



SOCIETY – ENVIRONMENT – TECHNOLOGY

Course description form

2012/2013

Course title: Fundamentals of sustainable development

Course language: ENGLISH

Course type: facultative – limited choice

Year of study, semester: Year 2–4, Winter Semester

Name of co-ordinator(s): Prof. dr hab. January Weiner

Collective point:

Type of course :

Lecture – tutor: Prof. dr hab. January Weiner

Number of hours: 13 **semester:** 3

Method of evaluation: essays, continuous evaluation

Condition of credits: Active participation in seminars; obligatory delivering of two written essays: (1) at the beginning of the course (about 500–800 words) and (2) at the end of the course (1200–1500 words).

Classes – tutor: Prof. dr hab. Jan Hartman

Number of hours: 3 **semester:** 3

Method of evaluation: essays, continuous evaluation

Condition of credits: Active participation in seminars



Additional information about method and condition of credits:

Active participation in seminars: students are obliged to participate in at least four meetings and their participation will be recorded; each student will have to make at least one, 5-min oral presentation based on a critical evaluation of a current environmental issue, with obligatory use of scientific arguments, supported with properly cited sources. The first essay, in the form of a questionnaire, should determine the initial background knowledge of the students; the second essay covers the whole material (including the topics presented by Prof. Hartman) and it should demonstrate the progress in students' understanding of the topics presented.

Prerequisites: None

Objective of the course / expected learning outcomes:

Knowledge: The participants should gain the knowledge and understanding of current global environmental issue based on natural sciences.

Abilities: The students are able to search for and to critically evaluate the information on global environmental problems; they are able to differentiate between scientific facts (data, theories) and human values (attitudes, goals).

Attitudes: Students representing different disciplines should gain respect and understanding for scientific methods/research approaches used in other fields. The participants with a background in natural sciences will appreciate social/psychological/economical aspects of environmental issues. The adepts of humanities will gain more confidence in natural sciences.

Teaching methods:

Lectures, seminars, practicals

Full description of the course / course contents

The course consists of one introductory meeting and five sessions (3 hrs each). The topic of each session will be announced at introductory meeting and the basic readings will be made available; students are expected to do their own literature search and preparations. Each session will start with a short presentation by an expert, followed by student presentations and discussions and/or practicals, involving critical selection of published information, simple computer simulations, etc. The major topics include:

- (1) **What does it mean “development”?** Human needs, human rights, human ambitions; demographic doom; how to define the basic levels of survival, comfort, luxury. Possible individual study topics: (a) Simulate age structure of a zero-growth, long-living human population, based in a simple model (e.g. Leslie matrix), easily available data (statistical yearbooks) and spreadsheet calculations. (b) Compare per capita consumption of energy (all) and energy of fuels today and in the past in various countries of the World. (c) Compare fuel consumption per vehicle in Europe and in the U.S.A. during 20th and 21st centuries.
- (2) **Limiting resources.** Food, water, energy, space; maximum possible rates of resource acquisition on Earth (currently); prospects and limits for gaining access to more resources or to develop efficient recycling technologies in the future – global scale. Possible individual study topics: (a) Identify regions where on earths the shortage of particular resources is most severe. (b) Estimate the area of arable land sufficient to cover national food and energy needs for various countries, including Poland – based on easily available data. (c) Discuss the inevitable conflict between food and biofuel production (cases: Mexico, Brazil).
- (3) **Biosphere & ecosystem services.** Natural biosphere cycles; human alteration of the biosphere; global change; biomes in the past and today; ecosystem functions vs. “services”. Possible individual study topics: (a) Estimate the proportion if the Net Primary Production Appropriation by Humans (HANPP) in Poland (based on easily available data) as compared to global HANPP. (b) Find and critically discuss well documented examples of ecosystem services (local scale) in temperate climatic zone.
- (4) **Human hierarchy of endangered values.** Topic will be covered by expert in ethics philosophy (Prof. Jan Hartmann). Exemplary problems to tackle: Landscape integrity and biodiversity vs. recreation, entertainments and electronic gadgets; Wilson’s “biophilia”. Gaia, New Age, etc: rationalism vs. mythology. How to promote sustainable



behaviors taking into account biological basis of human nature? How to discriminate between declared and really preferred values?

- (5) **Controversies and compromises.** Demographic control; migration of people; nuclear energy; GMO; reconciliation (Rosenzweig's "Win-win ecology"). Possible individual study topics: (a) Pros and cons for demographic control methods. (b) Pros and cons for nuclear energy. (c) Pros and cons for GMO. (d) Estimate the extent of contemporary "migration of people": attempt a prognosis of future migrations. (e) How feasible is the idea of "Win-win ecology"?

The exact list of topics may be adjusted to the participants postulates.

Short description of the course (max. 70 words):

The course encourages scientifically based and critical attitudes concerning such concepts as "development", "sustainability", "Limited and renewable resources", "ecosystem services", "global change". Basic global ecological problems will be presented in terms of natural sciences and confronted with their image in popular public opinion.

Recommended reading:

Michael L. Rosenzweig (2003). *Win-Win Ecology: How the Earth's Species Can Survive in the Midst of Human Enterprise*. Oxford University Press

Edward O. Wilson (1984). *Biophilia*. Harvard University Press.

Paul R. Ehrlich, Anne H. Ehrlich, 1990. *Population explosion*. Simon and Schuster.

Avery, John. (2005). *Science and Society*, 2nd Ed. (PDF, 375 pgs.).

Copenhagen: H.C. Orsted Institute:

<http://www.paricenter.com/library/papers/scibk1.pdf>

Statistical yearbooks.

Research papers from current scientific journals.

Scientifically valuable sources in Internet, incl. Wikipedia.