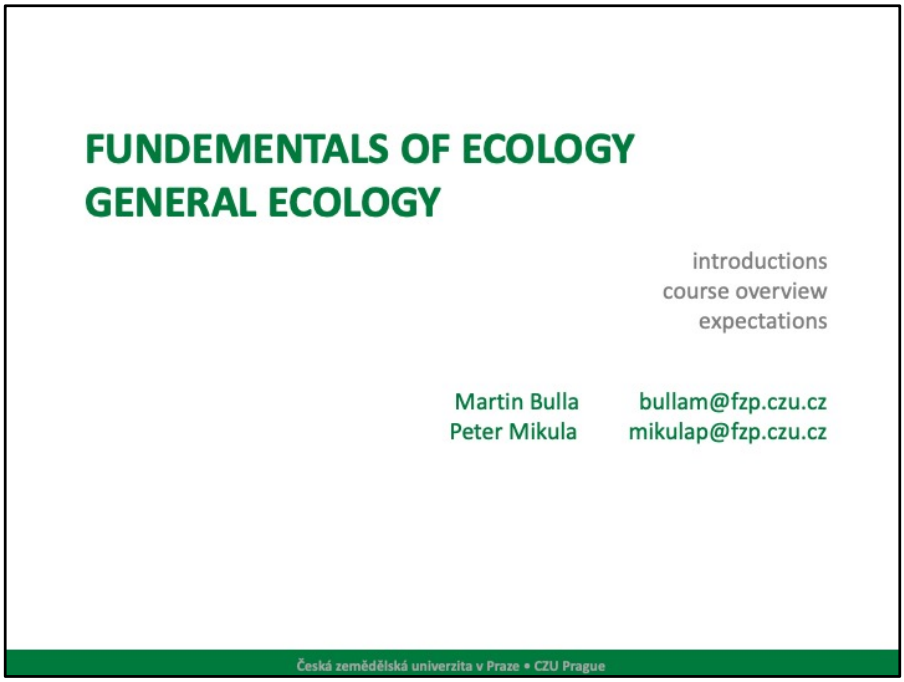
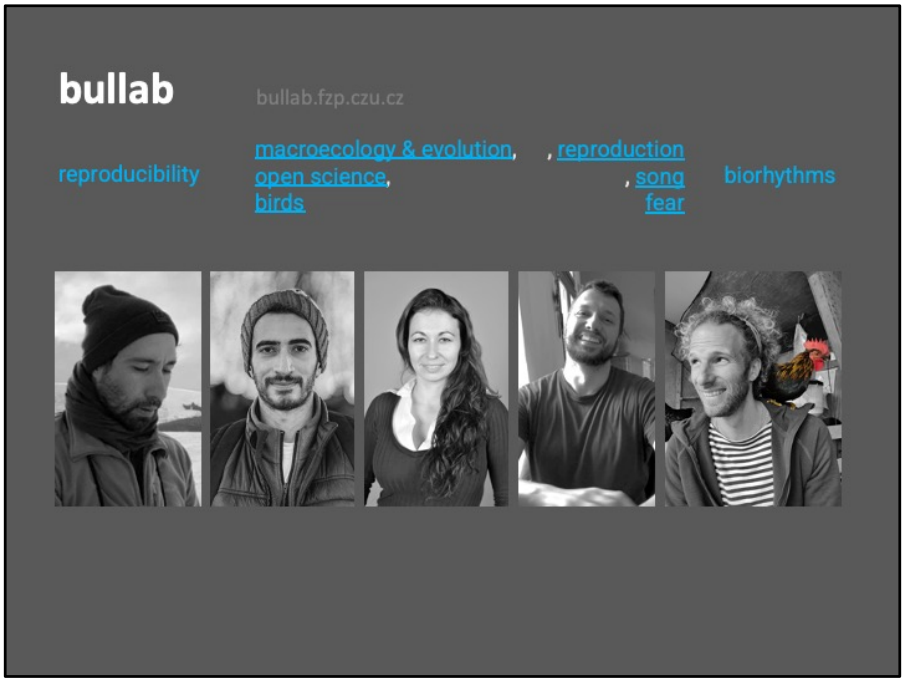


Today and coming days, the aim is not frontal teaching, but something that helps you. Ask questions.



