ca.* 18% of all known terrestrial plants, making of it the second most biodiverse after the Tropical Forests biome. This biodiversity is characterized by its high rate of endemism, rising in some locations to over 75%, and its extreme vulnerability to human activities.

Our focus in this course is to examine the geographical and climatic conditions in the Mediterranean basin and their impact on its life forms. Subjects covered include the Mediterranean Sea, the Geology of the Mediterranean, the Messinian Salinity Crisis (MSC) and the Mediterranean Climate. The class will also cover the terrestrial plant diversity in the Mediterranean basin, its origins and main characteristics and the different adaptation strategies to survive the environmental constraints in the region.

II. COURSE OBJECTIVES

- Understand the main concepts in terrestrial ecology
- Study the Mediterranean and its physical environment
- Familiarize with the different plant communities in the French Mediterranean region
- Learn about the main plant adaptations to cope with the Mediterranean environment
- Develop skills in scientific writing based on field observations

III. LEARNING OUTCOMES

- Understand the scopes and objectives of ecology and its link to life and earth sciences
- Improve your ecological vocabulary
- Refresh your knowledge on the plate tectonics theory and apply it to understand the geology of Mediterranean Sea & its basin
- Understand the MSC and the its ecological consequences
- Understand the global atmospheric and hydrologic cycles, their link to the global climate and to the distribution of terrestrial biomes
- Understand the drivers of the Mediterranean-type climate
- Understand the origins of today's Mediterranean plant diversity
- Identify the main plant adaptation strategies in the Mediterranean basin
- Familiarize with plant units in the Mediterranean, particularly in the south of France

- Identify the different plant units in the field and recognize their adaptation strategies
- Develop observational skills *in situ*
- Develop scientific writing

IV. INSTRUCTIONAL METHODS AND ACTIVITIES

- In-class lectures and discussions
- Field-trips and students' observations
- Fieldwork-based written reports
- Oral presentations based on selected scientific readings

V. PRIMARY TEXTBOOKS (Additional resources will be provided with each section of the course)

Mediterranean Ecogeography

By Harriet D. Allen

1st Ed., 2000

Prentice-Hall (Pearson Education)

ISBN: 0582404525

Principles of Terrestrial Ecosystem Ecology.

Authors: F. Stuart Chapin, Pamela A. Matson, Peter M. Vitousek

2nd Ed., 2011

Springer

ISBN-10: 1441995021

ISBN-13: 978-1441995025

VI. EVALUATION AND GRADING

- 20% Attendance, in-class activity and quizzes
- 20% Written reports (Based on fieldtrips)
- 10% Oral Presentations
- 25% Midterm exam
- 25% Final exam

VII. LECTURES, SHOWS, EXHIBITS, WORKSHOPS, EVENTS, ETC.

Commensurate with your study abroad, we should be constantly prepared to take advantage of any events that would enrich the material of the course and add to your learning experience. Over the semester, the syllabus may be adjusted according to the activities taking place in Aix or organized by IAU.

VIII. ATTENDANCE

One of the primary requirements this semester is that you attend class. This is not a lecture class, and its success depends very much on your coming to class on time, prepared for the lesson, and ready to participate in discussion and activities. Attendance will be part of your final grade.

About attendance: unexcused absences have a negative impact on your final grade. Each unexcused absence above two will lower the final grade by a half-letter grade. IAU College excused absences: absences linked to IAU excursions; sickness (a medical certificate is require.

IX. Courses Schedule

L1 **Principles of Ecology**

Introduction to Ecology: Brief history and some Definitions

Scopes and methods

Sub-disciplines in Ecology

- Organismal Ecology
- Population Ecology
- Community Ecology
- Ecosystem Ecology
- Landscape Ecology
- Global Ecology

L2

The Mediterranean: the land & the Sea

The Mediterranean Basin: An overview

The Mediterranean People

The Mediterranean Biome

The Mediterranean Sea: An Overview

The Mediterranean Sea's Properties

- Temperature
- Salinity
- Tide
- Biodiversity
- Oligotrophy

L3

Mediterranean Geology

Introduction to the plate tectonics theory

The geological history of the Mediterranean

Structural geology of the Mediterranean

Evidence from around the Mediterranean

Mediterranean volcanism and seismicity

L4

Messinian Salinity Crisis (MSC)

Introduction to the Geological Time Scale

The Messinian Age

The Messinian Salinity Crisis

- Definition of the MSC
- Evidence
- Timing
- Regional and global consequences

L5

Mediterranean Soils

Introduction

The Pedosphere

What is Pedogenesis?

Soil profiles and soil horizons

Mediterranean major soil types and their properties

Theories on the origin of Mediterranean soils
Formation factors
Consequences on Mediterranean plant cover

Midterm Exam – 5th of July Class time

- L6** **Global climatic patterns & the Mediterranean Climate**
- Global Energy Balance
 - Global Atmospheric circulation
 - Global Climatic patterns
 - The Mediterranean climate
 - Elements of the Mediterranean climatic regime
 - Specific climatic features in the French Mediterranean region
 - *Le Mistral*
 - *Le Marin*
- L7** **Global Biomes**
- Introduction to biogeography
 - Biome Classification systems
 - Whittaker Classification System
 - Major Terrestrial Biomes
 - Tropical Rain Forests
 - Savannah
 - Hot Desert
 - Temperate Grasslands
 - Mediterranean
 - Temperate Forests
 - Taiga
 - Tundra
- L8** **Mediterranean Plant Communities**
- Mediterranean dry prairies
 - Garrigue
 - Maquis
 - Mediterranean evergreen forests
 - Mediterranean mixed forests
 - Mediterranean coniferous forests
- L9** **Biodiversity and its drivers in the Mediterranean Biome**
- Introduction to the global floral realms
 - Biogeographical distribution patterns
 - Origins of the Mediterranean plant Diversity

Determinants of the Mediterranean today's biodiversity

Mediterranean endemism and its drivers

L10

Environmental constraints and Adaptations in the Mediterranean Biome

Adaptations against draught

Adaptations against fire

Aromatic plants

Other forms of adaptation

Final Exam - 13th of July Class time

X. Field Trips

Saturday 08/07/2023

Fieldtrip to the National Park of the Calanques, Calanques de Sugiton, Marseille