BIR1230 Introduction to biosphere engineering

[45h+15h exercises] 5 credits

This course is taught in the 1st and 2nd semester

Teacher(s): Philippe Baret (coord.), Pierre Defourny, Bruno Delvaux, Joseph Dufey, Alain PEETERS
Language: French
Level: First cycle

Aims

This course aims the initiation of the students to the important stakes related to the biological, agronomical and environmental engineering; to discern the role of the futur bio-engineer and to acquire the basic concepts essential to the analysis and management of ecosystems. It should bring the students to:
- understant the technical and scientific acts of a bio-engineer in a framework of wich's dimentions go beyond those of the engineer sensu stricto.
- acquire the basic concepts of the analysis of the air-water-soil interactions and of the global functioning of ecosystems.
- understand the bio-geochemical cycles (water, carbon, nitrogen) and the global funtioning of their compartments, especially the soil.

Main themes

The course proceeds from actual stakes related to the biological, agronomical and environmental engineering and will approach the following themes:
- the bio-geochemical cycles of the biosphere (water, carbon, nitrogen); enrgetic flows.
- notions of bio-climatology, classification of climats, climatic indicators.
- basic notions of ecosystems (biotopes and biocenoses, trophic chains); food chains; production and productivity.
- sustainable development; notions of equilibrium and imbalance; notions of vulnerability; biodiversity and the conservation problematic; pollution and tracability problems.
- role of the soil as a reactor in the functioning of ecosystems: water and mineral elements storage, alteration and acidification; notions of resilience, mobility of biogenous elements and bio-pedological cycles; storage and mobility of contaminants.
- impact of the human being on the functioning of the ecosystems and on the soil.

Content and teaching methods

The basic principles will be taught by means of concrete examples related to the biosphere engineering. For example: starting from the human nutrition seen globally, different concepts will be taught: trophic and food chains, energetic flows, productivity, bio-geochemical cycles (xater, carbon, nitrogen), functions of the soil compartment such as storage, mineral supply...
The learning process wiil be based on a problem-approach, where the basic concepts are acquired through an analysis of the stakes and a perspective view of the concepts.

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

Evaluation : continuous
Support : P.J. Jarvis (2000) Ecological Principles and Environmental Issues. Pearson Education Ltd., Limbourg, 303 p.

Other credits in programs

BIR12BA	Deuxième année de bachelier en sciences de l'ingénieur, orientation bioingénieur	(5 credits)	Mandatory