

Population Demography & Evolutionary Ecology

Course name	Population Demography and Evolutionary Ecology
Level / Semester	Master 2 Economics and Ecology / Semester 1
Credits	6 ECTS
Instructor(s)	Simon Blanchet (SEEM) Jean Clobert (SEEM) Jorge Peña (IAST)
Number of lecture hours	30

OBJECTIVES

This course will present an in-depth review of demographic and population dynamic tools. At the end of the course, students will be able to simulate demographic scenarios to evaluate species or population status, as well as potential environmental effects of different management actions.

Several tools will be presented to estimate demographic and key fitness parameters, and to calculate demographic and population dynamics. We will assess the effects of demographic, genetic and temporal variance. Tools such as minimum viable area and / or minimum viable population size, population extinction measures and the French environmental program “trame verte et bleue” of corridors for conservation will be illustrated using several terrestrial and freshwater examples. The interplay between economic value of harvesting, exploitation, and conflict with the protection of species and natural systems will be given special attention.

The course will be divided into two main parts. The first part will illustrate the fundamental principles of population demography and evolutionary ecology as well as the main modelling tools generally used. The second part aims at providing students some applied research tools for making these fundamental principles useful to help investigating some societal questions.

REQUIREMENTS AND GRADING POLICY

Due to the multidisciplinary nature of this master, attendance at lectures will be required. The course grade will be determined by the performance of the student on assignments (individual or team-based assignments, and/or presentations), and/or a final exam. Due again to the multidisciplinary nature of this master, assignments and exams may be different for economics and for ecology students.

Recommended reading:

- Carroll, S. P., Jørgensen, P. S., Kinnison, M. T., Bergstrom, C. T., Denison, R. F., Gluckman, P., ... and Tabashnik, B. E. 2014. Applying evolutionary biology to address global challenges. *Science*, 346, 1245993.

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- Hendry, A. P., Kinnison, M. T., Heino, M., Day, T., Smith, T. B., Fitt, G., ... and Gilchrist, G. 2011. Evolutionary principles and their practical application. *Evolutionary Applications*, 4, 159-183.
- Morris, W. F., and Doak, D. F. 2002. Quantitative conservation biology. Sinauer, Sunderland, Massachusetts, USA.
- Mills, S. L. 2013. Conservation of wildlife populations. Demography, genetics, and management. Willey-Blackwell.