- a newly founded research group exploring global patterns and evolution of traits along with local adaptations
- using mainly birds as our model species to understand reproduction and mating systems, song and fear;
- all tied together by a common thread: biorhythms and reproducibiliy
- we are promoters of open science

bullab

bullab.fzp.czu.cz

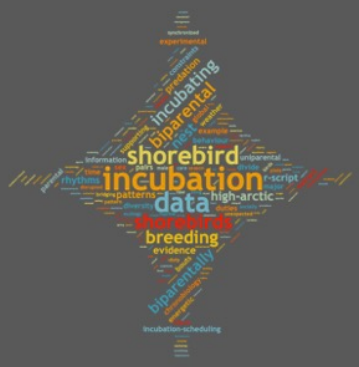
reproducibility

macroecology & evolution, , reproduction

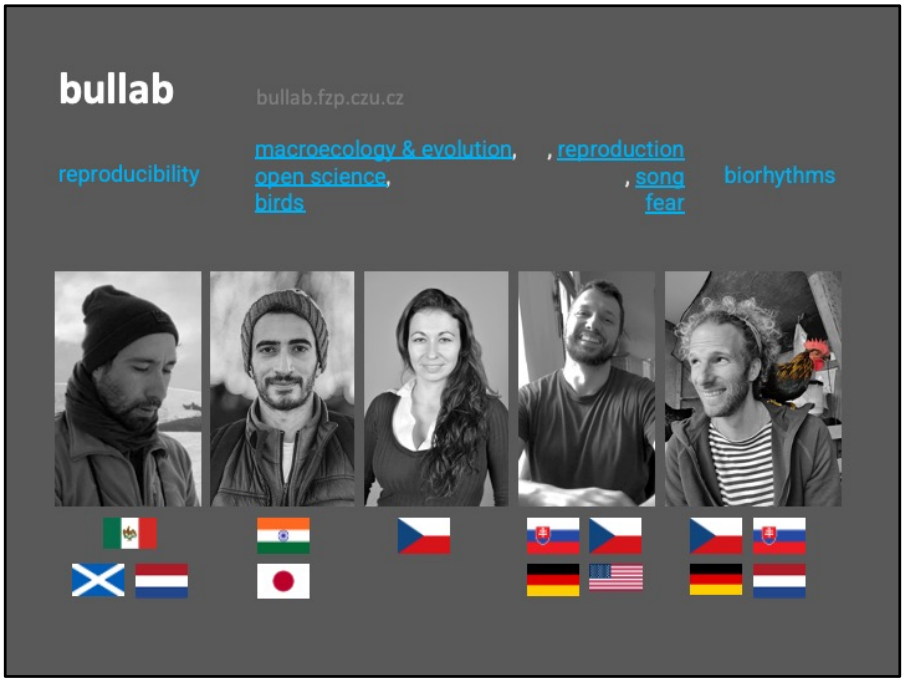
open science, , song

birds fear

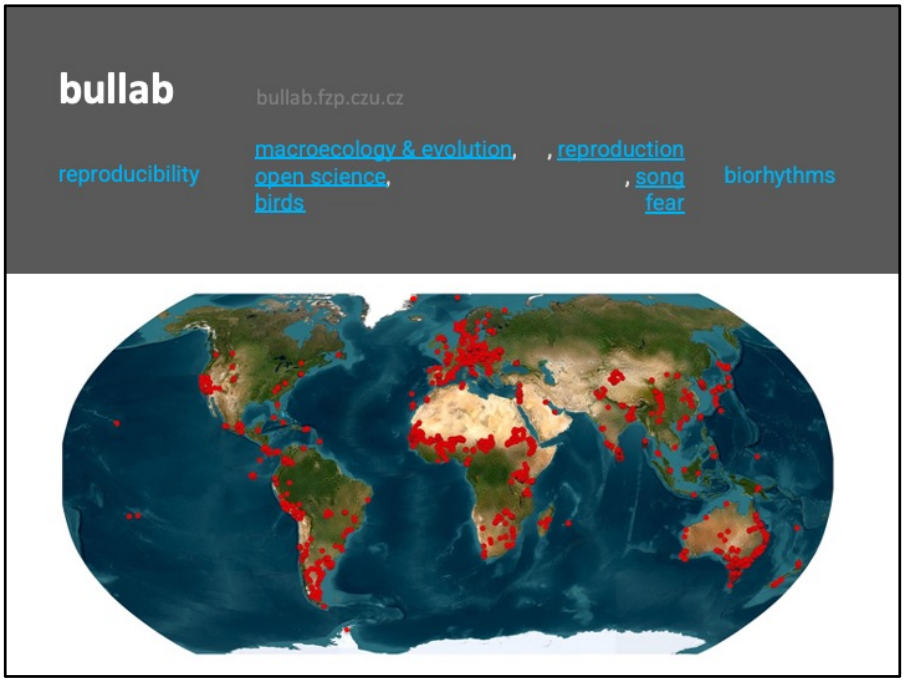
biorhythms



https://scholargoggler.com



International team



- collaborate with institutions and people across the globe

your turn

partici.fi/05826594

The aim of the course is to provide you with

- a fundamental understanding of the science of ecology, its scope, methods, and

- relevance to both basic and applied research.

