BIO-212 **Biological chemistry I**

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Cursus	Sem.	Type
Life Sciences Engineering	BA3	Obl.

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

Summary

Biochemistry is a key discipline for the Life Sciences. Biological Chemistry I and II are two tightly interconnected courses that aim to describe and understand in molecular terms the processes that make life possible.

Content

In this course we will learn the properties of biological macromolecules at the atomic level in order to understand their function within the cell. We will dissect therefore the basics of macromolecular structure and how it translates into functional molecular mechanisms. Among the major types of biological macromolecules, including nucleic acids, proteins, lipids and carbohydrates, we will put a major emphasis on proteins - the workhorses of cells. The content of the course will touch the following topics:

- Building blocks: Sugars, lipids, amino acids, oligonucleotides
- Protein structural organization, folding
- Analysis and visualization of proteins
- Protein expression and purification
- Protein structure determination by experimental and computational methods
- Thermodynamics and kinetics of biomolecules
- Methods to measure protein-protein and protein-ligand interactions
- Enzymatic catalysis and reaction mechanisms

Keywords

proteins, lipids, carbohydrates, nucleic acids, structural biology, biochemistry, enzymes, experimental and computational methods, protein folding, biophysics

Learning Prerequisites

Required courses

General Biology, Organic chemistry

Recommended courses
Physics I, II, III

Important concepts to start the course
- Basic understanding of chemical matter
- Basic understanding of thermodynamics
- Basic reaction mechanisms in organic chemistry

Learning Outcomes
By the end of the course, the student must be able to:
- Design experimental workflows for biochemical analysis
- Formalize reaction mechanisms of biological macromolecules
- Formulate questions that adress important biological problems
- Integrate diverse sources of data
- Generalize principles applicable to wide variety of biological problems

Transversal skills
- Assess one's own level of skill acquisition, and plan their on-going learning goals.
- Continue to work through difficulties or initial failure to find optimal solutions.
- Demonstrate the capacity for critical thinking
- Manage priorities.

Teaching methods
- Lectures
- Exercise session accompanying each lecture
- Execises session on bioinformatics and proteins structure visualization tools

Expected student activities
- Attending to classes
- Attendance to exercise
- Class participation

Assessment methods
- written exam

Supervision
Office hours	Yes
Assistant.e.s	Yes
Forum	Yes

Resources

Virtual desktop infrastructure (VDI)

No

Bibliography

- Kuriyan/Konforti/Wemmer - The Molecules of Life

Ressources en bibliothèque

- Find the references at the Library

Moodle Link

- https://go.epfl.ch/BIO-212