

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

**VINNYTSIA MYKHAILO KOTSIUBYNSKYI
STATE PEDAGOGICAL UNIVERSITY**

**EDUCATIONAL AND SCIENTIFIC PROGRAMME
Theory and Methods of Teaching Mathematics**

**OF THE THIRD (EDUCATIONAL AND SCIENTIFIC) LEVEL OF HIGHER
EDUCATION**

in the specialty A4 Secondary Education (by subject specializations)
subject specialization A4.04 Secondary Education (Mathematics)
field of knowledge A Education

**Qualification: Doctor of Philosophy in Theory and Methods of Teaching
Mathematics**

APPROVED

by the Academic Council of Vinnytsia Mykhailo
Kotsiubynskyi State Pedagogical University
Chairperson of the Academic Council

Prof. N. I. Lazarenko
(Minutes No. 11 dated “_21_”_May_2025)

The Educational and Scientific Programme
comes into force from “_1_”_September_2025

Rector

Prof. N. I. Lazarenko
(Order No. _90од_ dated “_22_”_May_2025)

Vinnytsia – 2025

FOREWORD

The Educational and Research Programme «Theory and Methodology of Teaching Mathematics» for the training of specialists for the degree of Doctor of Philosophy in the specialty A4 Secondary Education (by subject specializations), subject specialization A4.04 Secondary Education (Mathematics), defines the prerequisites for admission to study, the orientation and main focus of the programme, the number of ECTS credits required to obtain the third (educational and research) level of higher education, the list of general and special (professional) competencies, the normative and variable content of specialist training formulated in terms of learning outcomes, as well as the requirements for quality assurance of higher education.

The Educational and Research Programme «Theory and Methodology of Teaching Mathematics» is a regulatory document of Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University and applies to the University departments that provide training for Doctors of Philosophy in the specialty A4 Secondary Education (by subject specializations), subject specialization A4.04 Secondary Education (Mathematics).

The Educational and Research Programme is used during licensing and accreditation of the educational programme, inspection of educational activities in the specialty, as well as in the development of the curriculum, syllabi of academic disciplines, and practical training programmes.

The Educational and Research Programme in the specialty A4 Secondary Education (by subject specializations), subject specialization A4.04 Secondary Education (Mathematics), for the training of Doctors of Philosophy was developed prior to the implementation of the Higher Education Standard for the corresponding level of higher education by the working group of the Faculty of Mathematics, Physics and Computer Sciences of Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University, consisting of:

Matiash Olha Ivanivna – Doctor of Pedagogical Sciences, Professor, Professor of the Department of Algebra and Methods of Teaching Mathematics, Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University – Guarantor of the Educational Programme;

Mykhailenko Liubov Fedorivna – Doctor of Pedagogical Sciences, Professor, Professor of the Department of Algebra and Methods of Teaching Mathematics, Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University;

Voievoda Alina Leonidivna – Candidate of Pedagogical Sciences, Associate Professor, Dean of the Faculty of Mathematics, Physics and Computer Sciences, Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University;

Ryndiuk Valentyn Valeriiovych – Doctor of Philosophy degree applicant in the specialty A4 Secondary Education (by subject specializations), subject specialization A4.04 Secondary Education (Mathematics), Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University;

Khutchenko Ivan Viktorovych – Doctor of Philosophy degree applicant in the specialty A4 Secondary Education (by subject specializations), subject specialization A4.04 Secondary Education (Mathematics), Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University.

External Reviewers:

Shkolnyi Oleksandr Volodymyrovych – Doctor of Pedagogical Sciences, Professor, Head of the Department of Mathematics and Methods of Teaching Mathematics, Ukrainian State University named after Mykhailo Drahomanov;

Lenchuk Ivan Hryhorovych – Doctor of Pedagogical Sciences, Professor, Professor of the Department of Algebra and Geometry, Zhytomyr Ivan Franko State University;

Krutous Tetiana Petrivna – Candidate of Pedagogical Sciences, Vice-Rector for Academic and Pedagogical Affairs, Vinnytsia Cooperative Institute.

