



BIOTECHNOLOGY

Course Workload		Assessment form (examination/ graded test/ ungraded test)
ECTS	Hours	
3	108	Exam

The course is devoted to an overview of modern achievements in the fields of genetic engineering, protein design, cell technologies, regenerative medicine, including the context of bioinformatics.

Course structure:

1. GENETIC ENGINEERING, SYNTHETIC BIOLOGY

- 1.1. Basic genetic engineering.
- 1.2. Gene delivery, genome editing.
- 1.3. Gene synthesis, high-throughput cloning.
- 1.4. Genome synthesis, synthetic signaling circuits and metabolic pathways.

2. PROTEIN ENGINEERING, DRUG DESIGN

- 2.1. Protein design, peptide design.
- 2.2. Antibody design, directed evolution.
- 2.3. Ligand design, small molecule library creation and optimization.
- 2.4. CAR-T cells.

3. CELL BIOTECHNOLOGY, NEUROTECHNOLOGY AND NEURAL ENGINEERING

- 3.1. Stem cells, regenerative medicine.
- 3.2. Organoids, organ-on-a-chip, 3D bioprinting.
- 3.3. Brain-machine interfaces, neuroprosthetics.

4. APPLIED BIOTECHNOLOGY

- 4.1. Microbial biotechnology, industrial biotechnology.
- 4.2. Plant biotechnology, agricultural biotechnology, biofuel.
- 4.3. Biotechnology of animals, transgenic animals.