UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Managing Impact of Production On The Environment

2627-1-F7603Q005-F7603Q00502

Aims

The module ‘Managing impact of production on the environment' aims at providing knowledge and skills regarding the concept of planetary boundaries and of the Anthropocene. Classes will discuss ecology as tool for understand the system Earth and the interconnections among different subsystems (Lithosphere, Atmosphere, Biosphere, Hydrosphere and Anthroposphere).
Case studies will be analysed and discussed during sessions common to the other two modules to provide the necessary interdisciplinary understanding of the topics covered in the course.

Objectives

The module will focus on the close interconnections between the various components of the Earth system and on how human activities can alter its dynamics.
Students are invited to consult the syllabus of the entire course for details regarding learning and skill-related objectives.

Knowledge and Understanding (Dublin Descriptor 1)
At the end of the course, the student understands:
• definition of the Anthropocene;
• definition and properties of systems and socio-ecological systems;
• understand the concept of planetary boundary;
• understand the concept of tipping point;
• understand the concept of Holling cycle;
• understand the concept of "Environmental surprise";
• human alteration of biogeochemical cycles;
• ecological footprint;
• ecosystem services.
Furthermore, students acquire, review, and strengthen their knowledge regarding:
• the interconnected environmental-ecnomical-social-ethical environment complexity;
• how the resource improper use influences the Earth systems;

• the resources distributions between different environmental compartments;

Applied Knowledge and Understanding (Dublin Descriptor 2)
At the end of the course, the student will be able to:
• discuss about the concept of the Anthropocene;
• discuss about the sustainability;
• evaluate the ecological footprint for individual or nation level;
• list the planetary boundaries.

Making Judgements (Dublin Descriptor 3)
At the end of the course, the student will be able to:
• identify which resources are the most critical ones and will be the most critical ones;
• identify the impact of externalities om the environment and humans;
• identify strategies for minimizing socio-economical-environmental negative effects;
• independently choose the most appropriate methodological, technological, or modeling approach to assess and solve problems related to resources;
• integrate economic needs into an interdisciplinary framework (chemistry, biology, geology, ecology, physics, law, economics) to address complex environmental problems;
• critically analyze scientific literature and technical-regulatory documents and reports;
• independently evaluate policies, plans, and programs (legal, economic, energy), including in terms of sustainability and the UN Agenda 2030;
• independently develop the project and methodology for the final exam, critically evaluating the results obtained and integrating them with scientific literature.

Communication Skills (Dublin Descriptor 4)
At the end of the course, the student will be able to:
• be able to clearly and concisely explain, with appropriate language, the main environmental issues related to planetary boundaries;
• interact and collaborate with third parties.

Learning Skills (Dublin Descriptor 5)
At the end of the course, the student will be able to:
• be able to apply acquired knowledge to determine the best practices in future policies;
• be able to apply the acquired knowledge to new areas, different from those covered in the course, independently integrating it with other sources of knowledge;
• consult international scientific literature, databases, and technical reports from research centers, local authorities, governments, and international organizations;
• work both in groups and independently, using the scientific method as a working tool.

Contents

• Basics of Ecology.
• Geological time and the Anthropocene.
• Nine environmental boundaries.
• Ecosystem services, Ecological footprint and LCA.

Detailed program

• Elements of ecology.

• Geological time.
• The Anthropocene debates.
• Concept of systems and complexity of ecological systems.
• Limits and tipping point.
• Environmental surprises.
• Planetary boundaries and doughnuts economy.
• Ecosystem services, ecological footprint and Life Cycle Assessment.

Prerequisites

Basic notions of ecology.
Basic notions of environmental sustainability.

Teaching form

4 CFUs of mixed theoretical and interactive lessons (32 hours)
• 8 two-hour lectures, in person, mostly frontal teaching and discussion in class, Delivered Didactics.
• 4 two-hour lectures, online, mostly frontal teaching and discussions, Delivered Didactics.

1 CFU, of mixed didactics in the classroom (16 hours).
• 4 two-hour lectures, in person, including group presentations, group debates, discussion of relevant case studies and reading of relevant material in class, Interactive Teaching.

Attendance to lectures and interactive exercises is highly recommended.

Textbook and teaching resource

• Slides
• Notes shown during lectures and additional material on selected topics, *i.e.*, scientific articles, made available on the e-learning website of the course.

Semester

I semester (October - January)

Assessment method

The final exam consists of a single written exam at the end of the course, which comprises the discussion of various topics covered in The course within the three modules, with an emphasis also on the connections between concepts and processes, such as to arrive at a critical evaluation of work from the point of view of planetary

boundaries and responsible use of renewable and non–renewable resources. The final exam could include in-group activities focusing on the presentation and discussion of assigned case studies.
The assessment will evaluate the student's ability to understand and integrate the knowledge acquired in the three modules, critically discuss case studies, use appropriate scientific terminology, and provide a reasoned evaluation in relation to planetary boundaries and the responsible use of renewable and non-renewable resources.
The final score will be between 18/30 and 30/30 cum laude, based on the overall assessment considering the following criteria:
• knowledge and understanding;
• ability to connect different concepts;
• autonomy of analysis and judgement;
• ability to correctly use scientific language.

Office hours

Mondays, between 4.30 and 6.00 pm, after scheduling an appointment *via* phone or e-mail.

Sustainable Development Goals

QUALITY EDUCATION | SUSTAINABLE CITIES AND COMMUNITIES | RESPONSIBLE CONSUMPTION AND PRODUCTION