1. Profile of the educational and scientific program in the specialty A4 Secondary Education (by subject specialties), in the subject specialty A4.04 Secondary Education (Mathematics)

| 1 – General information | |
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| Full name of the higher education institution and structural unit | Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University Faculty of Mathematics, Physics and Computer Sciences, Department of Algebra and Methods of Teaching Mathematics |
| Level of higher education | Third (educational and research) level of higher education |
| Educational qualification | Doct Doctor of Philosophy (PhD) Qualification – Doctor of Philosophy in Theory and Methods of Teaching Mathematics |

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| Field of knowledge | A Education |
| Specialty | A4 Secondary Education (by subject specializations), subject specialization A4.04 Secondary Education (Mathematics) |
| Official title of the educational and research programme | Theory and Methods of Teaching Mathematics |
| Type of diploma and volume of the educational programme | Doctor of Philosophy diploma, single degree. Total volume: 240 ECTS credits (educational component – 60 ECTS credits; research component – 180 ECTS credits). Duration of the educational component: 1 year 6 months; duration of the research component: 4 years. |
| Mode of study | Full-time (daytime), part-time (extramural) |
| Accreditation status | Conditional (deferred) accreditation in accordance with the Resolution of the Cabinet of Ministers of Ukraine dated 16 March 2022 No. 295. Certificate No. 6996 (2024), (record ID 46970). |
| Cycle / level | National Qualifications Framework of Ukraine – Level 8; FQ-EHEA – Third Cycle; EQF-LLL – Level 8 |
| Validity period of the educational programme | 01 October 2025 – 30 September 2029 |
| Admission requirements | Based on Level 7 of the National Qualifications Framework (holding a Master's degree or Specialist qualification) |
| Language of instruction | Ukrainian |
| Official website for permanent access to the description of the educational programme | https://www.vspu.edu.ua/ |

2 – Aim of the Educational and Research Programme

The aim of the Educational and Research Programme «*Theory and Methods of Teaching Mathematics*» in the specialty A4 Secondary Education (by subject specializations), subject specialization A4.04 Secondary Education (Mathematics), is to train a highly qualified, competitive specialist integrated into the European and global educational and research space, who is capable of

solving complex specialized tasks related to the organization of the educational process, determined by the patterns and specific features of modern theory and methods of teaching mathematics, characterized by complexity and uncertainty of conditions. The programme aims to prepare graduates who are capable of conducting independent scientific research, analyzing existing knowledge, and generating new knowledge in the field of mathematics education methodology. It seeks to form an active, creative, and successful personality, capable of continuous self-improvement and effective adaptation to the requirements of a globalized world.

3 – Characteristics of the Educational Programme

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| Subject area (field of knowledge, specialty, specialization (if applicable)) | Field of Knowledge: A Education Specialty: A4 Secondary Education (by subject specializations), subject specialization A4.04 Secondary Education (Mathematics) |
| Description of the subject area | <p><i>Theoretical content:</i> Concepts, theories, and trends that reveal the regularities, principles, and fundamental foundations of the theory and methods of teaching mathematics.</p> <p><i>Methods, methodologies, and technologies:</i> Methods of theoretical and empirical research into the processes of teaching and learning mathematics at different age stages; modern teaching methodologies and data analysis methods; technologies for the effective development of competencies in mathematics education; development and validation of research methodologies and verification of their effectiveness.</p> <p><i>Tools and equipment:</i> Computer hardware and multimedia equipment; network-based information search and processing systems; library resources and technologies, including electronic resources; software for statistical data processing and visualization that enables the achievement of educational objectives and professional development goals.</p> |
| Orientation of the Educational and Research Programme | The Educational and Research Programme has both academic and applied orientation. Scientific research is focused on addressing problems in the field of the theory and methods of teaching mathematics, improving methods and tools of mathematics instruction, and the organization of mathematics education, as well as on their practical application. The programme aims to create optimal conditions for conducting scientific research |

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| | focused on solving global, national, and regional challenges. |
| Main focus of the Educational and Research Programme and specialization | Scientific research in the subject area of the theory and methods of teaching mathematics. Formation and development of competencies in research activity, creative teaching, and methodological work. |
| Distinctive features of the Educational and Research Programme | The Educational and Research Programme is aimed at fostering PhD candidates' in-depth comprehension and understanding of contemporary issues in the theory and methods of teaching mathematics in institutions of general secondary and higher education. This is achieved in specially created conditions of partnership interaction between the university and schools, as well as through partnership cooperation with the public organization « <i>International Association of Researchers in Mathematics Education Didactics</i> ». The organization of scientific activity is strategically oriented toward global trends. Researcher and teacher competencies in the field of mathematics education methodology are developed within the creative environment of a scientific school. |
| 4 – Employability and Further Study Opportunities for Graduates | |
| Employability | Graduates of the programme are qualified to work in institutions of secondary and higher education, research centers, and to hold managerial positions in educational organizations. PhD graduates are entitled to occupy positions in accordance with the current version of the National Classification of Occupations of Ukraine (Classifier of Occupations DK 003:2010, as amended by the Order of the Ministry of Economic Development and Trade of Ukraine dated 18 August 2020 No. 1574), including: 2310 – Higher education teaching professionals; 232 – Teachers of professional pre-higher education institutions and teachers of general secondary education institutions; 235 – Other education and training professionals. |
| Further study | Pursuit of the academic degree of Doctor of Sciences and acquisition of additional qualifications within the adult education system. |

