INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES LYON

DPT BIOSCIENCES
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Microbiology

General Microbiology

IDENTIFICATION

CODE : BS-3-S1-EC-COMICRO
ECTS : 2.0

HOURS

Lectures :	14.0 h
Seminars :	0.0 h
Laboratory :	24.0 h
Project :	0.0 h
Teacher-student contact :	38.0 h
Personal work :	12.0 h
Total :	50.0 h

ASSESSMENT METHOD

Lab class report. 30 mn
Written individual evaluation

TEACHING AIDS

Photocopies of the illustrations will be handed out before each lecture.
-slides
-videos

TEACHING LANGUAGE

English

CONTACT

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AIMS

To learn the fundamentals of handling and culture of microrganisms.
To acquire a global view of the microbial world, in nature, wastewater treatment plants, and as pathogenic agents and biotechnological tools.
To learn the essential concepts of genetics and understand the interest of some of them in bacterium identification and industrial microbiology.
To present the fundamentals of ecology, microbiology and genetic engineering.
To present a complete view of bacterial genetics, from the origins until now.

CONTENT

The roots of microbiology, genetics and ecology.
Archae- and Eubacteria; viruses.
The components of the bacterial cell
1. Cell envelope and secretion.
2. Internal structures: nucleide, plasmids, tubulin, actin.
Bacterial chromosome replication and bacterial division, cell cycle
3. External structures: capsule, fimbriae, flagelle. Assembly

Micro-organism diversity, role in ecosystems, bioremediation, food industry

Way of life of microorganisms: free life, biofilm, interactions with higher organism (symbiosis-pathogenesis) Notion of Microbiome. Some examples of pathogenic bacteria.

Basic notions of genetics: genes, alleles, adaptation and mutation.
Exchange of genetic material in bacteria: conjugation, transduction, transformation.

Evolution of microorganisms, short generation time + high selection pressure, high frequency of mutations, emergence of new strains, increased biodiversity. Case study: the emergence of antibiotic resistance and societal impact. The major mechanisms of resistance

BIBLIOGRAPHY

Atlas R. M. and Bartha R. 1997. Microbial ecology: fundamentals and applications (4th edition). Benjamin Cummings.
Griffiths A. J. F., Miller J. H., Suzuki D. T., Lewontin R. C. and Gelbart W. M. 2000. An introduction to genetic analysis. W. H. Freeman.
Hart T. et Shears P. 1997. Atlas de poche de microbiologie. Médecine-Sciences Flammarion.
Lewin B. 2003. Genes VIII. Benjamin Cummings.
Prescott L. M., Harley J. P. and Klein D. A. 2004. Microbiology (6th edition). McGraw-Hill Science.

PRE-REQUISITE

None.