MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
RIVNE STATE UNIVERSITY OF HUMANITIES

EDUCATIONAL AND PROFESSIONAL PROGRAM

«COMPUTER SCIENCES AND INFORMATION TECHNOLOGY»

Second (master's degree) **level of higher education**

in speciality 113 "Applied Mathematics"

branch of knowledge 11 Mathematics and Statistics

Qualifications: a master's degree of Applied Mathematics. Teacher of Applied Mathematics

APPROVED BY ACADEMIC COUNCIL

Chairman of academic council

_____ **prof. Postolovskyi R.M.**

(protocol № 2 dated 27. 02. 2020)

Educational program is introduced

with 01.09. 2020

Rektor RSHU

_____ **prof. Postolovskyi R.M.**

(order № 40-01-01 dated 27.02.2020)

Rivne, 2020

PREFACE

The educational and professional programme is a normative instrument which regulates normative, competent, qualified, organizational, educational and methodological requirements for preparation of candidates for the second (master) level of higher education in the field of knowledge 11 "Mathematics and Statistics" in speciality 113 "Applied Mathematics". The educational and professional programme is developed for introducing the Implementation of the higher education standard for the second level of higher education by the project team of the Rivne State Humanitarian University consisting of:

project team leader (guarantor of the educational program):
Siaskyi Andrii, Doctor of Technical Sciences, Professor;
project team members:
Moroz Igor, Ph.D., Associate Professor;
Shakhraichuk Mykola Iovych, Ph.D., Associate Professor.

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I. Profile of educational program in specialty 113 "Applied Mathematics"

1 – General information	
Full name of higher educational institution	Rivne State University of Humanities
The degree of higher education and the name of the qualification in the language of the original	Master's degree. Master's degree of applied mathematics. Teacher of applied mathematics
The official name of the educational programme	Applied Mathematics
Type of diploma and the volume of the educational and professional programme	Master's degree, unit / 90 credits ECTS / 1 year 4 months
Accreditation	Certificate of Accreditation (series УД No18001457). Validity by 01.07.2023
Cycle / Level	NRC Ukraine - level 8, FQ-EHEA - second cycle, EQF-LLL - level 7
Prerequisites	Availability of a bachelor's degree, an educational qualification level of a specialist
Language (s) of teaching	Ukrainian
The term of the educational and professional programme	By 2023
The Internet address for the placement of a description of the educational and professional programme	http://www.rshu.edu.ua/navchannia/osvitni-prohramy/mahistr
2 - The purpose of the educational programme	
To provide training of highly qualified specialists in the field of mathematics in specialty 113 Applied Mathematics, capable of formulating, solving and generalizing theoretical and practical problems in their professional activity using fundamental and applied methods involving mathematical modelling and modern information technologies.	
3 - Characteristics of the educational and professional programme	
Subject area (branch of knowledge,	Branch of knowledge - 11 "Mathematics and Statistics" Specialty - 113 "Applied Mathematics"

specialty)	
Orientation of the educational programme	Educational and professional. The focus of the programme is on a specialist capable of solving complex problems in mathematical modeling of processes and objects of different nature, at the research level and in professional activities.
The main focus of the educational and professional programme	Special education at the second (master's) level in the field of 11 Mathematics and Statistics in speciality 113 Applied Mathematics. Key words: mathematical and computer modeling of natural, technical, economic and social systems and processes; system analysis; optimization and optimal control; mathematical methods of identification and recognition, software development.
Features of the programme	Integration of knowledge from advanced fields of applied mathematics (modern methods of mathematical modelling and computational mathematics, analysis of stochastic processes, data analysis, mathematical programming). Ensuring the practice of (assistant and production) in scientific and industrial enterprises, institutions of higher education and IT companies.
4 - Eligibility of graduates for employment and further education	
Specialist trained in economic sectors for DC 003:2010	
Eligibility for employment	Master in specialty 113 "Applied Mathematics" can hold such positions: 2121.2 Mathematician (Applied Mathematics). 2121.2 Mathematical Analyst in Operations Research. 2131.2 Computer programmer. 2132.2 Application programmer. 2310.2 University lecturer.
Further education	The possibility of continuing education on the programme of the third (educational and scientific) level of higher education.
5 - Teaching and evaluation	
Teaching and learning	Teaching is conducted in the form of: lectures, practical and laboratory exercises, self-study instruction using teaching and methodological literature and syllabuses of lectures, individual tutorials, consultations, work and assistant practice, preparation of qualification (master's degree) work.
Evaluation	Students' educational achievements are evaluated on a national scale (excellent, good, satisfactory, unsatisfactory, credit, no gain) 100-point scale and ECTS scale (A, B, C, D, E, FX, F).
6 - Competencies of programme	
Integral competence (IC)	Ability to solve complex problems and problems of applied mathematics, science, economy and social sphere during training or professional activity, provides for the application of modern mathematical theories and methods and is characterized by complex and uncertain conditions.
General Competence (GC)	1. Ability to think abstractly and analytically and generate ideas. 2. Ability to apply theoretical knowledge and skills to learning and professional activities. 3. Ability to communicate with a second (foreign) language. 4. Ability to use information and communication technologies. 5. Ability to conduct research at the appropriate level. 6. Ability to retrieve, process and analyse information from various sources sources. 7. The ability to be critical and self-critical. 8. Ability to identify, address and resolve problems.