| 5 – Teaching and Assessment | |
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| Teaching and learning | Problem-oriented learning at the level of creative cognition and inquiry. The educational component of training is based on competence-based, activity-oriented, and learner-centered approaches. Acquisition of research methodology and skills of academic presentation. Conducting independent scientific research. Individual academic supervision, support, and consultation by a research supervisor. Development of skills in scientific and pedagogical activity in higher education. Participation in conferences, webinars, and publication activities contributes to the development of the ability to present one's own research achievements within the professional community. Active involvement in all organizational and methodological activities of the department fosters readiness and capacity for creative educational activity. |
| Assessment | Assessment is carried out based on the results of continuous and final evaluation (examinations, pass/fail assessments, continuous assessment, testing, oral and written examinations). Knowledge, skills, and competencies are assessed using a three-dimensional grading scale: a 100-point scale, the ECTS scale, and an extended institutional scale. Interim assessment is conducted in the form of an annual report in accordance with the individual study and research plan. Research results are validated through presentation at scientific conferences and publication in peer-reviewed academic journals. Final certification includes the public defense of the dissertation before a one-time specialized academic council. |
| 6 – Programme Competencies | |
| Integral competency | Ability to solve complex problems in the field of professional activity, including research and innovation, which involves in-depth rethinking of existing knowledge and the creation of new integrated knowledge and/or professional practices based on an understanding of global, national, and regional challenges. |
| General competencies (GC) | <p>GC 1. Ability to generate and implement new ideas.</p> <p>GC 2. Ability to work in an international context.</p> <p>GC 3. Ability to design and manage projects.</p> |

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| | <p>GC 4. Ability to analyze, evaluate, forecast, and ensure the quality of research activities.</p> <p>GC 5. Ability to organize one's own activities as a component of collective activity.</p> <p>GC 6. Ability to motivate people to achieve a common goal.</p> <p>GC 7. Understanding the importance of compliance with ethical standards and copyright in conducting scientific research, presenting its results, and in academic and pedagogical activities.</p> |
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| <p>Professional (special) competencies of the specialty (PC)</p> | <p>PC 1. Knowledge of the fundamentals of philosophy, psychology, and pedagogy that contribute to the development of general culture and personal socialization, and the ability to apply this knowledge in professional and scientific activities.</p> <p>PC 2. Ability to design and organize a modern educational environment for the learning and development of learners.</p> <p>PC 3. Ability to organize the educational process based on the principles of partnership pedagogy and student-centered learning.</p> <p>PC 4. Ability to supervise the practical training of higher education students.</p> <p>PC 5. Ability to assess learning outcomes and provide feedback to learners based on assessment results.</p> <p>PC 6. Ability to develop and improve teaching and learning materials.</p> <p>PC 7. Ability to independently conduct theoretical and/or experimental pedagogical research using general scientific and specialized methods.</p> <p>PC 8. Ability to communicate in a dialogic mode with the broader scientific community and the public in the field of scientific and/or professional activity.</p> <p>PC 9. Ability to identify, scientifically substantiate, and critically evaluate directions for the development of the methodology of teaching mathematics, taking into account global trends.</p> <p>PC 10. Ability to apply, develop, and improve modern technologies in scientific and pedagogical activities.</p> <p>PC 11. Ability to value diversity and multiculturalism and to be guided in professional activities by contemporary ethical standards and principles of tolerance, dialogue, and cooperation.</p> <p>PC 12. Ability to organize personal professional development.</p> |
| <p>7 – Programme Learning Outcomes</p> | |
| <p>PLO 1. Conceptual and methodological knowledge in the field A Education necessary for solving significant problems in teaching, research, and/or innovation, expanding and reassessing existing knowledge and professional practice, as well as critical analysis, evaluation, and synthesis of new and complex ideas.</p> | |

PLO 2. Comprehensive knowledge (including reinterpretation and critical analysis) of relevant literature in the subject specialization A4.04 Secondary Education (Mathematics).

