



**FACULTY
OF SCIENCE**



FUNDAMENTAL AND APPLIED CHEMISTRY

MASTER'S DEGREE PROGRAMME



PROGRAM ADVANTAGES

- ✓ There are courses which promote students' understanding of the main trends of modern chemistry developing, the latest research methods of physicochemical analyses, the nature and essence of phenomena on which obtained methods are based, as well as identification and study of substances and material properties.
- ✓ Leading experts of other universities, the institutes of the Russian Academy of Science and chemical enterprises support and review disciplines and scientific research practices.
- ✓ Much attention is paid to academic knowledge as well as to the development of practical skills in working with research equipment.
- ✓ Lectures, master classes, creative projects and conferences are regularly held with the participation of invited famous world-class scientists.
- ✓ The Master's training gives an opportunity to take part in students exchange programs with partner universities.
- ✓ The program had an international accreditation in DEVA-AAC agency (Spain).



STUDYING PROCCESS

120 credits

Lectures, laboratory classes and self-study, several types of traineeship, research work.



EXPERIMENTAL RESEARCH METHODS IN CHEMISTRY

- Fundamentals of chemical laboratory safety.
- Current state of research in this field of science, comparing the expected results with the ones of the world level.
- Chemistry experimenst.

ORGANIC CHEMISTRY SECTION



BASICS OF DRUG DESIGN

- The main goals and concepts of medical chemistry.
- Target action of drugs.
- Lipids.
- Enzymes.
- The principles drugs speculative design.
- Receptors.
- Nucleic acids as targets of the action of drugs.
- Fundamentals of modern computer design of drugs.



CHEMISTRY OF HETEROCYCLIC COMPOUNDS

- Nomenclature of heterocyclic compounds, short cycles.
- Five-membered heterocycles with one heteroatom.
- Five-membered heterocycles with two heteroatoms.
- Six-membered heterocyclic compounds.



INORGANIC CHEMISTRY SECTION



SOLID STATE CHEMISTRY

- The nature of solids.
- Phase transitions and their classification.
- Preparative methods for producing solids.
- Defects and non-stoichiometry.
- Solid solutions.
- Research methods of solids: diffraction, microscopic, spectral.
- Thermal analysis.
- Physical properties of solids.
- Ion conducting and solid electrolytes.
- Electrical, magnetic and optical properties.



BIOINORGANIC CHEMISTRY

- The development of bioinorganic chemistry as a science.
- General biochemical characteristics of living organisms, chemical composition.
- Structure, properties and functions of proteins.
- Enzymes, classification and nomenclature.
- Bioinorganic chemistry of molecular nitrogen fixation.
- Composition, structure and functions of nucleic acids.



PHYSICAL CHEMISTRY SECTION



CATALYSIS

- Classification of catalytic processes.
- Characteristic properties of catalysts.
- Working principle of catalysts.
- Homogeneous catalyzed reactions.
- Acid, basic and electrophilic catalysis.
- Fundamental patterns of heterogeneous catalysis.
- Sustainable catalysis.
- Sustainable catalytic technologies.



NANOCHEMISTRY

- Thermodynamics of nanoparticles.
- Physical and chemical methods of nanoscale systems generation.
- Methods of nanoparticles research.
- Reactivity of nanostructures.
- Applied nanochemistry.



STUDENTS FEEDBACK

TATYANA KRYUCHKOVA, RUSSIA

“ I was a Master’s student at the Faculty of Science at RUDN University. While at university, we gained practical knowledge and skills which let us feel confident in our profession; our classes were widely connected with practical experience. The knowledge I obtained being enrolled in the program helped me a lot in my work. I would definitely recommend students who already have Bachelor’s Degree to apply for this course. ”

ALEKSANDRA SHULGA, LITHUANIA

“ In 2014 I graduated from RUDN University with a Bachelor’s Degree, my major was “Chemistry. After that I enrolled for the Master’s course in “Chemistry”(04.04.01), my speciality was “Fundamental and Applied Chemistry”. I would like to express my deep gratitude for two amazing academic years in the magistracy. The teaching staff was a group of professionals who through the entire period helped us to cope with the tasks, taught us to meet the deadline, and if some difficulties and problems emerged, taught us to solve them. During my master’s degree training, I knew lots of new and interesting things, which turned out to be important and useful in practical applications. The training course comprised not only lectures and seminars, there was a lot of laboratory work, research practices. Many classes were held interactively, various acute problems were discussed, the participants had to offer all kinds of solutions themselves. ”



