**Alexander Butlerov Institute of Chemistry**

**Department of Organic Chemistry**

**Master degree program**

**Cheminformatics and Molecular Modelling**

Chemoinformatics is a focus area of theoretical chemistry at the interface of chemistry, computer science, biology, pharmacology, physics and mathematical statistics, which requires information retrieval from an array of experimental data. Molecular modelling is a collective term for methods for studying the structure and properties of molecules by computational methods followed by visualizing the results, providing a three-dimensional representation at the given conditions of calculation.

Kazan University is one of three universities in the world-training specialists in the field of molecular modelling and chemoinformatics along with the University of Strasbourg (France) and the University of Indiana (United States).

**Academic staff**

To implement the master's program Chemoinformatics and molecular modeling, the Department of Organic Chemistry has highly qualified staff: 7 Doctors, 10 PhD. The direct management of the masters is carried out by professors, associate professors and teachers of the Department of Organic Chemistry.

Scientific co-management by master's projects is carried out by the employees of profile institutes of the Russian Academy of Sciences, other universities, research departments of industrial and research-and-production enterprises, as well as by employees of the chemoinformatics laboratory of the University of Strasbourg.

**Career opportunities**

Successful graduates of this programme can find work in the Research & Development departments of the enterprises of the pharmacological, oil and chemical industries, IT companies developing new software products for molecular modeling and chemoinformatics, as well as in academic institutes engaged in the development of new, practically useful substances, in In particular, at present there are opportunities for postgraduate study at KFU, University of Strasbourg (France), University of North Carolina (USA), Prices Tra Helmholtz in Munich (Germany), the list is updated annually. Cooperation with BIOCAD opens up opportunities for them to practice and prospects for subsequent employment.

**Partners**

University of Strasbourg, France, University of North Carolina (USA), Prices Tra Helmholtz in Munich (Germany).

**The learning outcomes of Master`s program are**:

1. Ability of students to work independently in cheminformatics field who have knowledge of chemistry, of computer science, of mathematics and biology, of molecular modeling using different methods, of creation and administration of databases (including chemicals).
2. Deep knowledge in the field of cheminformatics.
3. Students’ active participating in research projects. By the end of the Master’s program graduates are able to design and perform PhD research projects.

**General courses**

* Chemoinformatics;
* Molecular Modelling;
* Quantum chemistry;
* Drug design;
* Bioinformatics;
* Database management;
* Programming in Bash, Python, C / C ++, Java, PHP;
* Data Mining
* Foreign language
* Academic writing
* Philosophical problems of chemistry
* Computer technologies in science and education
* Actual problems of modern chemistry
* Biochemistry
* Modern theories of chemical bonding

**Special courses**

* Fundamentals of Chemistry
* Fundamentals of Biology
* Pharmacodynamics and pharmacokinetics
* Mechanisms of chemical reactions
* Chemometrics
* Physical methods of studying organic compounds
* Electronic and spatial structure of molecules
* Metabolism and toxicity of organic substances
* Nanomaterials and nanosystems

**Requirements**

Those graduates already holding a Bachelor's degree can apply for admission to Master's degree programs.

1. Applicants must have a qualification/degree corresponding to a 4-year educational program of higher education.
2. If English is not the student's native language, then his/her TOEFL examination results (or equivalent) will be no less than 80 for an on-line test, or no less than 5,5 for IELTS. Training within the Program will be given in English and Russian.
3. Interview

**Additional information**

Training masters in Chemoinformatics and Molecular Modeling can be implemented with two possible options: a single or double degree program. The double degree program is completed jointly with the University of Strasbourg, France. Students study one year at the Chair of organic chemistry at KFU, and the second year – at the University of Strasbourg. After completion of the program, students receive diplomas from both universities.

**Credit hours**: 120 ECTS (124 with electives)

**Assessment methodologies used:** please contact the head of the programme for this information

**Duration of the program**: 2 years

**Deadlines for admission:** three months before program start date

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