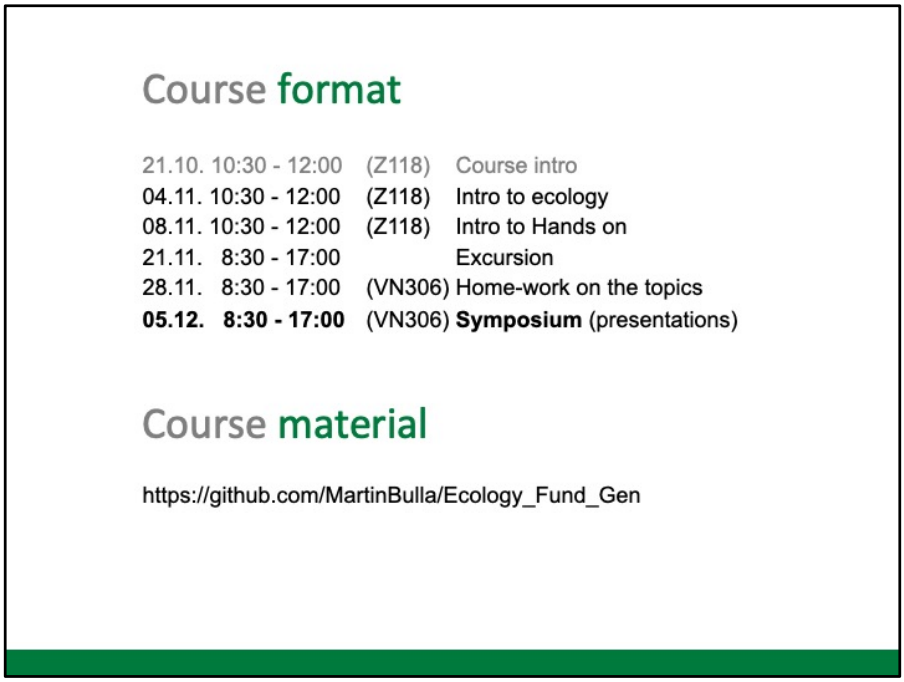
Gain

- insights into
    - ecological theory,
    - empirical approaches,
    - the role of ecology in addressing pressing global environmental challenges.
- ability to work independently within a team (using individual strength to the teams advantage)
- Experience in
    - working with literature research
    - communication skills
    - time management
- Critical thinking

Hands on learning

Presentation – a back bone of the course

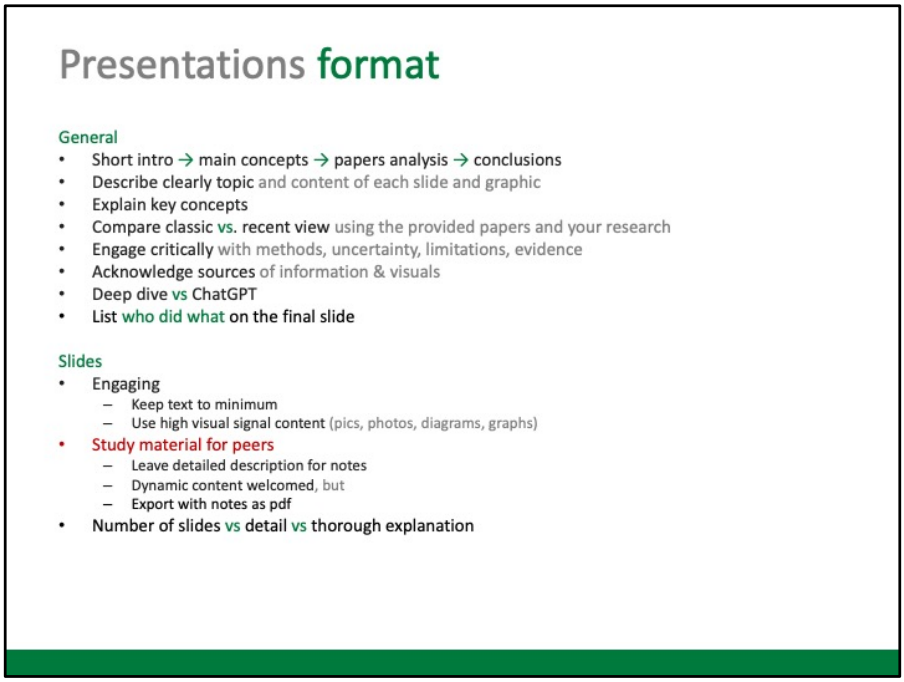
- Practice scientific thinking and clear communication
- Read and synthesize primary literature
- Learn about basic ecological concepts
- Connect classic ideas with modern developments
- Create re-usable study material for peers



