

## Block Course Structural Biology and Biophysics

6 weeks, first half of autumn semester, 3<sup>rd</sup> year of studies, 5<sup>th</sup> semester of the curriculum BSc in Biology, 15 credit points are requirement for "Major in Molecular Biology". The aim is to obtain a Bachelor in Biology at the University of Basel in the field of molecular biology or integrative biology.  
<https://www.biozentrum.unibas.ch/bsc-in-biology>.

### Goal

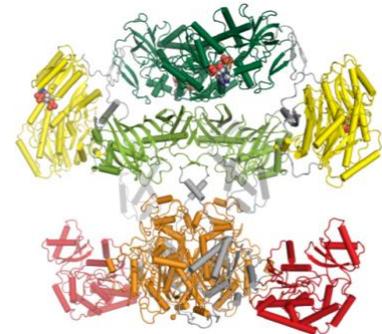
This Block Course will enable students to glean deep insight into the nanoscopic world of biomolecules that drive functional cellular processes. Here, you will gain a fundamental understanding of the cutting-edge computational tools, experimental methods and quantitative analytical techniques being used to resolve biomolecular structures and their interactions correlated across atomic, molecular and cellular length scales.

### Organization

This course consists of three main themes: protein design, theoretical concepts and experimental research. First, students will be introduced to AI-based structural prediction and protein design. Second, you will participate in lectures to learn about the theoretical underpinnings of structural biology and biophysical methods. Third, all students will carry out weekly research projects using different combinations of methods and analyses. As a bonus, students will build and test their own designer proteins.

### Topics

- computational tools including AI-based structure prediction
- protein design, expression and purification
- atomic force microscopy
- cryo-electron microscopy and tomography
- X-ray crystallography
- nuclear magnetic resonance
- surface plasmon resonance
- isothermal calorimetry
- mass photometry



Molecular Machines

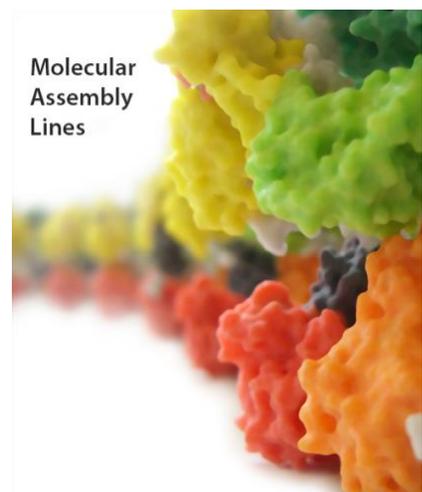
### Requirements

Successful completion of the first two years of the BSc Biology with the module Molecular Biology in the second year. The grade of the module Molecular Biology must be sufficient (at least grade 4). Good knowledge of the main lecture Structural Biology (module Biologie 4).

### Labs

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March 6, 2026



Molecular  
Assembly  
Lines