

**BULGARIAN ACADEMY OF SCIENCES  
INSTITUTE OF MATHEMATICS AND INFORMATICS**

Approved:

(Prof. P. Boyvalenkov, Director of IMI-BAS)

**QUALIFICATION PROFILE**

**Higher Education Area:**

4. Natural Sciences, Mathematics, and Informatics

**Professional Field:**

4.5. Mathematics

**PhD Programme:**

Operations Research

The PhD programme in Operations research provides the third degree of higher education for acquiring the educational and scientific degree of Doctor of Philosophy.

This Qualification Profile determines the knowledge, skills, personal and professional competences of the PhD students who have pursued and completed the PhD programme in Operations research.

**Requirements for admission and training**

The admission and training of PhD students are in accordance with the legal requirements of:

- the Higher Education Act;
- the Development of the Academic Staff in the Republic of Bulgaria Act;
- the Regulations on the Implementation of the Development of the Academic Staff in the Republic of Bulgaria Act;
- the Regulations on the Conditions and Order for Acquiring Scientific Degrees and Occupying Academic Positions at the Bulgarian Academy of Sciences;
- the Regulations on the Conditions and Order for Acquiring Scientific Degrees and Occupying Academic Positions at the Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences;
- the Rules for the Activity of the Training Centre (TC) and the Academic Council (AC) of BAS.

The duration of the programme is:

- 3 years in case of full-time training;
- 4 years in case of part-time training;
- up to 3 years in case of self-study.

The PhD programme in Operations research provides the opportunity to obtain the educational and scientific degree of Doctor of Philosophy in professional field 4.6. Mathematics upon:

- successful completion of all stages of the PhD student's individual plan;
- successful defence of the thesis.

## **Aim**

The PhD programme in Operations research aims to train highly qualified specialists with in-depth fundamental and professional competence for individual and team work in research and applied activities as well as teaching in the field of mathematical modelling and its applications, by creating skills for planning, organising and performing scientific and applied research and presenting its results.

The training in the PhD programme in Operations research is in full compliance with the mission and objectives of IMI-BAS, set out in the Research Development Strategy of the Institute of Mathematics and Informatics, and in particular with its priority area Mathematical modeling: stochastics, operations research, numerical methods and scientific computing, approximation theory and fundamentals of mathematical models. The ones who graduate the PhD course of study and research will be able to contribute to activities of immediate benefit for the society: building and applying mathematical models of the economy and of other processes in the society at the level of Ministries and other Central Government Agencies; building and applying mathematical models in the field of national security; further applying the research approach in the education in mathematics and informatics; building mathematical models and numerical methods for their specific applications in other fields of research – physics, chemistry, biology, social sciences.

## **Competences**

Holders of the educational and scientific degree of Doctor of Philosophy, awarded by IMI-BAS, shall have acquired intellectual qualities, knowledge, practical skills and habits for:

- independent study;
- teamwork;
- planning and carrying out scientific and practical tasks in time;
- setting problems, proposing solutions, justifying choices of approaches and methods;
- formulating, expressing, and defending scholarly arguments, ideas, and concepts;
- conducting comprehensive scientific studies;
- presenting scientific results orally and in writing;

- doing all of the above fluently in English.

More particularly, the successful PhD graduates in Operations research at IMI-BAS shall:

- have mastered methods and tools for research – collection, synthesis, analysis, and summarisation of scientific information on achievements, good practices, developments, policies, and problems in Bulgaria and around the world related to a specific case study;
- be skilled in conceptual modelling, implementation and testing of optimal functional models serving the case study;
- be capable of developing models for efficient use and further growth of the produced technological tools and services;
- be able to apply schemes for monitoring and (self-)control of the performed research activity.

## **Careers**

PhD Graduates in Operations research are highly qualified specialists, who can work as:

- lecturers in universities, colleges, etc.;
- researchers in scientific institutes and laboratories;
- leaders or members of teams working on national or international projects in fundamental or applied sciences;
- evaluators of projects in the field of operations research, and mathematical modeling;
- experts in governmental and public structures on issues related to applications of the mathematical modelling by operations research methods in decision making processes;
- consultants on operations research;
- specialists in design and development of of mathematical models;
- heads of quality management departments in technology and information service systems, etc.

A PhD graduate can:

- participate in various forms of continuing qualification (postdoctoral programmes);
- apply for academic positions and obtain scientific degrees.

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The Qualification Profile was approved by the Scientific Council of IMI-BAS on --.--.2022 (Minutes No. 1).