PUT THE INFO/NOTE HERE

Presentations logistics

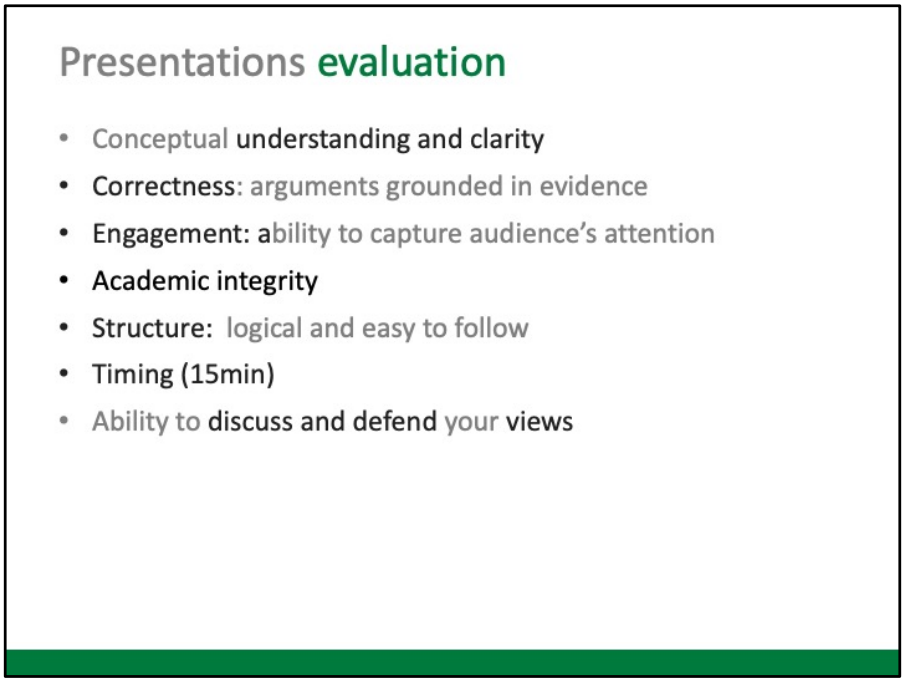
- 15 min talk + 15 min moderated discussion
- On key aspects of ecology
  - Topic
  - Papers - traditional and current
- 10 teams of 4-5 people
  - randomly selected
  - all member contribute equally
    - 1 day – reading the papers and literature search
    - 1 day – homework
    - 1 day – preparing the presentation
    - 1 day – presentation and engagement in the discussion (your and presentations of others)
  - all team members present



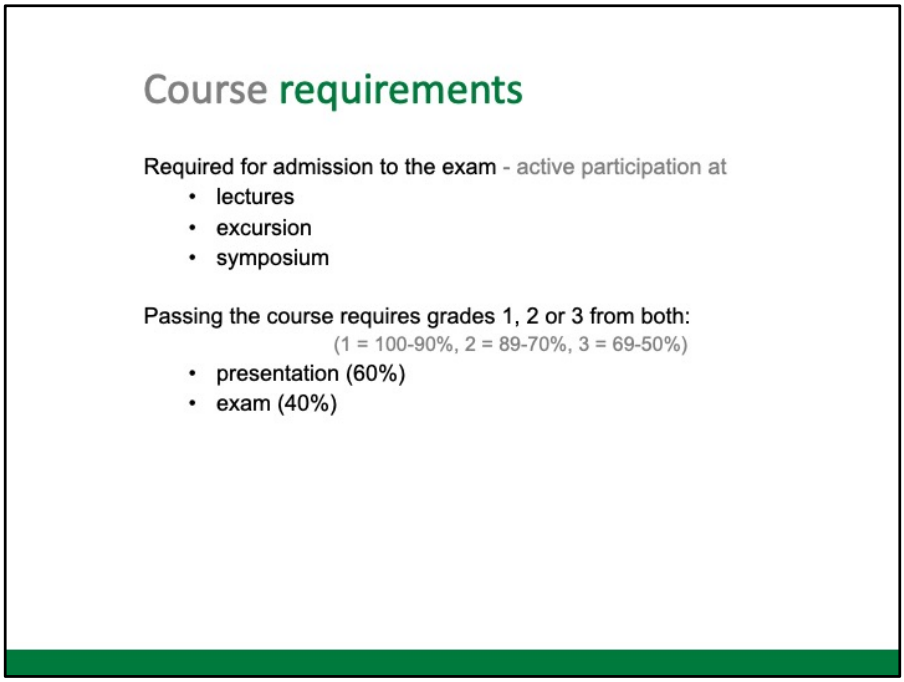
Engaging slides – rule of thumb: do the slides the way you learn the most when you see a presentation.

