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# Structure and Systems Bioinformatics

## BIOINF 4120 (9 ECTS credits)

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Summer 2019

Mon 10-12, Wed 12-14, A104, Sand 14

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### Overview

The lecture conveys key concepts of structural bioinformatics and systems biology. The first part of the course will cover RNA secondary structure prediction, modeling of protein structures and protein structure prediction. The second part of the course will focus on the main concepts and methods of systems biology, entailing analysis of transcriptomics and proteomics data in the context of biological networks.

### Goals

- Formalize problems in structural bioinformatics and computational systems biology
- Apply standard tools and methods in structural bioinformatics
- Analyze high-throughput omics data
- Work on research questions independently and in a team

### Requirements

- Participation in the weekly problem sessions.
- Individually work on weekly assignment sheets.
- Joint work on a small research project, a written paper on the project and presentation of the project in class.

### Evaluation

- Assignments will have to be worked on individually. We will check for duplicate solutions and reserve the right to not score obvious copies.
- Students caught copying solutions can be excluded from the course!
- Work on projects will be in teams of 2-3 students.
- 50% of the points in both the assignments and the project are required for admission to the finals. Points achieved in excess of 50% in assignments and projects will serve as bonus to the final exam (at most 10% of the points in the finals).
- Depending on the number of participants, the final exam can be either a written or an oral exam.

### Materials

Slides will be handed out at the beginning of each lecture. Materials will be made available at the ILIAS page of the lecture.

Recommended, though not required, textbooks are:

- Branden, Tooze: Introduction to Protein Structure, Garland Science, 1998
- Leach: Molecular Modeling. Principles and Applications, Prentice Hall, 2<sup>nd</sup> ed., 2001
- Berg, Tymoczko, Stryer: Biochemistry, Spektrum, 2003
- Creighton: Proteins – Structures and Molecular Properties, Freeman, 2<sup>nd</sup> ed., 1992

### Key Dates

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**April 15**

Introduction/First Lecture

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**June 27**

Hand-in of projects

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**July 03**

Project presentations in class

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**July 29 to August 9**

Final examinations – individual dates to be scheduled.