

PHYS-301

Biophysics : physics of the cell

Manley Suliana

Cursus	Sem.	Type
Biomedical technologies minor	E	Opt.
Life Sciences Engineering	MA2, MA4	Opt.
Mechanical engineering	MA2, MA4	Opt.
Physics of living systems minor	E	Opt.
Physics	BA6	Opt.

Language of teaching	English
Credits	3
Session	Summer
Semester	Spring
Exam	Written
Workload	90h
Weeks	14
Hours	3 weekly
Courses	2 weekly
Exercises	1 weekly
Number of positions	

Summary

In this course we will study the cell (minimum unit of life) and its components. We will study several key cellular features : membranes, genomes, channels and receptors. We will apply the laws of physics to develop models to make quantitative and predictive statements.

Content**Introduction to cell biophysics**

Topics (lectures):

1. Biological membranes: Hydrophobic effect, 2D elasticity (2-4)
2. Molecular events: Ligand binding, ion channel function (5-7)
3. Transport in cellular systems: Diffusive, directed, crowded (8-11)
4. Genomes: Regulation, transcription, networks and circuits (12-14)

Content:

1. Introduction of biological systems and concepts
2. Description of observations and measurements
3. Estimates of relevant numbers / development of quantitative models
4. Exposure to current research articles

Assessment methods

Written exam

Resources**Moodle Link**

- <https://go.epfl.ch/PHYS-301>