PLO 3. Knowledge of the requirements for organizing the educational process, the content of higher education standards, and the specifics and trends of teaching in higher education.

PLO 4. Knowledge of the specifics and trends of academic advising in higher education, as well as requirements for the organization and content of practical training of learners.

PLO 5. Ability to demonstrate innovation, a high degree of autonomy, and consistent commitment to the development of new ideas or processes in advanced contexts of teaching and research activities.

PLO 6. Ability to explain and illustrate, using examples, the solution of complex pedagogical problems through the application of modern methodological approaches in teaching; ability to make well-reasoned decisions, including in conflict pedagogical situations and for their prevention.

PLO 7. Ability to take into account the principles of inclusiveness in higher education.

PLO 8. Ability to identify trends in the development of mathematics education methodology and educational digitalization and to incorporate them into the educational process.

PLO 9. Ability to organize and develop an integrated educational and developmental environment that promotes learning and education of learners in the context of contemporary tasks of Ukraine's development.

PLO 10. Ability to select and apply modern educational technologies and methodologies for developing subject-specific competencies of learners and to analyze the effectiveness of teaching activities.

PLO 11. Ability to supervise the practical training of higher education students.

PLO 12. Ability to analyze, design, develop, implement, and modernize teaching and learning support for mathematics education (including the use of digital tools).

PLO 13. Ability to design electronic educational resources using modern tools and to evaluate the effectiveness of didactic digital resources.

PLO 14. Ability to organize assessment of learning outcomes, conduct assessment procedures, determine the level of achievement of learning outcomes, and analyze and justify assessment results.

PLO 15. Ability to use academic Ukrainian and foreign languages in teaching and research activities.

PLO 16. Ability to initiate, plan, implement, and adjust a coherent process of in-depth scientific research in compliance with principles of academic integrity.

PLO 17. Ability to present research results and discuss them with professionals in the state and foreign languages.

PLO 18. Ability to objectively evaluate the results of one's own research as well as critically analyze research findings obtained by other scholars in the relevant field.

PLO 19. Knowledge of the fundamentals of research management and project management; ability to initiate complex projects and demonstrate leadership and autonomy during their implementation.

PLO 20. Knowledge of and adherence to the fundamental principles of academic integrity in scientific and educational activities.

PLO 21. Ability to communicate freely on issues related to scientific and expert knowledge with colleagues, the wider academic community, and society at large.

PLO 22. Ability to develop, improve, and present educational programmes and educational components.

PLO 23. Ability to supervise research and/or creative work of learners.

PLO 24. Ability to engage in continuous self-development and self-improvement, including mastering new teaching methodologies and research methods.

8 – Resource Provision for Programme Implementation

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| Staffing | <p>Staffing complies with the personnel requirements for conducting educational activities in the field of higher education in accordance with the current legislation of Ukraine (Resolution of the Cabinet of Ministers of Ukraine «<i>On Approval of the Licensing Conditions for Educational Activities of Educational Institutions</i>» dated 30 December 2015, No. 1187, as amended).</p> <p>All staff involved in the educational training of Doctors of Philosophy under this Educational and Research Programme hold an academic degree and/or academic title and demonstrate a confirmed level of scientific and professional activity. Academic staff possess relevant basic education and an appropriate number of publications in scholarly journals of categories «A» and «B», as well as in international journals indexed in Web of Science and/or Scopus databases. Professional development of academic and teaching staff is carried out in accordance with the professional development plan of the departments.</p> |
| Material and technical resources | <p>The resource base of Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University is fully adapted for training specialists at the third level of higher education. The availability of own educational facilities is 100%. The premises used in the educational process comply with</p> |

