KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI

UNIWERSYTET JAGIELLOŃSKI W KRAKOWIE

UNIA EUROPEJSKA
EUROPEJSKI
FUNDUSZ SPOŁECZNY

SOCIETY – ENVIRONMENT - TECHNOLOGY

Course description

2012/2013

Course title: **Evolution of natural systems**

Course language: ENGLISH

Course type: **facultative – limited choice**

Year of study, semester: **III**

Name of co-ordinator(s): **Jan Kozłowski**

Collective point (involve point 10,12,17 - 10. Type of course, 12. Number of hours, 17. Assessment methods and pass requirements)

Type of course: **lectures (8 h), exercise classes – computer simulations in groups of 12 students (2 h); seminars (4 h) in the form of mini-conference; tutorials in small 6 student groups (2 h)**

Lecture – tutors: Prof. Bernard Korzeniewski, Prof. Jan Kozłowski

Number of hours: **8;** semester: **winter**

Method of evaluation: **Test with questions checking not only knowledge, but mainly understanding. A few open questions may be added, depending on the number of participants. The test will cover knowledge from all lectures, acquired by self-learning, on tutorial meetings and seminars.**

Condition of credits: **60% of final grade; minimum 50% of maximum possible number of points as pass requirement**

Classes – tutor: .....

Number of hours: ……semester: ……..

Method of evaluation:.....

Condition of credits:.....

Laboratory - tutor: .....

Number of hours: ……semester: ……..

Method of evaluation:.....

Condition of credits:.....

Tutorials – tutors: Dr Marcin Czarnołęski, Prof. Jan Kozłowski

Number of hours: **2** semester: **winter**

Method of evaluation: **Active participation in meetings, activity and precision in email correspondence**

Condition of credits: **minimum 4 points as pass requirement; presence at each of two scheduled meetings 1 point, activity during each meeting 0-2 points, other activities 0-3 points.**

Seminars – tutors: Dr M. Czarnołęski, Prof. J. Kozłowski

Number of hours: **4** semester: **winter**; in the form of one day mini-conference

Method of evaluation: **Active participation at two levels – presentation and participation in discussion**

Condition of credits: **minimum 8 points as pass requirement; presence – 4 points, activity in discussion 0-2 points, presentation or poster 0-10 points.**

Exercise classes – tutor: Dr Marcin Czarnołęski

Number of hours: **2** semester: **winter**

Method of evaluation: **Active participation**

Condition of credits: **minimum 1 point as pass requirement; presence 1 point, activity 0-2 points.**

Industrial placement – tutor:.....

Number of hours: ……semester: ……..

Method of evaluation:.....

Condition of credits:.....

Additional information about method and condition of credits: Each student will get evaluation sheet, where participation at seminars, exercise class and tutorials will be noted together with activity evaluation during these events.

Pass requirements: not less than 50% from the test, minimal required points from other components, at least 20 points from all other components. Final grade: 60% test, 40% points from all other components.

Prerequsites: Basic knowledge of biology at high school level. Some students may require additional tutoring in genetics.

Objective of the course / expected learning outcomes:

Knowledge: Students should know and understand basic mechanisms and outcomes of the evolution of Universe and biological evolution. They should understand biological roots of human conscious, behavior and culture.

Abilities: Students should be able to capture basic differences in the mechanisms of three evolutions: cosmic, biological and cultural. They should be able to read critically texts on biological evolution, and to defend evolutionary theory against attacks of creationists and intelligent project prophets.

Attitude: Understanding basic difference between cosmological, chemical and Darwinian evolution. Understanding crucial role of Darwinian evolutionary theory for biology; students should be eager to defend it. They should acquire a custom of looking at biological and social phenomena through the glasses of evolutionary theory.

Teaching methods:

Lectures, seminars, simulations, discussions. Students will read/watch/listen recommended printed and Internet material, tailored depending on their background, to prepare for seminars, tutorials and discussions. Some recommended texts will question evolutionary theory (Intelligent Project concept) to teach critical thinking about the subject.

Full description of the course / course contents:

The course will start from cosmological evolution (discipline: physics, chemistry and astronomy) and chemical evolution leading to the origin of first replicating unit (discipline: chemistry) then most of time will be spent on biological evolution (discipline: biology), and finally some basics will be taught on biological roots of human conscious, behavior, culture and artificial intelligence (disciplines: biology, psychology, sociology, anthropology, information science). Studying cosmological evolution will allow to understand the origin of Earth as a cradle of life. Then ideas on natural origin of life will be presented, with the focus on the feature of living things that allow biological Darwinian evolution. Current state of evolutionary theory will be presented, with the focus on the mechanisms that allowed the evolution of conscious, culture and human behavior (sexual selection, kin selection, evolution of cooperation). Finally, current views on anthropogenesis and on switch from biological to cultural evolution will be presented to the students and studied by the students. The leading question on human evolution will be: Modern societies – educated people with Paleolithic brains and minds?

Short description of the course:

Cosmological, chemical and biological evolution; biological roots of cultural evolution. The origin of Earth and life on earth; features of living things making Darwinian evolution unavoidable; biological evolution based on random mutations and natural selection; sexual selection, kin selection and the evolution of cooperation; anthropogenesis and cultural evolution; biological roots of human conscious, behavior and culture.

Recommended reading: This point may evolve until October.

Basic reading:

1. B. Korzeniewski – Three Evolutions (Free access translation of „Trzy ewolucje", Małopolska Oficyna Wydawnicza Korona, 1998, with some changes made in 2008 available at http://www.scribd.com/doc/32382711/Trzy-Ewolucje-Bernard-Korzeniewski).

2. B. Korzeniewski – From Neurons to Self-Consciousness: How the Brain Generates the Mind, Gateway Books, 2010 (Translation of „Od neuronu do (samo)świadomości", Prószyński i S-ka, 2005).

3. J. Avery – Information Theory and Evolution – World Scientific, 2003 (selected chapters)

4. Stephen Stearnes lectures on evolution, http://academicearth.org/courses/evolution-ecology-and-behavior

Additional Reading (recommended items will depend on the background of particular participants):

1. Stearns & Hookstra – Evolution – Oxford University Press, 2005 (selected chapters)

2. Andrew Whiten – The Evolution of Culture, http://darwin.st-andrews.ac.uk/documents/whiten.pdf

3. J.L. Casti – Paradigms Regained – Abacus, 2001 (chapters)

4. J. Diamond:

   a) The Third Chimpanzee: The Evolution and Future of the Human Animal (1991)

   b) Why is Sex Fun? (1997)

   c) Guns, Germs, and Steel: The Fates of Human Societies (1997)

   d) Collapse: How Societies Choose to Fail or Succeed (2005) – lecture http://www.youtube.com/watch?v=IESYMFtLIis

5. Matt Ridley:

a) The Red Queen: Sex and the Evolution of Human Nature (1993)

b) The Origins of Virtue: Human Instincts and the Evolution of Cooperation (1996)

c) Genome: The Autobiography of a Species in 23 Chapters (1999)

d) Nature via Nurture: Genes, Experience, & What Makes Us Human (2003)