

Faculty of Biological, Agronomic and Environmental Engineering

BIR1323

Microbiology

[30h+15h exercises] 3.5 credits

This course is taught in the 2nd semester

Teacher(s): Jacques Mahillon
Language: French
Level: First cycle

Aims

The two main objectives of this course are:

1. Acquisition of basic knowledge and main concepts in general microbiology.
2. Practical exercises of the main techniques related to the study and control of microorganisms.

Main themes

In order to fulfil the proposed objectives, the following themes are developed through an integrated approach:

- The microbial world in the reality of its size and diversity, the multiplicity of its habitats and relationships with the environment, including the other organisms.
- The world of viruses and bacteriophages and the methods developed for their use or their control.
- The potential of genetic adaptation of microbes and, in particular, the specificity of their sexuality.
- The past, present and future use of microorganisms in biological engineering.
- The strategies allowing the most efficient control of microorganisms, using either prophylactic or curative methods.
- The industrial use of microbes in the fields of agro-food industry, environment or medicine.

The main objectives of the practical work, mostly performed by the students themselves, are: i) macroscopic and microscopic observations of bacteria, fungi and bacteriophages, and ii) the use of the basic techniques of descriptive microbiology.

Content and teaching methods

This course includes a series of theoretical lectures and a practical work where the students get acquainted with the basic techniques used in microbiology. This course contains eleven distinct parts. However, at several occasions during the lectures, connections and links are made between the different sections in order to give a comprehensive and coherent overview of the matter. The first part gives an historical account of microbiology including the various tools and approaches used in this field. Parts two and three deal with the notions of bacterial growth, nutrition and metabolism. In the fourth part, the concepts associated with bacterial genetics are detailed, in particular the phenomena of genetic rearrangements and transfers. This part is continued in the fifth section where a description of the main discoveries and corresponding techniques of genetic engineering are detailed. Prokaryotic and eukaryotic viruses are described in part six. The diversity of the bacterial world is explained in part seven. Parts eight and nine focus on microbial commensalism and symbiosis while part ten is dedicated to bacterial opportunism and pathogenicity, including the prophylactic and curative methods applied to these pathogens. Finally, part eleven gives an overview on the fields of food and industrial microbiology.

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

Precursory courses General Biology, Introduction to Biochemistry and Introduction to Genetics

Evaluation At the end of the semester, a general written exam consists into a 4 to 5 question test covering the entire course and aiming to evaluate the understanding, comprehension and integration of the various sections of the course. On a voluntary basis, part of the evaluation can relate to the appreciation of a talk given by the student, in front of the entire audience, on a microbiology subject chosen in agreement with the Teacher.

Support Lecture notes, overhead copies (paper printouts of PowerPoint files) and several reference textbooks. These documents are also available on iCampus [<http://www.icampus.ucl.ac.be/>].

Teaching team The Teacher gives the ex-cathedra lectures while the practical work are organised and supervised by a team including an assistant and a technician.

Programmes in which this activity is taught

BIR2 Bio-ingénieur
BRAS3DS Diplôme d'études spécialisées en brasserie

Other credits in programs

BIR21/A	Première année du programme conduisant au grade de bio-ingénieur (Agronomie)	(3.5 credits)	Mandatory
BIR21/C	Première année du programme conduisant au grade de bio-ingénieur (Chimie)	(3.5 credits)	Mandatory
BIR21/E	Première année du programme conduisant au grade de bio-ingénieur (Environnement)	(3.5 credits)	Mandatory
INCH22	Deuxième année du programme conduisant au grade d'ingénieur civil chimiste	(3.5 credits)	
INCH23	Troisième année du programme conduisant au grade d'ingénieur civil chimiste	(3.5 credits)	