QUALIFICATION DESCRIPTION

PhD Program	Computational Mathematics
Educational and scientific degree	PhD degree, level 8 under the National Qualifications Framework
Area	4. Natural sciences, mathematics and informatics
Professional field	4.5 Mathematics
Form of Education	Full-time / part-time / self-study / under Art. 21, para. 7 of the Higher Education Act
Duration of Study	Full-time up to 3 years / part-time up to 4 years / of independent training and under Art. 21, para. 7 of the Higher Education Act up to 5 years
Form of graduation	Defense of PhD Thesis

OBJECTIVES OF THE TRAINING

The doctoral program in Computational Mathematics aims to prepare highly qualified specialists in mathematics who can apply their knowledge and skills in various scientific and applied fields. The program emphasises the development of research skills, critical thinking, and the ability to solve complex problems through the application of modern mathematical and programming methods and techniques.

Objectives of the doctoral program.

- Creation of highly qualified scientific, research and teaching staff with experience in theoretical and experimental activities in the field of mathematics and its applications, who are given freedom of study and research, taking into account the differences in their interests;
- Integration of research and training of PhD students through the reproduction and multiplication of new knowledge and marketable scientific products;
- Sustainable development of academic activities in accordance with international quality standards in the training of doctoral students;
- Activation of the academic initiative and scientific potential of IICT for the implementation of projects and research arising from the new market needs and the challenges of the changing environment.

CONTENT OF THE TRAINING

The PhD program in Computational Mathematics has been developed following the requirements and provisions of the Higher Education Act, the Regulations on the Terms and Conditions for Acquiring Scientific Degrees and Academic Positions at the Bulgarian Academy of Sciences and the Regulations on the Specific Conditions for Acquiring Scientific Degrees and Occupying Academic Positions at IICT-BAS. The discussion and adoption took place at a meeting of the Scientific Council of the Institute. The education of doctoral students is conducted according to an individualised educational plan, consistent with the chosen topic of the dissertation. In the individual plan, according to the Program of the doctoral program, the mandatory for the doctoral student are noted in detail the general educational, language, IT and

specialized courses, scientific research (literature research, empirical research), approbation of the results on the topic of dissertation (participation in doctoral and scientific forums, publications in reputable journals), etc. Doctoral students submit annually an annual attestation of the work done according to their individual plan and, if necessary, its update. The annual attestation of each PhD student is discussed and adopted at a meeting of the National Assembly of the Institute. According to the Law on Dissertations, full-time PhD students also submit quarterly reports on the work carried out on the dissertation.

KNOWLEDGE, SKILLS AND PROFESSIONAL COMPETENCES

Basic competencies consisting of:

- In-depth knowledge of theories, concepts, principles and models related to mathematics and its applications;
- ability to make comparative analyses and choose an appropriate solution from among alternative solutions;
- Ability to propose new concepts, principles, models for solving a specific problem.

Scientific and specialized competencies (in the scientific field) – presenting knowledge and skills necessary for the dissertation research:

- carrying out research in the field of mathematics and its applications;
- conducting interdisciplinary research;
- formulating and preparing proposals for research projects;
- dissemination of the acquired knowledge in the form of publications.

Additional skills:

- ability to work together as members of scientific teams and develop organizational skills;
- Being interested in modern trends and innovations in technology and maintaining stable professional growth and self-improvement;
- Good presentation skills.

In addition to specific knowledge, emphasis is also placed on the acquisition of skills such as: use of specialized literature (including in a foreign language); systematization, generalization and analysis of existing statements; independent conduct of scientific and applied research; shaping and presenting the results in an understandable, logical, precise and correct way.

The dissertation topics are formulated on current problems dictated by the needs of academia and business. PhD students are encouraged to focus their research activities in promising areas that meet the public expectations and needs of the country, which would also favor their own realization after the successful completion of this educational and scientific degree.

PROFESSIONAL REALIZATION

The knowledge and skills accumulated in the educational cycle allow graduates to realize themselves in research, production, implementation and design units dealing with increasing the efficiency of existing and innovative productions. The training provides knowledge and skills for solving complex scientific problems; for managing units related to the development and implementation of effective mathematical models and high-performance algorithms; for evaluating projects in the field of computational mathematics; for the provision of expert and consulting services in state and public structures or in the private sector on issues related to the use of numerical methods in other sciences, medicine, industry, etc.; as well as for training

students in higher education institutions.

After graduating from this specialty, doctors can continue their studies in postdoctoral programs in the country and abroad.

The Scientific Council of IICT-BAS approves the Qualification description on 26.3.2025 (Record № 3).

Approved by:

corr. mem. Sv. Margenov