CH-312

Dynamics of biomolecular processes

Fierz Beat

Cursus	Sem.	Type
Chemistry	BA6	Obl.
HES - CGC	E	Opt.

Language of teaching	English
Credits	2
Session	Summer
Semester	Spring
Exam	Written
Workload	60h
Weeks	14
Hours	**2 weekly**
Courses	2 weekly
Number of positions	

Summary

In this course we will discuss advanced biophysical topics, building on the framework established in the course "Macromolecular structure and interactions". The course is held in English.

Content

- **Membranes**
  - fusion, fission, membrane deformation
  - diffusion
- **Channels and receptors**
  - ion channels, receptors
  - detection of physical and chemical stimuli
- **Protein folding / substates / dynamics**
  - molecular chaperones and protein folding in the cell
  - conformational fluctuations in protein function and regulation
  - natively disordered proteins
- **Protein machines**
  - motor proteins in trafficking
  - motor proteins in DNA and chromatin transactions
- **DNA binding proteins / transcription**
  - protein DNA interactions
  - search processes in the nucleus
  - dynamics and function of the transcription machinery

Keywords

protein folding, dynamics, molecular machines, DNA, transcription, receptors, membrane, diffusion, trafficking

Learning Prerequisites

Required courses

Macromolecular structure and interactions
Chemical Biology
Chemical thermodynamics

Recommended courses

Chemical Biology

Important concepts to start the course

Protein structure, folding, function and dynamics
Theoretical biophysics, thermodynamics, chemical kinetics
Membranes and lipids

Teaching methods

Ex cathedra and discussions.

Expected student activities

Literature study
Active participation to discussions

Assessment methods

Written exam

Supervision

Others Moodle

Resources

Bibliography

Literature articles / reviews
"Principles of Physical Biochemistry", Van Holde, Prentice Hall
"Physical Biology of the Cell", Phillips, Kondev, Theriot, Garcia, Garland Science

Ressources en bibliothèque

- Find the references at the Library

Moodle Link

- https://go.epfl.ch/CH-312

Prerequisite for

CH-413 Nanobiotechnology and Biophysics
CH-419 Cellular Signalling