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| | <p>sanitary standards and fire safety requirements. A local computer network is in operation. Classrooms, libraries, reading rooms, and dormitories provide unrestricted Wi-Fi Internet access.</p> <p>All teaching and learning materials necessary for the educational process are available on the official website of Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University. The educational process is supported by multimedia equipment and informational resources in accordance with the requirements of the Educational and Research Programme and academic discipline syllabi.</p> |
| <p>Information and learning-methodological support</p> | <p>Information and learning-methodological support complies with the technological requirements for educational activities in higher education in accordance with current Ukrainian legislation (Resolution of the Cabinet of Ministers of Ukraine No. 1187, as amended). The library of Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University provides an electronic catalogue of educational and scientific literature and periodicals, an institutional repository, and plagiarism checking of scholarly works of higher education applicants (articles, conference papers, dissertations, etc.).</p> <p>All library resources are available via the University website: http://vspu.edu.ua and the library website: http://library.vspu.edu.ua</p> <p>Requests may be submitted via email: vspu.lib@gmail.com.</p> <p>The library reading room and educational facilities provide wireless Internet access. http://library.vspu.edu.ua Information and learning-methodological support of the programme is also available at: http://amnm.vspu.edu.ua</p> |
| <p>9 – Academic Mobility</p> | |
| <p>National Credit Mobility</p> | <p>Opportunities for academic mobility are provided in accordance with the Regulations on Internal Academic Mobility of Participants in the Educational Process of Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University, based on bilateral agreements between Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University and domestic higher education institutions. URL: https://vspu.edu.ua/content/position/p128.pdf</p> |

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| International Credit Mobility | Participation in international programmes is available. Student mobility is organized on the basis of partnership cooperation agreements between Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University and foreign universities. URLs: https://vspu.edu.ua/content/position/p134.pdf https://vspu.edu.ua/international/?p=programs |
| Education of Foreign Higher Education Applicants | Education of foreign higher education applicants is possible in accordance with the Admission Rules of Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University and the <i>Regulations on Education of Foreign Citizens at Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University</i> . URL: https://vspu.edu.ua/content/position/poll10.pdf |

2. List of Components of the Educational and Research Programme and Their Logical Sequence

2.1. List of Components of the Educational and Research Programme

| Code | Components of the Educational Programme (Courses, Practices, Qualification Work) | Credits | Form of Final Assessment |
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| 1. EDUCATIONAL COMPONENT OF THE EDUCATIONAL AND SCIENTIFIC PROGRAMME | | | |
| Mandatory Components of the Educational and Scientific Programme (ESP) | | | |
| MC 01 | Philosophy of Science and Ethics of the Researcher | 3 | Exam |
| MC 02 | Ukrainian Language for Academic Purposes | 3 | Pass/Fail |
| MC 03 | Foreign Language for Academic Communication | 3 | Exam |
| MC 04 | Academic Writing in a Foreign Language | 3 | Pass/Fail |
| MC 05 | Professional and Pedagogical Competence of a Higher Education Teacher | 3 | Pass/Fail |
| MC 06 | Digitalisation of Scientific Research | 3 | Pass/Fail |
| MC 07 | Methodology of Teaching Mathematics in Various Types of Educational Institutions | 3 | Pass/Fail |
| MC 08 | Educational Measurement | 3 | Pass/Fail |
| MC 09 | Research and Project Activity of a Teacher (Mathematics) | 4 | Exam |
| MC 10 | Electronic Educational Resources in the Methodological Activity of a Teacher (Mathematics) | 4 | Pass/Fail |
| MC 11 | Scientific and Methodological Seminar | 5 | Exam |

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| MC 12 | Pedagogical (Teaching Assistant) Practice | 5 | Pass/Fail |
| MC 13 | Research Practice | 3 | Pass/Fail |
| Total volume of mandatory components: | | 45 | 9 Pass/Fail assessments, 4 Exams |
| Elective Components of the Educational and Scientific Programme (ESP) | | | |
| EC 01 | Course from the list of university-wide elective disciplines of the general training cycle for the Doctor of Philosophy degree (approved by the Academic Council of Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University for the respective year of admission) | 3 | Pass/Fail |
| EC 02-05 | Courses from the list of elective disciplines of the professional training cycle for the respective year of admission, approved by the Academic Council of Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University | 3 | Pass/Fail |
| | | 3 | Pass/Fail |
| | | 3 | Pass/Fail |
| | | 3 | Pass/Fail |
| Total volume of elective components: | | 15 | 5 Pass/Fail assessments |
| 2. RESEARCH COMPONENT OF THE EDUCATIONAL AND SCIENTIFIC PROGRAMME | | | |
| Preparation of the doctoral dissertation, participation in scientific and practical conferences, seminars, joint research projects, preparation of publications in peer-reviewed academic journals, and public defense of the dissertation. | | 180 | |
| Total volume of the educational programme | | 240 | 14 Pass/Fail assessments, 4 Exams |

RESEARCH COMPONENT OF THE EDUCATIONAL AND SCIENTIFIC PROGRAMME

The research component of the Educational and Scientific Programme provides for the conduct of independent scientific research by a higher education applicant under the supervision of one or two academic supervisors and the presentation of its results in the form of a dissertation. The research component includes the following types of activities:

- conducting scientific research and preparing the dissertation;
- dissemination of research results (publication of articles, participation in conferences, scientific seminars of the NGO «International Association of Researchers in Mathematics Education Didactics», etc.);
- certification (public defense of the dissertation).

