

3-Year Course Evaluation for BIO210 Evolutionary Biology

Spring 2024, course responsible Adele Mennerat

Content

This 10-point course (mandatory for master students in Biodiversity Ecology Evolution) gives a solid overview of how evolution works as well as current research questions in evolutionary biology. There is also a secondary focus on the scientific approach and what distinguishes science from belief. The course is based on reading parts of the textbook “Evolutionary Analysis” by Herron & Freeman (5th ed.), and parts of the pocketbook “Why evolution is true” by J. Coyne.

Students are expected to take active part in their own learning, via reading the textbook at home prior to class, using the reading guides provided by the teacher, and doing group exercises in class. They are specifically made aware of this in the first info meeting; information for which parts of the book they should read when is available via MittUiB and written in “timeplan” as a comment for each teaching day. To get the most learning out of the course, they are expected to read prior to attending the corresponding class. For students with reading difficulties, an audio version of the book is also available.

To guide their reading, the course coordinator provides them with one “reading guide” per chapter listing the most important points to remember, keywords, and self-test questions. In-class teaching typically starts with a quiz and is followed by a lecture interspersed with think-pair-share and short group exercises (e.g. discuss a figure or results from a study mentioned in the textbook). The groups are defined by the teacher at the start of the semester and kept the same throughout. One person from each group is randomly asked to report on behalf of the group to the rest of the class (this particular point was implemented from 2023 onwards).

During the first half of the semester the focus is on conceptual foundations. To complete the textbook, time is dedicated in class to re-formulate and clarify the most important processes. The three last chapters of this first half (chapters 8-10) are more advanced and entirely approached via team-based learning in class: first, a 10-question quizz taken individually, then coming in groups and agreeing on the answers, and then checking whether the answers are correct using scratch cards. Finally, the teacher goes through the questions in plenum to clarify what makes the alternative answers incorrect. This part of the course ends with a midterm exam in week 11 covering chapters 1-10 (digital, multiple choice). To prepare for the midterm, students are given practice quizzes in advance, in addition to the questions contained in reading guides.

To solidify their learning, they also have to validate three mandatory assignments in the semester, consisting in guided simulation exercises using the SimUtext online program (as evolution is impossible to observe in class but possible to study via simulations) where they are guided through each topic with some questions giving them immediate feedback. This is followed by 10 multiple-choice, graded questions related to what they have just done. In 2022-2023 these three “virtual labs” focused on (1) drawing and reading phylogenies, (2) evolution by natural selection and (3) evolution by sexual selection. In 2024 the two first ones were replaced by (1) host-parasite coevolution and disease evolution, (2) natural selection with a newer, better simulation study and (3) sexual selection (same as before).

The latter part of the semester involves lectures on various topics given by multiple lecturers, providing examples of current and local evolutionary research done at UiB in topics such as disease evolution (A. Mennerat), evolutionary development (A. Hejnol), early human evolution (SapienCe, UiB), and speciation / biogeography (H. Meijer / N. Straube, University Museum). Finally, some time is dedicated to equipping students with argumentative tools and examples to address creationism and intelligent design arguments. What is learned here is mostly reflection and debating skills, on evolution and more generally scientific evidence and its place in society.

Student evaluation and other evaluations that are relevant to the course.

Over the three years (2022-2024) 26 students filled in the evaluation surveys.

100% of respondents:

- evaluate the course as relevant for their studies
- deem the workload appropriate
- think the course description and learning outcomes fit well with the course contents.

90-95% of respondents:

- are satisfied with the course as a whole
- think the expectations ahead of exams were clear

Over 85% of respondents

- judge the communication with the course coordinator to be good (the complaints were about the main teacher not answering emails quick enough)
- state that the course motivated them to work

23% of respondents

- judge they were given insufficient constructive feedback on their prestation

From spring 2023 steps were taken based on earlier student feedback from 2021 / 2022, namely:

- clarifying that a response to emails should not be expected faster than the next working day, and that emails sent in weekends would not be answered immediately
- regularly reminding them that reading guides and reading schedules were available in MittUiB
- providing test questions and practice quizzes earlier in the semester; making the mandatory assignments in-class to make sure they also completed the virtual simulations prior to answering the graded questions
- clarifying the expectations for the oral exam and reassuring them by providing a list of possible exam questions from previous years

From the “free comments” fields the following feedback emerged:

- the amount of reading was extensive, much at times but not overwhelming (one wrote that the course had made them like reading books and that they would continue doing so in the future).

- most respondents were happy with the lectures, the easiness of communication with the teacher, and deemed the course very interesting
- most respondents praised the reading guides as very useful tools significantly improving their learning; one particular student wrote that this was the best structured course they had since secondary school (!) and that contrary to “pugging” for other courses, they will remember most of what they learned in BIO210 thanks to the reading guides :)
- some complained in 2024 that there was insufficient time between Fridays and Mondays to read the chapter well enough over the weekend. In other years teaching sessions were not as close together, which would be preferable to come back to.

Further improvements to make: more in-class group work, clearer expectations for the oral exam, and one more feedback session on the midterm & virtual labs (although these exist already, students do not seem to think it is enough).

Experiences from others who contribute to the teaching of the course

Other lecturers have mostly signaled that they enjoyed teaching in this course, that the students were active and that they would like to continue doing so.

The percentage of failures on the course

Failure rates for students that attended the course throughout are 3% (2022), 7% (2023) and 0% (2024).

Drop-out rates after semester start were 6% (2022), 6% (2023) and 7% (2024).