SCIENVI201
Ecology
Spring 2021

Classroom number: 2
Class times: T1 (MON 08:45-10:45 THU 13:45-15:45)

Instructor:
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I.Track information

a) Prerequisites for this course: SCIENVI102 or SCILIFE101
b) This course serves as a prerequisite for: SCIENVI301, SCIENVI302

Relevant to tracks:
- Life Sciences
- Environmental Sciences
- Earth Sciences

II. Course description

Ecology is the scientific study of the distribution and abundance of organisms and the interactions that determine distribution and abundance. Over the past decades, ecology has grown from an obscure science into a position at the forefront of public and political consciousness. Applied ecology has become an important scientific tool to address important political and environmental issues.

Ecology is generally divided into 3 levels: the individual organism, the population (consisting of individuals of the same species) and the community, in which several species are living together. In addition, ecology focuses on the relationship between living creatures and their chemical and physical surroundings, which together make up an ecosystem.

Ecology is a complex science. It draws on many areas of knowledge such as organic and inorganic chemistry, plant and animal biology, physiology, meteorology, and even economics. This course focuses on the basic principles of ecology, from individuals to ecosystems. We then proceed to environmental conditions and resources, and the 4 levels of ecology: individuals, populations, communities and ecosystems. Two weeks will be spend on ecological modelling, as an important tool for understanding and predicting ecological systems. We will conclude with some actual cases of applied ecology.

III. Study load

This course earns students four credits (7.5 ECTS). The class meets twice a week for two hours. Preparation time is approximately 10 hours per week.

IV. Course materials

For the course the following materials will be used:

1. Essentials of Ecology (4th edition)
   By Colin R. Townsend, John L. Harper and Michael Begon
   Blackwell Publishing, 2014
2. Primary scientific articles (to be obtained via Web of Science).
3. A popular science book of choice (see assignment description)

V. Course organization and requirements

a) General format of class meetings:
There are 56 contact hours, which are spend in lectures, tests, discussion, student presentations and computer labs. Students are expected to spend about 150 hours on homework.

b) Discussion of the textbook chapters
The 14 chapters of the textbook will be discussed during brief interactive lectures. The lecture may also contain questions or exercises that the students can work on during class. For each chapter, study questions are put on moodle. Students are strongly advised to use these study questions as a study tool. The study questions will be identical or similar to the questions that will be asked on the tests. Study questions do not need to be handed in and are not graded.

c) Ecological modelling
8 hours of lectures are devoted to ecological modelling, since it is an important tool for knowledge testing and -development in the field of ecology. The practical work has to be handed in for a grade. The modelling lectures will be given by modelling expert Prof. dr. Johan vd Koppel of the Netherlands Institute for Sea Research (NIOZ).

d) student presentation.
Students will deliver a presentation about a controversial topic in ecology. (see assignment description)

e) Expectations:
Students are expected
- To attend all classes
- To study the subjects treated
- To actively engage in group discussions
- To prepare an interactive presentation about a controversial topic in ecology
- To write a book review
- To present at least 1 news item

VI Evaluation/assessment

The grading of the course will be as follows:

- 3 Exams EOE 60%
- Practical work on ecological modelling 10%
- presentation 15%
- book review 15%
- Failure to hand in non-graded homework assignments or join excursions may lead to grade deductions

Rules regarding absence and lateness:
Repeated lateness will affect the final grade. Missing classes affects the grade as follows: Missing 3 lessons may lead to minor grade deduction, depending on the reasons for absence and whether or not informing beforehand. Missing 4 classes: 5 % grade deduction (of final grade). Missing 5 classes 10 % grade deduction. Missing 6 or more classes: fail the course.

VII Course schedule

Week	Date	Subject
1	Feb 01	- Course introduction - chapter 1: ecology and how to do it
1	Feb 04	- chapter 2: Ecology's evolutionary backdrop -
2	Feb 08	- chapter 3: physical conditions and the availability of resources -
2	Feb 11	- Ecological modelling – guest lecture by prof. Johan vd Koppel
3	Feb 15	- chapter 4: climate and the worlds biomes
3	Feb 18	- chapter 5: birth, death and movement -
4	Feb 22	- Spare session
4	Feb 25	- Ecological modelling – guest lecture by prof. Johan vd Koppel
5	March 01	- **Test 1: chapter 1-5**
5	March 04	- Ecological modelling – guest lecture by prof. Johan vd Koppel
6	March 08	- chapter 6: interspecific competition -
6	March 11	- Lecture chapter 7 -
7	March 15	- Lecture chapter 8 -
7	March 18	- Ecological modelling – guest lecture by prof. Johan vd Koppel

8	March 22	- Lecture Chapter 9
8	March 25	- Lecture Chapter 10
	March 29	*Spring break – no class*
	April 01	*Spring break – no class*
9	April 05	*Easter Monday – no class*
9	April 08	- Spare session
10	April 12	- **Test 2: chapter 6-10**
10	April 15	- Lecture chapter 11
11	April 19	- Lecture chapter 12 -
11	April 22	- Lecture chapter 13 -
12	April 26	- Lecture chapter 14 -
12	April 29	- Extra materials
13	May 03	- Spare session
13	May 06	- **Test 3: chapter 11-14**
14	May 10	- Hand in book reviews - Presentations on book reviews: lessons learned
14	May 13	- *Ascension day – no classes*
15	May 17	- excursion
15	May 20	- excursion

VIII. Course learning objectives

General aim:

The aim of this course is to provide students with a basic overview of the field of ecology. Students should have a basic understanding of the principles of evolution by means of natural selection, be able to distinguish between the four different levels of ecology and define a scientific question at the right level. Further, they should have a

basic understanding of important ecological principles, such as succession, competition, predator-prey relationships and reproductive strategies.

Learning goals:
After following this course the students are able to:

1. Explain the interdependence between ecology and evolution
2. Explain how the characteristics of ecological niches are determined by the organisms response to conditions and resources in its environment.
3. Explain the basics of population dynamics and make simple calculations.
4. Appreciate the significance of interspecific competition in the structuring of communities
5. Describe the principles and give examples of different forms of cohabitation
6. Describe the effect of predation on community structures
7. Explain the relation between the structure and stability of food webs
8. Describe biodiversity patterns and explain how biodiversity is governed by resources and interactions.
9. Understand the basic fluxes of energy and matter through ecosystems and make simple calculations.
10. Understand the possibilities and restrictions of ecological modelling and be able to generate a simple ecological model.
11. Explain the economic value of the various products and functions of ecosystems and make a rough calculation of this value
12. Perform a literature study on an applied ecological topic and present this in the form of a 30 min oral presentation
13. Summarize the contents of a primary scientific literature article and present these in a short presentation