
Systems Biology II

BIOINF 4394 (6 ECTS credits)

Overview

This class teaches how methods from mathematical modeling can be applied to biological systems. This includes creating models of biochemical reaction networks, simulation and analysis of their dynamic responses as well as fundamental programming techniques for solving problems of systems biology. Note that “Systems Biology I” covers distinct topics and is **not** a prerequisite for this class.

Goals

- Introduction to the fundamental concepts of biological networks
- Knowledge about biophysical and biochemical constraints and implicit assumptions, principles of enzyme catalysis, open and closed systems, effects of reversible reactions on the overall system as well as multiple time scales.
- Practical experience in deriving kinetic equations and the dynamic simulation of systems biology models as well as subsequent analysis

Requirements

- Weekly participation within the tutorial
- Joint completion of a small project, documentation as scientific essay, and presentation of the project.

Evaluation

- Assignments will have to be submitted in small groups of up to three students. Every team member must be able to demonstrate the results.
- Instructors will check for duplicate solutions and reserve the right to distribute points across all identical solutions.
- Students caught copying solutions can be excluded from the course!
- Work on projects will be in teams of two to three students.
- 50% of the achievable points in both assignments and project are required for passing and participation in the final exam. Points achieved in excess of 60% in assignments and projects will be added as bonus points to the final exam. Bonus points will improve the final exam grade up to 15% of the regular points in the final exam.
- The final exam will be a written test.

Winter Semester 2018/19
Friday 10-12 in Room C215 and
Thursday 10-12 Room A104

Instructors:

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Office Hours: Monday 10-12

Materials

Slides and complementary material will be made available at the ILIAS page about this class.

Recommended literature:

- Palsson. Systems Biology: Simulation of Dynamic Network States. Cambridge University Press, 2011.
- Goodsell. The Machinery of Life. 2nd edition, Springer-Verlag, 2009.
- Koolman & Roehm. Color Atlas of Biochemistry. 2nd edition. Thieme-Verlag, 2005.

Milestones

October 19th 2018

First lecture

November 2nd 2018

First homework assignment due

December 14th 2018

Begin of project work

February 1st 2019

Submission of projects

February 8th 2019

Presentation of projects

February 22nd 2019

Final exam in F119

April 5th 2019

Repetition exam at in F119