The research component of the Educational and Scientific Programme «Theory and Methods of Teaching Mathematics» provides the

performance by a third-cycle higher education applicant of an independent scientific study aimed at solving relevant problems in the theory and methods of teaching mathematics, obtaining new scientifically substantiated results, and implementing them in educational practice.

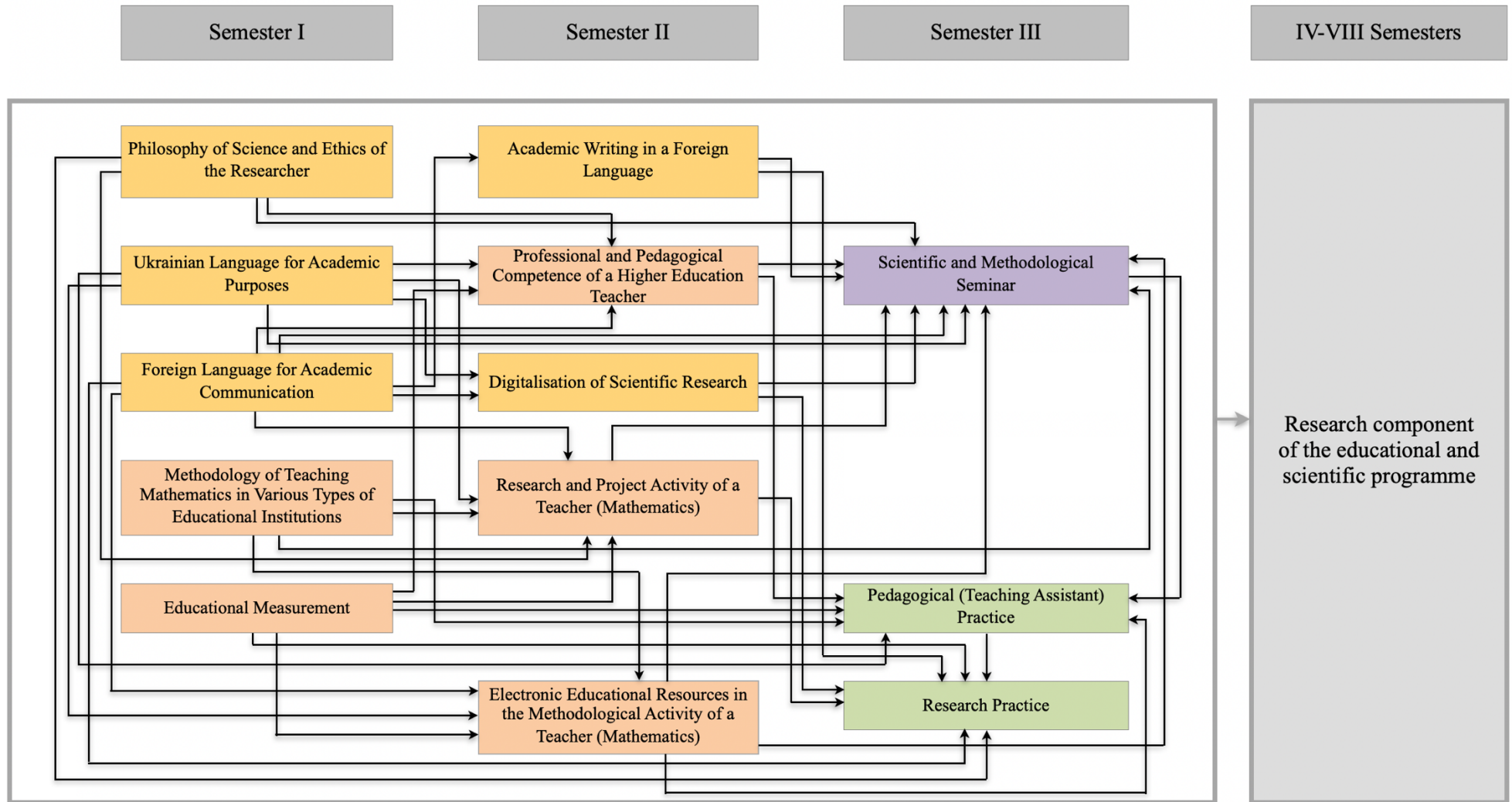
The research component includes:

