

BIO-244

Physics of the cell

Persat Alexandre

Cursus	Sem.	Type
Life Sciences Engineering	BA6	Opt.

Language of teaching	English
Credits	4
Session	Summer
Semester	Spring
Exam	Written
Workload	120h
Weeks	14
Hours	4 weekly
Courses	2 weekly
Exercises	2 weekly
Number of positions	

Summary

Living organisms evolve in a physical world: their cells respond to mechanics, electricity and light. In this course, we will describe the behavior and function of cells using physical principles.

Content

Molecular motors
 Ion channels
 Electricity in cells
 Multicellularity and biological patterns
 Biofilms
 Numbers and estimates in biology
 Life at low Reynolds number
 Biopolymers
 Cytoskeleton
 Membrane mechanics

Keywords

Biological Physics
 Quantitative Biology
 Back of the envelope calculations
 Biomechanics
 Mechanobiology
 Cells

Learning Prerequisites**Required courses**

Introductory Biology
 Introductory Physics

Learning Outcomes

By the end of the course, the student must be able to:

- Quantify forces in biological systems
- Identify mechanically sensitive elements in a cell
- Integrate their engineer knowledge in biology

Assessment methods

Written exam

Supervision

Office hours	Yes
Assistants	Yes
Forum	Yes

Resources

Bibliography

Physical Biology of the Cell (Rob Phillips, Jane Kondev, Julie Theriot)
Ressources en bibliothèque

- Physical Biology of the Cell / Phillips

Ressources en bibliothèque

- [Physical Biology of the Cell / Rob Phillips, Jane Kondev, Julie Theriot](#)

Notes/Handbook

The instructors will provide class notes

Moodle Link

- <https://go.epfl.ch/BIO-244>