

BIO-477

**Infection biology**

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Cursus	Sem.	Type
Life Sciences Engineering	MA2, MA4	Opt.
Minor in life sciences engineering	E	Opt.

Language of teaching	English
Credits	5
Session	Summer
Semester	Spring
Exam	Written
Workload	150h
Weeks	14
<b>Hours</b>	<b>5 weekly</b>
Lecture	3 weekly
Exercises	2 weekly
<b>Number of positions</b>	

**Summary**

Infectious diseases (ID) are still a major problem to human health. But how do pathogens make us sick? How do they evolve and spread? The discovery and use of antibiotics and vaccination has changed the outcome of some IDs. But resistance mechanisms have evolved and are of major concern.

**Content**

- Impact of infectious diseases (pandemics, epidemics)
- Evolution of pathogens and horizontal gene transfer
- Bacterial infections (intra vs. extracellular bacteria)
- Virulence factors including toxins and secretion systems
- Identification of virulence factors using molecular approaches
- Diarrheal diseases
- Respiratory diseases
- Viral infections
- Symbiosis
- Human microbiota
- Vaccines
- Antimicrobials
- Eukaryotic pathogens including pathogenic fungi
- Bioethical aspects of ID research

**Keywords**

Infection Biology; bacterial pathogens; viruses; eukaryotic pathogens; antibiotics and resistance mechanisms; virulence factors; global impact of infectious diseases.

**Learning Prerequisites****Required courses**

An *Introductory Microbiology* course is a prerequisite.

Exchange students will only be accepted after presentation of a certificate indicating that they have followed a basic microbiology course.

**Recommended courses**

Basic microbiology (prerequisite), immunology, basic cell biology, and genetics and genomics.

### **Important concepts to start the course**

Basic microbiology; knowledge of prokaryotic specialities (ribosomes, cell wall etc).

### **Teaching methods**

Ex cathedra + discussion of relevant publications + exercises

### **Expected student activities**

Participating students are expected to engage in this course by attending lectures, reading additional material, understanding and presenting recent state-of-the-art publications, and completing exercises.

### **Assessment methods**

Written exam

### **Supervision**

Others                      Moodle webpage (EPFL-SV-Master Infection Biology; BIO-477)

### **Resources**

#### **Bibliography**

- "Bacterial pathogenesis: a molecular approach / Brenda A. Wilson ... [et al.]. Year:2011. ISBN:978-1-55581-418-2
- "Microbiology: an evolving science / Joan L. Slonczewski, John W. Foster. Year:2011. ISBN:978-0-393-11824-7
- "Principles of virology" / S.J. Flint ... [et al.]. Year:2009. ISBN:978-1-55581-443-4

#### **Ressources en bibliothèque**

- [Microbiology: an evolving science / Joan L. Slonczewski, John W. Foster.](#)
- [Principles of virology" / S.J. Flint ... \[et al.\]](#)
- [Bacterial pathogenesis: a molecular approach / Brenda A. Wilson ... \[et al.\]](#)

#### **Moodle Link**

- <https://go.epfl.ch/BIO-477>