- substantiation of the research topic, purpose, objectives, object, and subject of the study;
- analysis of the current state of the researched problem in national and international scientific literature;
- development of theoretical provisions and/or an original methodology for teaching mathematics;
- organization and conduct of a pedagogical experiment using appropriate methods of pedagogical diagnostics and statistical processing of results;
- validation and dissemination of research results through publication in peer-reviewed scientific journals and participation in scientific and practical events;
- preparation and formal presentation of the dissertation for the degree of Doctor of Philosophy.

The research is carried out under the supervision of an academic supervisor (or supervisors), who has the right to adjust the course of the scientific research and bears responsibility for the training of the applicant and the timely completion of the stages of dissertation work. The outcome of the research component is a completed and successfully defended dissertation that demonstrates scientific novelty as well as theoretical and practical significance in the field of the theory and methods of teaching mathematics.

The dissertation and the corresponding scientific publications are subject to mandatory verification for the absence of academic plagiarism, fabrication, falsification, and other forms of academic misconduct.

2.2. Structural and Logical Scheme of the Educational and Research Programme



3. Form of Attestation of Higher Education Applicants

The form of attestation of higher education applicants is the public defense of scientific achievements in the form of a dissertation. Admission to the defense is granted upon successful completion by the applicant of their individual study and research plan. In the case of early successful completion of both the educational and research components of the Educational and Research Programme, an early public defense of the qualifying scientific work may be conducted, based on the results of which the qualification of Doctor of Philosophy in Theory and Methods of Teaching Mathematics is awarded.

Requirements for the qualifying work. The dissertation for the degree of Doctor of Philosophy is an independent, comprehensive research study that proposes a solution to a relevant scientific problem in the field of knowledge A Education, the results of which constitute an original contribution to the development of the specialty A4 Secondary Education, subject specialization A4.04 Secondary Education (Mathematics). The dissertation for the degree of Doctor of Philosophy in Theory and Methods of Teaching Mathematics must have a volume of 7–9 author’s sheets of the main text and be prepared in accordance with established requirements. Compliance with academic integrity is based on the principles of adherence to generally accepted moral standards; compliance with copyright legislation; proper citation of information sources in cases of borrowing ideas, statements, or data; and independent completion of assigned tasks. The qualifying work is subject to plagiarism checking in accordance with the regulatory documents of the University. Requirements regarding the procedure and specific conditions for conducting the public defense of the dissertation are determined by the Cabinet of Ministers of Ukraine.

4. Matrix of Correspondence between Programme Competencies and Components of the Educational Programme (Appendix A)

5. Matrix of Provision of Programme Learning Outcomes (PLOs) by the Relevant Components of the Educational Programme (Appendix B)

6. List of Regulatory Documents on Which the Educational and Research Programme Is Based

1. **SG 2015** (Standards and Guidelines for Quality Assurance in the European Higher Education Area). Available at: https://ihed.org.ua/wp-content/uploads/2018/10/04_2016_ESG_2015.pdf

