

## ENS 210: Computational Biology, Fall 2024

The aim of the ENS 210 course is to provide introduction to the basic concepts around Computational Biology and Bioinformatics, the data science serving to improve our understanding in Biological (or biology inspired) systems.

Within the scope of the course, basic concepts and tools on Bioinformatics and Computational Biology will be taught with an emphasis on the applications. Strong emphasis will be spent on the link to biology.

### Topics

1. Basic Concepts of Molecular Biology; Life, Proteins, Nucleic acids.
2. The Mechanisms of Molecular Genetics; Genes and the Genetic Code, Transcription, Translation and Protein Synthesis, junk DNA and Reading frames, Chromosomes
3. How the Genome is Studied; Maps and Sequences, Specific Techniques
4. The Human Genome Project
5. Molecular Biology Databases on the Web
6. Strings, Graphs and Algorithms
7. Sequence Alignment Algorithms; Global, Semiglobal, and Local Alignment
8. Multiple Sequence Alignment; Star alignment, Tree alignment
9. Database Search; PAM, BLOSSUM matrices, BLAST, FASTA
10. Quantitative and Probabilistic Pattern Matching
11. Protein Ligand Docking
12. Bio-ethics

### Instructor

Emrah Nikerel. email: emrah.nikerel

### Grading, attendance

<b>Exams:</b>	MT1	20 %	November 1st
	MT2/Lab	20 %	November 22
	HW/Q/Project	30 %	weekly, <i>ad hoc</i>
	Final	30 %	January, TBA

**Attendance** is compulsory by the University regulations. **Update**, November 1st: As there is no specific set of rules set by the University, routine ENS210 practices (time-corrected version) will be used:

*4 (for lectures) or 2 (for labs) unexcused absences will be considered legitimate for grade reduction.*

### Books

No specific resource book will be used. There is a plethora of free (as in freely accessible) resources on this topic. A simple google/bing/yahoo/duckduckgo search will provide necessary support.