Study material – great if slides are dynamic (but either keep non-dynamic version or keep in mind that peers will study from the slide

Various approaches – one has clear signal content and then many slides are ossible



clarity, scientific grounding, engagement, and defence of arguments during group presentation at the symposium



Active participation in the excursion and the symposium is required for admission to the exam.

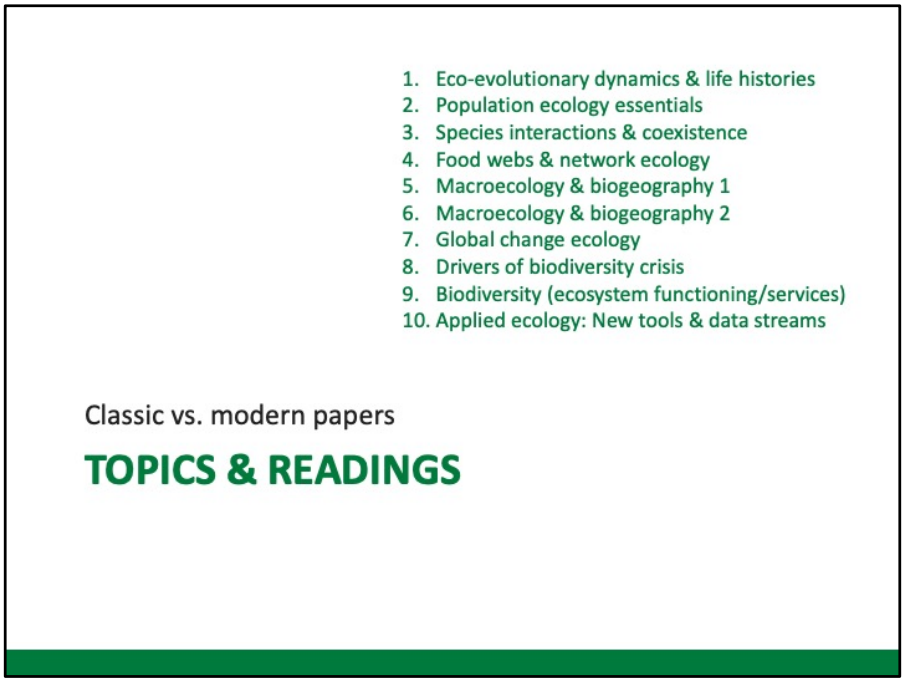
Passing the course requires passing (grade 1-3; 1 = 100-90%, 2 = 89-70%, 3 = 69-50%) both components:

(1) **Presentation (60%)**: clarity, scientific grounding,

engagement, and defence of arguments during group presentation at the symposium.

(2) **Exam (40%)**: written test evaluating knowledge of key ecological principles.

The final grade is the weighted mean of the presentation and exam grades (rounded).



PETO, can you create the list

Eco-evolutionary dynamics & life histories

Does the fast-slow continuum adequately capture life history variation across taxa, or do we need multiple axes of life-history strategy?

- **Classic:**
  - Stearns, S. C. (1977). The evolution of life history traits: a critique of the theory and a review of the data. Annual Review of Ecology and Systematics, 145–171.
- **Recent:**
  - Stott, I. et al. (2024). Life histories are not just fast or slow. Trends in Ecology & Evolution, 39(9), 830–840.

Population ecology essentials

Allee effects: ecological curiosity or fundamental driver of population dynamics?

