

MOLECULAR BIOLOGY AND BIOTECHNOLOGY (2024)

ITMO

120 credits

Professional training

Mandatory courses

- Advanced Biochemistry
- Molecular Oncology
- Basics of Genetic Engineering
- Molecular Neuroscience

1, 2, 3, 4 semesters

12 credits

Elective specializations/modules/courses

- Cytotoxicity Studies
- Visualization of 3D Structures and Tissues
- Principles and Applications of Oligonucleotide Biosensors
- Microorganisms Basics
- Principles of Oligonucleotide Agents that Cleave RNA
- Gene Synthesis
- Microfluidic Technologies
- Atomic Force Microscopy in Biology
- Cell Culture Basics
- Scientific Experiment Basics
- Cell Staining
- Digital Screening of Nanoparticle Cytotoxicity
- Advanced Methods for Nucleic Acid Detection
- Synthesis and Characterization of Nanoparticles for Biomedicine
- 3D Culture Basics
- Design of Peroxidase Mimetic Nanomaterials
- Oligonucleotide-based Gene Therapy
- Modern Methods of Tumor Therapy
- Basics of Working with Plasmid DNA
- Nanoparticle Biocompatibility Investigation
- Enzyme Biosensors for the Food Industry
- Magnetic Composite Materials for Biomedicine
- 3D Bioprinting for Biomedicine
- Multiphysics Modeling in Biomedicine and Biotechnology
- Biosensors and their Applications for Biomarker Detection and Analysis
- Biostatistical Analysis of Microbiota
- Biostatistics in R
- Bacterial Genome Assembly and Annotation

1, 2, 3, 4 semesters

42 credits

54 credits

Fundamental training

- Applied Artificial Intelligence
- Creative Technologies
- Entrepreneurship
- Thinking
- Foreign Language
- Soft Skills

1, 2, 3, 4 semesters

18 credits

Practical training

- Research Internship
- Senior Internship
- Preparation for Thesis Defense and Thesis Defense

1, 4 semesters

54 credits

Optional courses (in English)

- Energy Storage
- Natural Language Processing in Chemistry
- Machine Learning for Chemical Systems
- Computational Chemistry and Modeling of Chemical Systems
- Advanced Methods of Materials Characterization
- Catalysts and Green Chemistry
- Data Product Development Workshop
- Applied Math and Statistics
- Algorithms and Big Data in Chemistry and Materials Science
- Comprehensive Approach to Materials Synthesis
- Alternative Energy Fundamentals
- Nanoengineering and Nanofabrication
- Neural Networks in Chemistry
- Programming of Chemical Tasks
- Advanced Materials for Industrial Applications
- Additive Technologies

1, 2, 3, 4 semesters