



**THE CHEMISTRY
OF HETEROCYCLIC COMPOUNDS**
in English

MASTER'S DEGREE PROGRAMME



PROGRAM ADVANTAGES

- ✓ Classes are held in English, so foreign students do not have to study at the Preparatory faculty, Russian students receive professional education, improving their level of language.
- ✓ The Master 's program "Chemistry of heterocyclic compounds" is aimed at providing students with and in an opportunity to obtain up-to-date academic experimental knowledge and practical skills in the synthesis and research of substances and materials. This program encourages students to carry out independent scientific research within the framework of scientific direction.
- ✓ The programs and disciplines support and review as well as research practices are carried out by specialists of other universities, the institutes of RAS and leading chemical enterprises in the corresponding fields.
- ✓ The peculiarity of training is a large number of individual and group creative projects.
- ✓ Lectures and master classes given by foreign world-class scientists are held regularly. There is also an opportunity for Master's students to be engaged in joint creative projects and participate in conferences.
- ✓ The program provides an opportunity for students to participate in student exchanges with university partners.



STUDYING PROCCESS

120 credits

Lectures, laboratory classes and independent work,
several traineeships , NIR.



TOPICAL TASKS OF MODERN CHEMISTRY

- Main trends of the natural scientific development.
- Modern methods of isolating organic compounds.
- Modern approaches to conducting chemical reactions.
- Use of protecting groups in organic synthesis.
- Introduction to metal complex catalysis.
- Introduction to organocathalysis.
- Reactions of cyclopyric compounds in organic synthesis.
- Chemistry of bioconjugates.
- Determination of the structure of natural compounds.



RUSSIAN LANGUAGE IN THE PROFESSIONAL ACTIVITY OF MASTER'S PROGRAM STUDENTS

- Scientific speech and its features.
- Specific activities in the field of science.
- Creation of secondary scientific texts.



EXPERIMENTAL RESEARCH METHODS IN THE CHEMISTRY OF HETEROCYCLIC COMPOUNDS

- Fundamentals of work safety in a chemical laboratory.
- The current state of research in this field of science, the comparison of the expected results with the ones of the world level.
- Chemical experiments.
- Methods for the synthesis of organic substances.
- Analysis and generalization of the results.



BASICS OF DRUG DESIGN

- Basic goals and concepts of medical chemistry.
- Drug action targets.
- Lipids.
- Enzymes.
- Principles of mind design of medicines.
- Receptors.
- Nucleic acids are targets of drug action.
- Foundations of modern computer drug design.



MOLECULAR SPECTRAL ANALYSIS

- Principles of molecular spectral analysis.
- Principles of IR spectroscopy.
- Principles of quantitative IR spectroscopy.
- Practical aspects of measuring IR spectra.
- IR spectroscopy of organic compounds.
- Principles of UV spectroscopy.



CHEMISTRY OF HETEROCYCLIC COMPOUNDS

- The nomenclature of heterocyclic compounds, small cycles.
- Five-membered heterocyclic compounds with one heteroatom.
- Five-membered heterocycles with two heteroatoms.
- Six membered heterocyclic compounds.



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».