

Program Imalis Master – M1

First semester - 2026

UNBIO1-038 - Evolutionary Ecology (6 ECTS)

<https://www.edu.bio.ens.psl.eu/spip.php?article54>

1. Short Description of Course

This is an intermediate-level course in evolutionary ecology. The course is designed to address the foundational themes of evolutionary ecology and provide adequate preparation for specialized, graduate-level courses. Topics covered in this class include : the origin of phenotypic variation, ecological causes of and constraints on natural selection, and the study of adaptation ; evolution of life history traits, mating strategies and sex-related traits, social behavior (in human and non-human species) ; the ecology and evolution of interactions among species, evolution of symbiosis, and evolution of diseases and resistance.

Maximum class size: 20 students.

The class is taught in: English

Keywords: Eco-evolutionary feedbacks, life history theory, aging, behavioral ecology, natural selection, sexual selection, ecological interactions, epidemiology

2. Registration

Students external to the ENS Biology Department can attend and validate the class if the primary instructor has been contacted beforehand and agreed (see contact information below). Following approval, students need to register online at least one week before the course starting date:

<https://www.enseignement.biologie.ens.fr/?article207>

3. Location and Timeline

Location: Biology Department, 3rd floor - Room 306, at ENS, 46 rue d'Ulm, Paris.

Building entry with access card only (visitors must use the intercom at the entrance). The floor and class rooms are accessible without a badge. The building, floor and class room are accessible to people with disabilities.

Total duration (in person): 39 hours

Total duration (online): 0 hours

Homework will consist in : reading research article, presentation of one article during the semester

For exact dates/time of the class this year, refer to the course website or to "Detailed Schedule and Content" section below

4. Instructors and Contact Information

Primary instructor: François Mallard, francois.mallard@bio.ens.psl.eu

Preferred method of contact: email

5. Course Communications

Most course communication will use the Moodle platform.

Course material will be made available on Moodle

Announcements will be posted on Moodle

6. Course Prerequisites or Co-requisites

Course prerequisites: content of UE :

- Biologie évolutive UNBIO1-012
- Ecologie et Biodiversité UNBIO1-010

Students are expected to be familiar with basic concepts and results of population ecology, community ecology and population genetics.

Competency level in Unix : None

Level in programming [Python/R] : None

7. Course Format, Teaching Methods, Special Activities

Course format and teaching methods: Lectures by the primary instructor and by guest speakers.

About half of the course will last 2h and followed by a discussion about a research article. Every week, a group of 2-3 students will introduce the article and animate the discussion together with the primary instructor.

8. Expected Learning Outcomes

Upon completion of the course students will be able to:

- read, analyze, and present current research articles in evolutionary ecology and related disciplines
- describe the ecological, evolutionary, and life-history components of population and species interactions
- explain/define how species and populations evolve and adapt, integrating multiple levels of biological integration
- understand models of population dynamics and evolutionary processes
- interpret equations of epidemiological dynamics in terms of evolutionary and ecological mechanisms
- follow courses of Evolutionary Ecology M2 Imalis track

9. Detailed Schedule and Content

Date		Topic	Instructor
Tuesday	9h - 12h	Introduction	François Mallard
22/09/2026			
Tuesday	9h - 12h	Evolution of Reproduction	François Mallard
29/09/2026			
Tuesday	9h - 12h	Sexual Selection	David Laloi
06/10/2026			
Tuesday	9h - 12h	Evolutionary epidemiology	Samuel Alizon
13/10/2026			
Tuesday	9h - 12h	Evolutionary epidemiology	Samuel Alizon
20/10/2026			
Tuesday	9h - 12h	Eco-evolutionary feedbacks	Régis Ferrière
27/10/2026			
Tuesday	9h - 12h	Eco-physiology	Jean-François Le Galliard
03/11/2026			
Tuesday	9h - 12h	TD. Adaptive radiations and evolutionary convergence	Jean-François Le Galliard
10/11/2026			
Tuesday	9h - 12h	Evolution and phenotypic plasticity	François Mallard
17/11/2026			
Tuesday	9h - 12h	Investigating adaptation in natural populations through long-term monitoring	Céline Téplitsky
01/12/2026			
Tuesday	9h - 12h	Game theory and the study of animal behavior	Jean-Baptiste André
08/12/2026			
Tuesday	9h - 12h	Ecology and evolution of symbiosis	Marc-André Sélosse
15/12/2026			
Tuesday	9h12h	Ecology and evolution of symbiosis	Marc-André Sélosse
19/01/2026			
Tuesday		Exam	X
26/01/2026			

10. Evaluation and Grading

The module will be evaluated both during the course—through an article presentation—and then through a written exam (2-hour) at the end of the semester. Each week, a group of two to three students will present an article related to the course topic for that day. All articles will be available at the start of the module so that students can choose which ones they wish to present. Students will also be evaluated on their ability to discuss the articles presented by the other groups during the semester.

The final exam will consist of two parts: a first section with open-ended questions covering the semester's material, followed by a second section in which students will analyze and interpret figures from research articles.

<u>Assessment Categories</u>	<u>Percentage of final grade</u>
Article presentation	25%
Final exam	75%
Total	100%

11. Required or Suggested Resources

Textbooks and interesting references

Alizon S (2020) Evolution, écologie et pandémie. Ed. Points / Le Seuil.

Danchin E, Giraldeau LA, Cézilly F (2008) Behavioural Ecology. Oxford University Press.

Mayhew PJ (2006) Discovering Evolutionary Ecology. Oxford University Press.

Roff DA (2001) Life History Evolution. Sinauer.

Shuster SM, Wade MJ (2003) Mating Systems and Strategies. Princeton University Press.

Selosse MA (2000) La Symbiose. Vuibert.

Thomas F, Lefevre T, Raymond M (2010) Biologie Evolutive. de Boeck Ed.

12. Absence, Class Participation, Classroom Behavior Policies

Students are expected to arrive in time and attend classes regularly and to fully participate in all course activities. Students should notify the instructor in advance in case of a planned absence, and should otherwise produce a medical certificate. To foster a positive learning environment, students and instructors have a shared responsibility. We seek to create a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting, chatting, reading a newspaper, making phone calls, web surfing, etc.).

Disclaimer: Information contained in this syllabus may be subject to change with reasonable advance notice, as deemed appropriate by the primary instructor of the course.