UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Biology and Biology Teaching - M-Z

2425-3-G8501R045-G8501R071M-MZ

Course title

BIOLOGY – FUNDMENTALS AND DIDACTICS WITH LABORATORY

Topics and course structure

Synthesis of the program

-The basis of Biology

-Biological systems: from cells to organisms

-The biological world: environment, evolution, biodiversity

-Ecology and environmental education

Detailed program

The main topics of Biological, Natural and Environmental Sciences will be part of the course, following the proposed scheme:

- Definition of life
- Organic molecules and the chemistry of life
- Procaryotes and eucaryotes
- Animal and plant cells organisation
- Metabolism
- Cell division: mitosis and meiosis
- Inheritance of characters

- From single cells to complex structures: tissues and organs
- General function and structure of the human body
- Structure and function relationship: how the environment plays its role.
- Taxonomy and classification of the organisms
- Biological evolution
- Didactic of evolution
- The history of life
- The evolution of humans
- Fundamental aspects of biological systematic
- Fundamental features of plants
- Fundamental features of animals
- Ecology and environmental education
- Science communication

Objectives

Biological structures and functions, evolution and environmental relationships are the core topics of the course.

Main objects are:

1. to know disciplinary contents and the appropriate scientific language
2. to learn the means for communicating the contents and the ways to propose them to the children of infant and primary school
3. to localize the contents into the environment, within evolution and ecological relations
4. to approach reading

Methodologies

Teaching form comprises:

- 28 lessons of 2 hours in person which alternate delivered didactics and interactive teaching; 2 lessons will be dedicated to verify the acquisition of knowledge and methodologies;
- 10 hours of lab activities in person.

Online and offline teaching materials

Slides, lessons recordings and supplementary materials discussed in classroom, and all additional material (e.g., videos, books, scientific papers) suggested during the lessons.

The teachers make available additional and alternative materials to support non-traditional students in studying and preparing for the exam (full recording of the in-person lessons and what may be specified in the P.U.o.I and agreed upon).

Programme and references

References

1) Padoa-Schioppa E. *Metodi e strumenti per l'insegnamento e l'apprendimento della Biologia* Edises

2) It is necessary to refer to a text containing the main topics of Biology. A detailed high school text could be appropriate, or for a more detailed study, one of the following texts can be used:

- Sadava D et al., Elementi di biologia e genetica – quinta edizione- Zanichelli

- Sadava D et al., Biologia vol. 5. La biologia degli animali - Zanichelli

- Sadava D et al., Principi di Biologia - volume unico - Zanichelli

- Solomon et al., Fondamenti di biologia - EdiSES

3. All the students (attending and non attending) have to read one of the books to be chosen among those indicated by the teacher.

During the course additional material (papers and slides) could be suggested and provided and uploaded on site before the exam.

Assessment methods

Assessment methods will consist of a written exam with closed questions and open questions with oral test upon request either by students or teachers. The questions (closed and open) will focus on the entire program carried out in the classroom, on the laboratory activities and on the chosen book. The closed questions have the objective of verifying the basic knowledges and terminology; open questions aim at verifying overall knowledge, and the ability to describe and connect different topics. There will also be closed questions and an open question on the book chosen by the students, also with a view to teaching planning.

Ongoing written tests with the same overall structure as above are further proposed, as a possible choice by the students.

In order to implement a transparent evaluation of the exam, the general criteria adopted are reported.
The **general criteria** include an overall evaluation of the closed questions (correctness) and open questions in which the following parameters will be taken into global consideration:

- Completeness and accuracy of conceptual processing;
- Critical analysis and synthesis skills;
- Accurate and rigorous use of scientific terminology;
- Ability to apply conceptual connections.
  The evaluation levels will take into account the parameters indicated, which may be present (all or some) in an insufficient, partial, complete, in-depth, coherent/incoherent, exhaustive, advanced or excellent manner.
  The **overall evaluation** will take into account the parameters indicated and used for the evaluation of the open questions (or any oral exams), together with the evaluation of the closed questions.

Students who follow educational activities as part of an Erasmus program can choose to take the exam either in Italian or in English.

Oral and written according to the followings.

Written test with closed and open questions. Closed questions aim at evaluating the basic knowledge and language property; open questions aim at verifying overall knowledge, and the ability to describe and connect different topics.

Oral test will start from the discussion of possible critical points of the written test, and will be centered on the examination of detailed knowledge of all topics of the course (frontal lessons and laboratory). The book chosen by the students in view of a teaching planning will be discussed as well.

Ongoing written and oral tests with the same overall structure as above are further proposed, as a possible choice by the students.

Office hours

To be agreed with students by mail (emilio.padoaschioppa@unimib.it)

Programme validity

One academic year

Course tutors and assistants

Federica Bovio

Claudia Canedoli

Matilde Forcella

Simone Masin

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION | GENDER EQUALITY | REDUCED INEQUALITIES | CLIMATE ACTION | LIFE ON LAND