UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Biology and Biology Teaching - 2

1920-3-G8501R018-G8501R018M-T2

Course title

Biology: fundamentals and didactics with laboratory

Topics and course structure

1) Evolution
2) Biodiversity and human diversity
3) Biodiversity, invasive species and function of ecosystems
4) Ecology and environmental education

Objectives

Biological evolution and environmental relationships are fundamental aspects. Aims of the course are not only biology contents, but also how to propose them in classrooms of kindergarten and primary school.

The ability of connecting the biology contents to evolutionary stories and to ecological relationships is another important aims of this course

Structures and biological functions, biological evolution and environmental relations are the founding nuclei on which all the topics that will be covered in the course will substantially develop.

The main objectives are:

1) to know the disciplinary contents and the scientific language;

2) to learn how to communicate the contents and how to propose them to kindergarten and primary school classes;

3) to be able to locate the contents in the environment, within evolutionary stories and ecological relationships;

4) to motivate future teachers and their pupils to read

Methodologies

Lesson, active teaching methodologies, practical laboratory

Online and offline teaching materials

Slides and supplementary matherials (paper and exercises) discussed in classroom

Programme and references for attending students

Synthetic programme

Biology basis

Biological systems from cells to ecosystems

Biological world: environment, evoultuion and biodiversity

Ecology and environmental education

Detailed Programme

The course will cover the major topics of biology. Tentatively I will follow this pattern:

- Definition of life
- Organic and chemical macromolecules of life
- Prokaryotes and eukaryotes
- How individual cells (animals and plants) are organized

- Cellular metabolism
- Reproduction (mitosis and meiosis)
- Inheritance of characters
- From single cells to complex structures: tissues and organs
- The human body: the apparatuses; how are the general structures? What are they for?
- Relationship between the biological structure and its function: what changes in the different environments?
- Taxonomy and classification of living organisms
- Biological evolution
- Didactics of evolution
- History of life on earth
- Evolutionary history of man
- Fundamentals of biological systematics
- Systematics and characteristics of the plants
- Systematics and characteristics of animals
- Ecology and environmental education
- Science communication

References

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

2) A biology textbook, for consultation is mandatory. Students may use a textbook of high school, otherwise may consult one of the following textbooks (that I use for my lessons):

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  - Hills D et al., Fondamenti di biologia – Zanichelli

  - Solomon et al., Fondamenti di biologia - EdiSES

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

  - Sadava et al., Biologia 3. L’evoluzione e la biodiversità- quinta edizione – Zanichelli

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3) For all the students is mandatory to choose one book among:

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    - Bambarén S. (2013) *Il delfino* Sperling & Kupfer
    - Durrell G. (1990) *La mia famiglia e altri animali* Adelphi
    - Wilson E.O. (2010) *Anthill* Elliot edizioni
    - Cipriani (2011) *Il mistero di Burgess Shale* Feltrinelli
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During the lessons will be indicated and provided additional educational materials (articles and slides) that will integrate the preparation of the exam

Programme and references for non-attending students

Same as attending students

Assessment methods

The exam consists of written and oral examinations with the following methods: written exams with closed questions and open questions. The closed-ended questions have the objective of verifying the basic notions and terminology; open questions aim to assess, in addition to knowledge, the correct ability to exhibit and make connections.

The oral exam will consist of a discussion of any critical issues related to the written test and an interview to verify and deepen the knowledge of the topics covered in class and in the laboratory activities.

In addition, written and oral exams in progress are offered, which, if passed positively, allow enrollment for the first useful exam. The ongoing tests have the same structure as the written / oral exam.

Office hours

Monday at 16.30 after appointment by e-mail

Programme validity

One academic year

Course tutors and assistants

Claudia Canedoli

Simone Masin

Matilde Forcella