

2.00 credits

30.0 h

Q1

Teacher(s)	Declerck Stephan ;
Language :	French
Place of the course	Louvain-la-Neuve
Main themes	<p>Different aspects of environmental microbiology will be explained and discussed :</p> <ul style="list-style-type: none"> <li>- introduction to environmental microbiology : microbial ecology before and after the development of molecular tools, microbial diversity (including Archaea), classification of microorganisms based on their phylogenetic signature(s) or metabolism</li> <li>- overview of tools used to study microorganisms in situ</li> <li>- extensive illustration of the ability of microbes to live in complex communities (biofilms) and adapt to a great variety of environments, including soil, freshwater, oceans, extreme habitats, contaminated environments, eukaryotic organisms</li> <li>- how environmental microbiology can be translated into biotechnological and industrial applications</li> </ul>
Learning outcomes	<p><b>At the end of this learning unit, the student is able to :</b></p> <p>This course is aimed at providing the students with fundamental notions of microbial ecology. Microbial ecology has been rapidly evolving for the last 20 years or so due to the development of molecular tools to study microbes in their natural habitat.</p> <p>1 The objective of this course is that students get an up-to-date overview of the phylogenetic and metabolic diversity of environmental microbes, as well as of their role in the main biogeochemical cycles sustaining life on earth.</p>
Evaluation methods	<p>The assessment is based on a written exam which accounts for 75% of the final mark. Students also present the results of their research, orally and with the most appropriate media. A question and answer debate is initiated by all students. Evaluation is done on both the presentation (scientific content and pedagogical qualities) and the ability to answer questions and stimulate the audience. This oral presentation is obligatory and evaluated for 25% of the final grade for this course.</p>
Teaching methods	<p>The teaching method is based on a theoretical course given by the teacher. The last hours of classes are devoted to oral presentations by students. They select a particular ecosystem / biotope (environment) and describe the main microorganisms and their potential role in biotechnology. This presentation is followed by a debate involving all the students and the teacher.</p>
Content	<p>Theoretical lectures will cover 20 hours. The remaining 4 hours will be dedicated to oral presentations by the students on topics covering specific aspects of microbial ecology.</p> <p>The course will include the following chapters :</p> <ul style="list-style-type: none"> <li>- Introduction to environmental microbiology : history of microbial ecology, microbial phylogeny and the " tree of life ", metabolic diversity among environmental microbes</li> <li>- Techniques used to detect and study microbes in situ</li> <li>- Microbial consortia (biofilms), cell-to-cell communication, transfert of mobile genetic elements</li> <li>- Soil and rhizosphere microbiology</li> <li>- Aquatic microbiology (freshwater, oceans)</li> <li>- Subsurface microbiology (aquifers, oil fields, )</li> <li>- Microbial adaptation to extreme environnements</li> <li>- Biotransformation and biodegradation of pollutants</li> <li>- Symbiotic / syntrophic relationships with eukaryotic organisms</li> <li>- Biotechnology and bioprospection</li> </ul>
Inline resources	Moodle

Other infos	<p>Basic knowledge in microbiology (genetics, cell metabolism) Marks Students will prepare a lecture for the other students on a specific topic of microbial ecology (to be discussed with the teacher), for which they will get marks. In addition, at the end of the course, there will an oral examination with a few questions covering different chapters of the course.</p> <p><b>Support :</b>                  Notes taken by the students, PowerPoint presentation of the course (which will be available on iCampus [<a href="http://www.icampus.ucl.ac.be/">http://www.icampus.ucl.ac.be/</a>]).                  References of books and chapters will be communicated to the students at the course.</p>
Faculty or entity in charge	BIOL

**Programmes containing this learning unit (UE)**

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Biology of Organisms and Ecology	BOE2M	2		