QUALIFICATION DESCRIPTION

This qualification defines the knowledge, skills, personal and professional competences of the PhD students who have studied and graduated from the PhD programme Probability and Statistics.

I. ANNOTATION OF THE PROGRAMME

The Ph.D. programme in Probability and Statistics is designed to prepare highly skilled professionals for careers in academia, research, and industry, particularly in roles involving statistical data analysis across a variety of fields. These fields include education, healthcare, and other sectors integral to the development of a high-tech society. Graduates of the program are equipped to engage in teaching at higher education institutions, conduct research in scientific organizations, and provide expert advice in research units within industry and business.

The programme provides students with advanced scientific knowledge and expertise, immersing them in the latest developments in the field. PhD students acquire comprehensive training in rigorous research methodologies, enabling them to generate meaningful and original results. They also develop critical skills in research planning, problem-solving, and decision-making.

The programme is accredited by the NEAA in the professional field (PF) 4.5 Mathematics, at educational level 8 (Ph.D.) according to the National Qualification Framework. This aligns with the European Qualification Framework, ensuring that the qualification is comparable to those awarded in other EU countries.

Training is delivered by the Department of Probability, Operations Research, and Statistics, in close collaboration with colleagues from the Faculty of Mathematics and Informatics (FMI) who specialize in probability theory and mathematical statistics. Additionally, the program benefits from partnerships with other universities and research organizations both within the country and across the European Union. PhD students are actively involved in the department's scientific, research, and teaching activities, regularly participating in national and international scientific forums and conferences related to their field.

The admission and training of doctoral students follow the legal requirements set forth by the following regulations:

Higher Education Act
Law on the Development of Academic Staff in the Republic of Bulgaria
Regulations for the Implementation of the Law on the Development of Academic Staff in the Republic of Bulgaria
Regulations on the Conditions and Procedures for Acquiring Scientific Degrees and Occupying Academic Positions at Sofia University "St. Kliment Ohridski"
The Rules of Procedure for the Awarding of Academic Degrees in the Republic of Bulgaria
The duration of the Ph.D. program is as follows:
3 years of full-time study;
4 years of part-time study;
Up to 5 years of self-directed study.
The Ph.D. program in Probability and Statistics offers the opportunity to earn the academic and scientific degree "Doctor of Philosophy" in the PF 4.5 Mathematics upon:

Successful completion of all stages of the doctoral student's individual study plan;
Successful defense of the doctoral thesis.
The program may be conducted in either Bulgarian or English, depending on the candidate's preference. The language of instruction is determined at the time of admission and cannot be changed thereafter.

The main aims and objectives of the PhD programme in Probability and Statistics are:
- to provide doctoral students with training (in Bulgarian or in a foreign language) aimed at acquiring, broadening and deepening their theoretical knowledge, researching cutting-edge problems, tracking the newest trends in the development of the scientific field;
- to impose high standards for conducting scientific research in the professional field and in particular in the scientific topics of the doctoral program, using modern methods, tools and techniques for research;
- provide opportunities for doctoral students to produce independent and collaborative publications;
- to provide opportunities for PhD students to participate in multidisciplinary teams of scientific and applied research projects carried out by members of the Department, under national and international programmes;
- to ensure that the PhD student is consulted during the development of the dissertation by the supervisor, members of the department and the FMI;
- to provide opportunities for mobility of PhD students through the development of scientific cooperation with other higher education institutions and scientific organizations in the country and abroad, including Erasmus+ and other European scientific exchange programmes;
- to provide opportunities for the acquisition of skills and experience for teaching within the disciplines offered by the Department;
- to train highly qualified personnel with in-depth fundamental and professional competence for scientific, research, applied, expert and teaching activities in the field of algebra, number theory and their applications, carried out both independently and in a team, by creating skills for planning and organizing scientific and applied research and presenting the obtained results.

The training in the PhD programme Probability and Statistics is in full compliance with the mission and the vision of the FMI and in line with the Scientific Development Strategy of the SU. In particular the training is in compliance with the goals set by the FMI-SU:
- to preserve and develop the scientific capacity in the field of fundamental research in mathematics and informatics;
- to transform this capacity into a basis for applications in other areas of mathematics, computer science and natural and social sciences whose modern development relies on the increasing use of algebraic and arithmetical methods;
- to preserve and develop long-standing traditions in the discovery and development of young talents in mathematics and computer science in order to build the next generation of teachers and researchers.

II. EXPECTED RESULTS AND COMPETENCES

Upon successful completion of the Ph.D. program in Probability and Statistics, graduates are expected to acquire the following knowledge, skills, and competencies:

- **In-depth knowledge** of the current state of the scientific field, including contemporary issues, emerging trends, and developments in both theoretical and applied areas.
- **Highly specialized expertise** in the specific topics addressed by their dissertation research.
- **Independent learning abilities**, with the capacity to acquire new knowledge and generate innovative solutions to educational, research, and practical challenges, including in interdisciplinary domains.
- **Research planning and execution skills**, ensuring the timely completion of scientific and applied tasks.
- **Problem-solving and communication skills**, including the ability to clearly define research problems, propose solutions, formulate and defend scientific hypotheses and ideas, and select appropriate methodologies.
- **Comprehensive research skills**, enabling the design and execution of complex scientific investigations.
- **Scientific writing skills**, with the ability to produce high-quality publications that meet the standards of international academic journals, in both Bulgarian and foreign languages. Additionally, students will be prepared to present their research findings at national and international scientific conferences.
- **Analytical, critical, and systematic thinking**, allowing for the thorough evaluation of research questions and the development of sound scientific arguments.
- **Competence in utilizing bibliographic resources**, navigating specialized information sources, and using advanced mathematical software tools effectively.
- **Teaching competencies** to deliver courses offered by the Department of Probability, Operations Research, and Statistics.
- **Personal and professional competencies** for working collaboratively in research teams and managing research projects.

These competencies ensure that Ph.D. graduates are well-prepared for careers in academia, research institutions, industry, and other areas requiring advanced statistical and analytical expertise.

III. REALISATION

Graduates of the Ph.D. program in Probability and Statistics are highly skilled specialists, prepared to pursue a variety of professional roles, including:

- **University and college faculty members**, as well as educators in schools offering extracurricular programs for students with a strong interest in mathematics.
- **Researchers** in scientific institutes, research organizations, and specialized laboratories.
- **R&D professionals** in industry and business development departments.
- **Leaders and team members** in national and international research and applied science projects.
- **Consultants or contributors** to projects focused on the development of educational products and programs, including those for government and public institutions.
- **Project evaluators** in areas such as probability theory, mathematical statistics, and their applications across various fields, including mathematics, natural sciences, epidemiology, demography, cancer research, industry, and business.

Additionally, Ph.D. graduates can:

- Engage in **continuing education** opportunities, including postdoctoral programs.
- Compete for **academic positions** or pursue other advanced qualifications and degrees.

These opportunities highlight the broad applicability of the skills acquired during the program, enabling graduates to make significant contributions in academia, research, industry, and beyond.