

## Introduction to Ecology for Economists

Course title - Intitulé du cours	Introduction to Ecology for Economists
Level / Semester - Niveau /semestre	M2 / S1
School - Composante	Ecole d'Economie de Toulouse
Teacher - Enseignant responsable	Jorge Peña
Other teacher(s) - Autre(s) enseignant(s)	
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Other teacher(s) - Autre(s) enseignant(s)	
Lecture Hours - Volume Horaire CM	30
TA Hours - Volume horaire TD	
TP Hours - Volume horaire TP	
Course Language - Langue du cours	English
TA and/or TP Language - Langue des TD et/ou TP	

### Teaching staff contacts - Coordonnées de l'équipe pédagogique :

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### Course's Objectives - Objectifs du cours :

The main goal is for economists to be sufficiently acquainted with some of the main concepts (and jargon) used in evolutionary biology and ecology in order to be able to interact with biologists in an efficient way, and to follow more advanced courses of the Master program.

### Course outline :

Ecology is the scientific study of the interactions that determine the distribution and abundance of organisms. Evolution is the change in a population over time and a fundamental principle of biology. As Theodosius Dobzhansky famously put it: "Nothing in biology makes sense, except in the light of evolution". This course is an intensive introduction to some of the main theoretical concepts in ecology and evolution for students coming from an economics background.

It will mainly focus on a brief overview of the main forces of evolution (mutation, natural selection, genetic drift, and migration), of biotic interactions at the level of populations, and of population growth and evolution in class-structured populations. The course will cover the following topics:

1. Introduction to ecology and evolution as scientific fields.
2. Genetic variation.
3. Mutation and genetic drift.

4. Natural selection and gene flow.
5. Population dynamics, density dependence, and intraspecific competition.
6. Species interactions: Interspecific competition.
7. Species interactions: predation.
8. Species interactions: mutualism and parasitism.
9. Class-structured populations
10. Evolution in class-structured populations

The concepts will be introduced by means of mathematical models and their importance will be illustrated with case studies.

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**Prerequisites - Pré requis :**

Differential calculus, Linear algebra.

**Grading system - Modalités d'évaluation :**

Students will be asked to read and prepare a presentation of two scientific papers (25% of the grade each). There will also be a final exam (50% of the grade).

**Bibliography/references - Bibliographie/références :**

Ecology: From Individuals to Ecosystems. Michael Begon, Colin R. Townsend, and John L. Harper. 4th Edition. Blackwell Publishing.

Ecology: The Experimental Analysis of Distribution and Abundance. Charles J. Krebs. 6th Edition. Pearson Education Limited.

Matrix population models. Hal Caswell. Sunderland, MA: Sinauer.

**Distance learning – Enseignement à distance :**

Distance learning can be provided when necessary by implementing, for example: / En cas de nécessité, un enseignement à distance sera assuré en mobilisant, par exemple :

- Interactive virtual classrooms / Classe en ligne interactive
- Recorded lectures (videos) / Vidéo enregistrée de la présentation du matériel pédagogique
- MCQ tests and other online exercises and assignments / QCM et exercices en ligne
- Remote (online) tutorials (classes) / TP/TD à distance
- Chatrooms / Forums