	9. Ability to make informed decisions. 10. Ability to work independently and in a team. 11. Ability to communicate with other occupational groups at different levels, even when dealing with complex issues. 12. Ability to develop and manage projects. 13. Take responsibility for tasks and responsibilities. 14. Ability to communicate orally and in writing in one's mother tongue.
Professional competence (PC)	1. The ability to use general methods of constructing mathematical theories, to think logically, to formulate and prove mathematical statements and theorems, to derive conclusions, to determine the correctness of problem solving. 2. The ability to formalize problem-setting, select and apply mathematical and instrumental methods for problem-solving, research, analysis, design, optimal decision-making. 3. Ability to design structure and database algorithms, data management software, information systems, mastering the latest programming technologies, to improve the algorithmic style of thinking. 4. Ability to use computer technology, Computer networks and the Internet, operating systems, office applications, cloud systems, modern programming languages. 5. The ability to operate and maintain the software of automated systems is used in the mathematics workplace. 6. The ability to optimize, customize and upgrade the hardware and software of automated systems of different applications to suit their own needs. 7. Ability to plan and perform the necessary calculations in mathematical and computer simulations and in solving formalized problems with specialized software tools. 8. Capacity for analysis, identification and self-adjustment of possible algorithmic errors after numerical experiments in mathematical and computer simulations in solving formalised problems with the help of specialized software tools. 9. Ability to create technical documents, established reporting documents, use of legal documents. 10. The ability to adopt reasonable and economically sound organizational and managerial decisions to ensure safe working conditions. 11. Ability to search, systematic study and analysis of scientific and technical information, domestic and foreign experience associated with the application of mathematical methods for the study of various processes, phenomena and systems. 12. The ability to formulate a mathematical problem statement based on the language of the subject area and the choice of a suitable method for solving the problem. 13. Ability to conduct research on processes, phenomena and systems using mathematical methods and specialized software, carry out computational experiments, process, analyse and interpret the obtained results. 14. Ability to participate in the preparation of scientific reports on research and development and in the implementation of research and development results.
7 - Program Learning Outcomes (PLO)	

