EPFL

PHYS-302 | **Biophysics : physics of biological systems**

Rahi Sahand Jamal

Cursus	Sem.	Type
Bioengineering	MA3	Opt.
Ing.-phys	MA1, MA3	Opt.
Life Sciences Engineering	MA1, MA3	Opt.
Physicien	MA1, MA3	Opt.

Language of teaching	English
Credits	4
Session	Winter
Semester	Fall
Exam	During the semester
Workload	120h
Weeks	14
Hours	**4 weekly**
Courses	2 weekly
Exercises	2 weekly
Number of positions	

Summary

Understand and use population genetics, population dynamics, network theory, and reaction network dynamics to analyze and predict the behavior of living systems

Content

Master equation, population genetics, finite populations, genetic drift, stochastic modeling, fluctuating environments

Introduction to networks, dynamics on networks

Biochemical reaction networks, Michaelis-Menten kinetics, cooperativity, autoregulation, feedback and bistability, switches, oscillations, feed-forward loop network motif, stochastic gene expression, causes and consequences of stochastic gene expression, robustness

Keywords

physics of living systems, population genetics, population dynamics, genetic networks, systems biology

Learning Prerequisites

Recommended courses

physics, mathematics, and biology at the introductory university level

Teaching methods

Lectures, paper discussion, problem solving

Expected student activities

attending the lectures, completing exercises, reading and presenting recent papers in the field

Assessment methods

reports

Supervision

Office hours	Yes
Assistants	Yes