- **Classic:**
  - Stephens, P. A., Sutherland, W. J., & Freckleton, R. P. (1999). What is the Allee effect? Oikos, 185–190.
- **Recent:**
  - Muir, E. J., Lajeunesse, M. J., & Kramer, A. M. (2024). The magnitude of Allee effects varies across mechanisms. Oikos, 2024(7), e10386.

Species interactions & coexistence

Top-down control or bottom-up release: Is there evidence for predation's grip on prey numbers?

- **Classic:**
  - Krebs, C. J. et al. (1995). Impact of food and predation on the snowshoe hare cycle. Science, 269, 1112–1115.
- **Recent:**
  - Krebs, C. J., Boonstra, R., & Boutin, S. (2018). Understanding the 10-year snowshoe hare cycle. Journal of Animal Ecology, 87, 87–100.

Food webs & network ecology

From keystone to rewiring: does food-web complexity build local biodiversity?

- **Classic:**
  - Paine, R. T. (1966). Food web complexity and species diversity. The American Naturalist, 100(910), 65–75.
- **Recent:**
  - Bartley, T. J. et al. (2019). Food web rewiring in a changing world. Nature Ecology & Evolution, 3, 345–354.

Macroecology & biogeography 1

Latitudinal gradients in biodiversity (and its dimensions) - how and why?

- **Classic:**
  - Willig, M. R., Kaufman, D. M., & Stevens, R. D. (2003). Latitudinal gradients of biodiversity. AREES, 34, 273–309.
- **Recent:**
  - Brodie, J. F., & Mannion, P. D. (2023). The hierarchy of factors predicting the LDG. TREE, 38(1), 15–23.

Macroecology and biogeography 2

How many species do we actually have on Earth? Why is it so hard to estimate?

- **Classic:**
  - Mora, C. et al. (2011). How many species are there on Earth and in the ocean? PLoS Biology, 9(8), e1001127.
- **Recent:**
  - Wiens, J. J. (2023). How many species are there on Earth? Progress and problems. PLoS Biology, 21(11), e3002388.

Global change ecology

Are we facing a sixth mass extinction?

- **Classic:**
  - Ceballos, G. et al. (2015). Entering the sixth mass extinction. Science Advances, 1(5), e1400253.
- **Recent:**
  - Wiens, J. J., & Saban, K. E. (2025). Questioning the sixth mass extinction. TREE, 40(4), 375–384.

Drivers of biodiversity crisis

What are the main drivers of the current biodiversity crisis?

- **Classic:**
  - Bar-On, Y. M., Phillips, R., & Milo, R. (2018). The biomass distribution on Earth. PNAS, 115(25), 6506–6511.
- **Recent:**
  - Jaureguiberry, P. et al. (2022). Direct drivers of global biodiversity loss. Science Advances, 8(45), eabm9982.

Biodiversity ↔ ecosystem functioning/services

From services to contributions: valuing nature in a human world

- **Classic:**
  - Costanza, R. et al. (1997). The value of the world's ecosystem services and natural capital. Nature, 387, 253–260.
- **Recent:**
  - Díaz, S. et al. (2018). Assessing nature's contributions to people. Science, 359(6373), 270–272.

Applied ecology: New tools & data streams

From new dawn to new standard: citizen science in ecology

- **Classic:**
  - Silvertown, J. (2009). A new dawn for citizen science. TREE, 24(9), 467–471.
- **Recent:**
  - Fraisl, D. et al. (2022). Citizen science in environmental & ecological sciences. Nature Reviews Methods Primers, 2, 64.

FUNDEMENTALS OF ECOLOGY
GENERAL ECOLOGY

introductions
course overview
expectations

Martin Bulla bullam@fzp.czu.cz
Peter Mikula mikulap@fzp.czu.cz

Course format

21.10.	10:30 - 12:00	(Z118)	Course intro
04.11.	10:30 - 12:00	(Z118)	Intro to ecology
08.11.	10:30 - 12:00	(Z118)	Intro to Hands on
21.11.	8:30 - 17:00		Excursion
28.11.	8:30 - 17:00	(VN306)	Home-work on the topics
05.12.	**8:30 - 17:00**	(VN306)	**Symposium** (presentations)

Alternatives – January 2026

06.01.	8:30 - 17:00	Excursion
07.01.	**8:30 - 17:00**	**Symposium** (presentations)

06.01.	8:30 - 17:00	Home-work on the topics
13.01.	8:30 - 17:00	Excursion
14.01.	**8:30 - 17:00**	**Symposium** (presentations)