	1. To demonstrate knowledge and understanding of modern concepts, principles and theories of applied mathematics and apply them in practice. 2. To demonstrate knowledge of the structure, methods and means of scientific knowledge; philosophical foundations of scientific knowledge; general patterns of scientific development. 3. To demonstrate the ability to mathematically formalizing of problems formulated in the language of a given subject area; construct their mathematical models and select rational methods of solving them by analytical or numerical methods; assess the accuracy and reliability of the results obtained. 4. To build efficient precision of computation, stability, speed and cost of system resources algorithms for investigating mathematical models and solving complex problems. 5. To demonstrate knowledge of modern programming and software development technologies, software implementation of numerous and symbolic algorithms in solving applied engineering problems and problems in interdisciplinary branches - sociology, economics, ecology and medicine. 6. To apply conceptual knowledge acquired through learning and / or career development to innovation, particularly in the context of research. 7. To apply and develop fundamental and interdisciplinary knowledge in supporting and making management and technical decisions for the successful performance of professional tasks. 8. Owning the legal aspects of intellectual property protection; criminal liability for infringement of intellectual property rights; systems of prevention and detection of academic plagiarism. 9. To use new technologies and methods, achievements of domestic and foreign science in innovative activity at the enterprise, establishment of higher education. 10. To prepare scientific publications (reports), scientific and technical reports in the state language or in a foreign language, using scientific and educational literature on applied mathematics, handbooks, dictionaries and other scientific and technical information with copyright enforcement. 11. To demonstrate self-learning and continuing professional development. 12. Ability to effectively shape a communication strategy. To demonstrate professional communication skills in Ukrainian and at least one of the common European languages. 13. To manage complex actions or projects, to be responsible for making decisions under unforeseen conditions. 14. To carry out educational work in the relevant discipline, guided by normative documents and psychological and pedagogical requirements of the educational process.
8 - Resource support	
Personnel support	Lecturing on educational disciplines by scientific and pedagogical workers of the corresponding specialty having a degree and/or academic rank and working at their main place of work is more than

	50% of the number of hours determined by the curriculum; who have a Ph.D. degree or a professor's degree - more than 25% .
Material and technical support	Material and technical support meets the licensing requirements for providing educational services in the field of higher education and is sufficient to ensure the quality of the educational process.
Information and teaching - methodological support	Information and educational and methodological support of the educational programme for the training of specialists of specialty 113 Applied mathematics meets the licensing requirements and is sufficient to ensure the quality of the educational process.
9 - Academic mobility	
National Credit Mobility	On the basis of bilateral treaties between the Rivne State Humanitarian University and higher education and scientific institutions of Ukraine.
International Credit Mobility	On the basis of bilateral agreements between Rivne State University of Humanities and foreign educational institutions.
Teaching foreign applicants for higher education	Possible.

3 Form of certification of applicants for higher education

Certification of graduates of the educational program of specialty 113 Applied mathematics is carried out in the form of defence of the qualification master's work or the complex of the qualification examination on the specialty and ends with the issuance of the document of the established sample on awarding it a master's degree with the qualification: master of Applied Mathematics, specialist in the field of Applied Mathematics, teacher of Applied Mathematics.

The certification is carried out openly and publicly.

Forms of certification of applicants for higher education	Certification of graduates of the educational-professional program Applied mathematics of the specialty 113 Applied mathematics of the subject is implemented in the form of public protection of qualification work.
Requirements for qualification work and its public defence	Qualifying work is the academic work of a candidate for higher education, performed at the end of the master’s degree in applied mathematics, a specialist in applied mathematics, teacher of higher education to determine whether the applicant for higher education is in conformity with general and special competencies (learning outcomes).

6. The system of internal quality assurance in higher education

The Rivne State University of Humanities has a system for providing higher education institutions with quality education and higher education quality (internal quality assurance system), which provides for the following procedures and measures:

1) definition of principles and procedures for ensuring the quality of higher education;

2) monitoring and periodic review of educational programmes;

3) the annual assessment of higher education graduates, scientific and pedagogical and pedagogical staff of a higher educational institution, and regular publication of the results of such assessments on the official website of the higher educational institution, on information stands and in any other way;

4) ensuring the professional development of pedagogical, scientific and scientific and pedagogical workers;

5) ensuring the availability of the necessary resources for the organization of the educational process, including the independent work of applicants for higher education for each educational programme;

6) ensuring the availability of information systems for the effective management of the educational process;

7) ensuring publicity of information about educational programmes, degrees of higher education and qualifications;

8) providing an effective system for preventing and detecting academic plagiarism in scientific works of higher education and higher education graduates;

9) other procedures and measures.

The system of providing higher education institutions with the quality of educational activity and the quality of higher education (the system of internal quality assurance) may, upon submission by the Rivne State University of Humanities, be assessed by the National Agency for the Quality Assurance of Higher Education or independent institutions accredited by it, for the assessment and quality assurance of higher education on the subject of its compliance with the requirements systems of quality assurance in higher education, approved by the National Agency for the Quality Assurance of Higher Education, and international standards and guidelines for quality assurance.

Guarantor of the educational programme,
project team leader Professor A.O. Siaskyi