



EVOLUTIONARY BIOLOGY CRASH COURSE THIRD EDITION JUNE 2024

Introduction to Evolutionary Biology

Course by Giorgio Boccarella

In this introductory module you will learn what evolutionary biology is and its focus — you will learn how the theory of evolution provides us insights on how life is shaped by its interactions with the environment. Evolutionary biology also explores the mechanisms by which diversity comes to be and how it is maintained. We begin the exploration of these processes with this lecture and we will set the ground for a deeper understanding of the field.

Genetics

Course by Augustin Chen, Sergio González-Mollinedo & Stefany Moreno-Gómez

Understanding the forces that shape genetic variation and their effects on phenotypic variation is one of the main goals of evolutionary biology. This section will introduce basic concepts in population genetics and will explore classical models in the field that are used to study how allele and genotype frequencies change over time in response to processes like mutation, genetic drift and natural selection. We will also explore the molecular mechanisms that allow for genetic diversity and how this variation eventually comes under evolutionary forces that shape the evolution of populations.

Plasticity and Evolvability

Course by Jana Riederer

In this section we will discuss the role of phenotypic plasticity and evolvability in evolutionary biology. We will discover the answer to questions such as:

1. *What can genotype-phenotype maps tell us about evolution?*
2. *How can plasticity shape evolutionary trajectories?*
3. *What factors affect a population's capacity for evolution?*

In addition to these questions, we will discuss recent work in these areas and link them to current debates and controversies in evolutionary biology.

Experimental evolution

Course by Saudat Alishayeva

TBA

Speciation and tree thinking

Course by Raphaël Scherrer & Juan José Lagos-Oviedo

In this module you will learn about biological diversity — why there are many species, how they form, how to measure their relatedness and how long ago they split, and what other things we can learn once we have reconstructed their genealogy.

Behavioural ecology

Course by Jana Riederer, Jan Kreider, Mirjam Borger & Tanmay Dixit

The course aims to explore the way behaviour is shaped by evolution and how it feeds back into it. Evolutionary ecology shapes the way organisms behave and adapt and we will discover these aspects in the following subsections:

1. *(Inclusive) fitness and kin selection*
2. *Sexual selection*
3. *Coevolution and species interactions*
4. *Life history theory*

Theoretical Evolutionary Biology

Course by Raphaël Scherrer

Here we will learn why and how conceptual and mathematical models are used to represent how evolution works. We will introduce different modelling techniques and discuss what they can teach us, to what extent they are useful, and when they are not.

Evolutionary Conflicts

Course by Elpida Skarlou

TBA