

ACADEMIC YEAR: **2019-2020**COURSE: **GENERAL AND APPLIED ZOOLOGY WITH ELEMENTS OF ECOLOGY**

TYPE OF EDUCATIONAL ACTIVITY:

TEACHER: **Prof. Paolo Fanti**e-mail: **paolo.fanti@unibas.it**

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Language: **ITALIAN**ECTS: **8**(7 lessons and 1 tutorials
/practice)n. hours: **68**(56 lessons and 12
tutorials/practice)Campus: **Potenza****Dipartimento di Scienze**Program: **Biotechnologie (L2)**Semester: **I**(starting: 1/10/2019, expected
end: 16/01/2020)**EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES**

Key Topics: Evolution as an unifying paradigm of biology. Animal Biodiversity, Taxonomical Classification and main body plans in the Animal Kingdom. Main physiological solutions and strategies in the different animal taxa and their taxonomic, evolutionary and ecological aspects. Knowledge of key ecological principles, population dynamics, structure and function of communities and ecosystems. Anthropogenic impacts on ecosystems. Management and conservation of biological resources in a framework of sustainable development.

At the end of the course, students should be able to: a) appreciate the complexity of biological organization and to address scientifically controversial issues in a rational way; b) explain animal diversity in terms of biological function and effects of natural selection; c) analyze and report on topics learned; d) assess the scope of animal biology and understand relationships and applications in other study areas, as they relate to the evolution, function, behavior and ecology of animals.

PRE-REQUIREMENTS

Previous attending of the courses of *Biologia generale* (General Biology), *Botanica* (Botany), and *Fisiologia* (Physiology) is strongly suggested

Syllabus:

Introduction (1 hours of lessons): general aspects and organization of the course

Evolution (11 hours of lessons): Mechanisms of evolution, natural selection, adaptation. Darwinism, neo-Darwinian synthesis and advances in evolutionism. Concept of species and speciation, micro- and macro-evolution. Evo-Devo. Epigenetic aspects of evolution.

Animal Physiology (18 hours of lessons): Energy metabolism. Homeostasis and body temperature. Physiological systems: nutritional, respiratory, circulatory, excretory, skeletal/motor, nervous, sensorial, endocrine, reproductive. Elements of embryogenesis and morphogenesis.

Zoological systematics (8 hours of lessons + 12 hours tutorial/practice): Systematic taxonomy and classification. Animal evolution. Main invertebrate phyla and their features. Main vertebrate taxa and their features.

Ecology (10 hours of lessons): Organization, structure and properties of ecological systems. Physiological ecology as related to environmental conditions and resources. Reproductive and life strategies. Population structure and dynamics. Competition, predation and foraging. Species stability and abundance. Community structure and succession. Energy flux and matter cycles. Food chains and trophodynamics.

Applied zoology and ecology (8 hours of lessons): Sustainability, resource exploitation and agriculture. Integrated control and management of medical, agricultural and veterinary pests. Conservation biology. Transgenic organisms and their environmental impact. Climate change and impact on ecosystems.

TEACHING METHODS

The course activities total 68 hours, 56 of which as theoretical lessons and 12 hours as classroom/laboratory tutorials.

EVALUATION METHODS

Two main options are offered to the students, in relation to their regular attendance of the lessons or not.

For students with regular attendance of the lessons. The evaluation will be divided in three parts: a) learning checkpoints during the course (through multiple choice tests and other written tests) to evaluate learning and comprehension of the basic concepts; b) written reports on scientific topics (chosen by the student in a list of proposals), to test the ability to analyze and address complex scientific issues in a rational way; c) a final oral

examination to evaluate the ability of connecting the basic concepts learned, to explain animal diversity in terms of both biological function and as a result of evolutionary history, to understand relationships and application of the learned concepts in other biological and biotechnological study areas, as they relate to the evolution, function, behavior and ecology of animals. Each of the three evaluation parts will be graded as 10 points over the total of 30 points.

For students without a regular attendance of the course: a) before the final oral examination, the student should prepare and submit two written reports on scientific topics, chosen by the student in a list of proposals, to test the ability to analyze and address complex issues in a rational way; b) a final oral examination to evaluate the ability of connecting the basic concepts learned, to explain animal diversity in terms of biological function and as a result of evolutionary history, to understand relationships and application of the learned concepts in other biological and biotechnological study areas, as they relate to the evolution, function, behavior and ecology of animals. The written reports will be graded on 10 points, while the oral examination will be graded on 20 points. The final grade will be the sum of the two scores.

TEXTBOOKS AND OTHER ON-LINE EDUCATIONAL MATERIAL

Evolution: Pievani T. (2010) *La teoria dell'evoluzione*, 2nd edition, Il Mulino or Coyne J. A. (2011) *Perché l'evoluzione è vera*, Codice or Zimmer C. (2013) *Le infinite forme. Un'introduzione alla biologia evoluzionistica*, Zanichelli

Animal Physiology and Systematic Zoology: Hickman, Roberts, Keen, Eisenhour, Larson, l'Anson, (2016). *Zoologia*, 16th edition, McGraw-Hill; or Westheide, Rieger (2011). *Zoologia sistematica*. Zanichelli

Ecology: a) Smith & Smith (2017). *Elementi di Ecologia*, 9th ed. Pearson Paravia

Other educational material will be given to the students during the course

INTERACTION WITH STUDENTS

Visiting hours: every Monday from 15 to 16, Tuesday from 18 to 19, Thursday from 17:30 to 18:30 and Friday from 11:30 to 12:30. Students can also ask to be received for additional questions and informations, at the room 3A 307, or send an e-mail, addressing at paolo.fanti@unibas.it.

EXAMINATION SESSIONS (FORECAST)

Except in August, an examination session is expected every month, with two sessions at the end of the semester. During the semesters, the examination sessions are only for "studenti fuoricorso" (i.e., students who attended the course in previous years).

The exact dates for the exam sessions can be found at the following link (sorry, at the present time, only in italian):

<https://unibas.esse3.cineca.it/ListaAppelliOfferta.do;jsessionid=>

SEMINARS BY EXTERNAL EXPERTS YES NO

ADDITIONAL INFORMATION