STUDENTS FEEDBACK



INDIRA KHAIRULLINA, TURKMENISTAN



Doing the Master's course in "Fundamental and Applied Chemistry" at RUDN University became an interesting experience for me. The most important thing for me was to expand my knowledge in the Physical and Colloidal chemistry, adsorption and catalysis, highly qualified teachers supported and us in the process. Moreover, working on the relevant and essential topic of my scientific research let me express myself as a research chemist. Doing a course at the magistracy at RUDN University is a wonderful start to the professional career. ”



TATYANA TERYOSHINA, RUSSIA

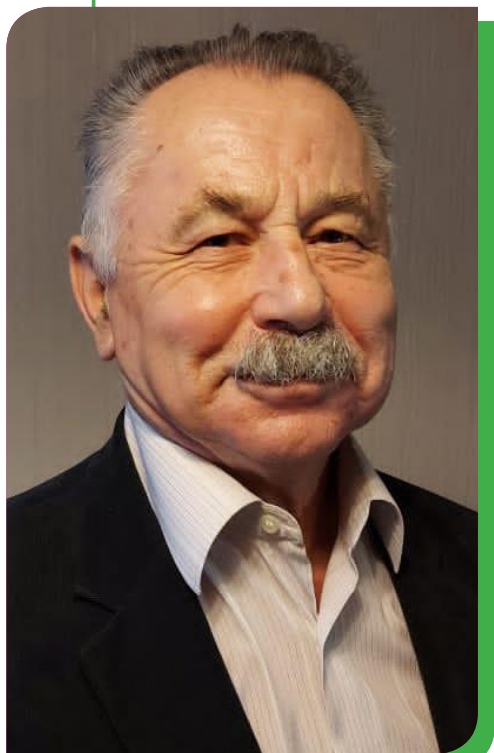


The Master's program "Fundamental and Applied Chemistry" comprises disciplines that help to deepen your academic knowledge and practical skills both in various fields of inorganic chemistry and in physicochemical research methods. Research practices and seminars were conducted in a format that facilitated the discussion of topical issues and challenges. I would like to express my gratitude to the entire teaching staff for their knowledge, support and assistance! Thanks to them, I was able to reveal my potential as a research chemist. I advise you all to enroll for a master's course at RUDN university, because this is a great opportunity to do your favorite work in a great team! ”



HEAD OF THE PROGRAMME

ALEXEY V. VARLAMOV



DSc (Doctor of Science) in Chemistry, Professor of the Department of Organic Chemistry.

FIELDS OF SCIENTIFIC INTEREST ARE SYNTHESIS:

stereochemistry and reactivity of nitrogen-containing heterocyclic compounds; biologically active compounds; study of open reaction of the expansion of tetrahydropyridines and tetrahydroazepines by activated acetylenes, development on its basis of preparative methods for the synthesis of condensed azocins and azonins; development of synthetic approaches to synthesis of isoindoles condensed with nitrogen-containing heterocycle on the basis of homoillamines and α -furylated nitrogen-containing heterocycles.

- Author of more than 220 scientific articles in peer-reviewed Russian and foreign scientific journals (VAK, SCOPUS, Web of Science) and 25 author's certificates and patents, regularly gives presentations at international conferences on the chemistry of heterocyclic compounds.
- The repeatedly recipient of the grants from Russian and foreign scientific foundations for conducting research and organizing scientific events.
- Professor A.V. Varlamov is a member of the Expert Council on Chemistry of the RFFI; a member of the three specialized councils for the protection of candidate and doctoral dissertations; a member of the editorial board of the journal «News of the Academy of Sciences. The series is chemical».
- Professor A.V. Varlamov was awarded the Professor A.N. Costa commemorative medal, Golden Laureate sign for his art in organic synthesis of heterocycles, established by the International Charity Fund «Scientific Partnership» and the International Fund «Cultural Property».