2. **EQF 2017** (European Qualifications Framework). Available at: <https://publications.europa.eu/en/publication-detail/-/publication/ceead970-518f-11e7-a5ca-01aa75ed71a1/language-en>
<https://ec.europa.eu/ploteus/content/descriptors-page>
3. **QF-EHEA 2018** (Qualifications Framework of the European Higher Education Area). Available at: http://www.ehea.info/Upload/document/ministerial_declarations/HEAParis2018_Communique_AppendixIII_952778.pdf
4. **ISCED 2011** (International Standard Classification of Education). Available at: <http://uis.unesco.org/sites/default/files/documents/international-standard-classification-of-education-isced-2011-en.pdf>
5. **ISCED-F 2013** (International Standard Classification of Education Fields of Education and Training). Available at: <http://uis.unesco.org/sites/default/files/documents/international-standard-classification-of-education-fields-of-education-and-training-2013-detailed-field-descriptions-2015-en.pdf>
6. **EQF Level Descriptors for History**. Available at: http://www.unideusto.org/tuningeu/images/stories/HUMART/History_EQF_Level_Descriptors.pdf
7. **Law of Ukraine “On Higher Education”**, dated 1 July 2014. Available at: <https://zakon.rada.gov.ua/laws/show/1556-18#Text>
8. **Law of Ukraine “On Education”**, dated 5 September 2017. Available at: <https://zakon.rada.gov.ua/laws/show/2145-19#Text>
9. **Law of Ukraine “On Scientific and Scientific-Technical Activity”**, dated 26 November 2015. Available at: <https://zakon.rada.gov.ua/laws/show/848-19#Text>
10. **Resolution of the Cabinet of Ministers of Ukraine No. 261**, dated 23 March 2016, *On Approval of the Procedure for Training Applicants for the Degrees of Doctor of Philosophy and Doctor of Sciences in Higher Education Institutions (Research Institutions)*. Available at: <https://zakon.rada.gov.ua/laws/show/261-2016-%D0%BF#Text>
11. **Resolution of the Cabinet of Ministers of Ukraine No. 44**, dated 12 January 2022, *On Approval of the Procedure for Awarding the Degree of Doctor of Philosophy and Revocation of Decisions of One-Time Specialized Academic Councils*. Available at: <https://zakon.rada.gov.ua/laws/show/44-2022-%D0%BF#Text>

12. **Order of the Ministry of Education and Science of Ukraine No. 40**, dated 12 January 2017, *On Approval of Requirements for Dissertation Formatting*. Available at: <https://zakon.rada.gov.ua/laws/show/z0155-17#Text>
13. **Order of the Ministry of Education and Science of Ukraine No. 32**, dated 15 January 2018, *On Approval of the Procedure for Forming the List of Professional Scientific Journals of Ukraine*. Available at: <https://zakon.rada.gov.ua/laws/show/z0148-18#Text>
14. **Code of Ethics of the Scientist of Ukraine**. Available at: <https://zakon.rada.gov.ua/rada/show/v0002550-09#Text>
15. **National Classifier of Ukraine: Classifier of Professions DK 003:2010**. Available at: <https://zakon.rada.gov.ua/rada/show/va327609-10>
16. **National Qualifications Framework of Ukraine**, approved by the Resolution of the Cabinet of Ministers of Ukraine dated 23 November 2011, as amended on 25 June 2020. Available at: <http://zakon4.rada.gov.ua/laws/show/1341-2011-%D0%BF>
17. **List of Fields of Knowledge and Specialties for Higher and Professional Pre-Higher Education**, approved by the Resolution of the Cabinet of Ministers of Ukraine dated 29 April 2015 No. 266 (as amended by Resolution No. 1021 dated 30 August 2024). Available at: <https://zakon.rada.gov.ua/laws/show/266-2015-%D0%BF#Text>
18. **Regulations on Accreditation of Educational Programmes**, approved by the Order of the Ministry of Education and Science of Ukraine dated 15 May 2024 No. 686. Available at: <https://zakon.rada.gov.ua/laws/show/z1013-24#Text>

Working Group

Guarantor of the Educational Programme _____ Prof. O. I. Matiash

Members of the Working Group:

_____ Prof. L. F. Mykhailenko
 _____ Assoc. Prof. A. L. Voievoda
 _____ PhD student V. V. Ryndiuk
 _____ PhD student I. V. Khutchenko

Appendix A

Matrix of Correspondence between Programme Competencies and Components of the Educational Programme

| | Mandatory Components of the Educational and Scientific Programme | | | | | | | | | | | | |
|--|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | MC 01 | MC 02 | MC 03 | MC 04 | MC 05 | MC 06 | MC 07 | MC 08 | MC 09 | MC 10 | MC 11 | MC 12 | MC 13 |
| <i>General competencies (GC)</i> | | | | | | | | | | | | | |
| GC 1 | • | | | | • | • | • | | • | | • | | • |
| GC 2 | | | • | • | | | | | | | • | | |
| GC 3 | | | | | • | • | • | | • | | • | | • |
| GC 4 | • | | | • | | • | • | • | • | | • | | • |
| GC 5 | | | | | • | | • | | • | | • | • | • |
| GC 6 | | | | | • | | • | | • | | • | • | |
| GC 7 | • | • | | • | | • | | | | | • | | • |
| <i>Professional (special) competencies of the specialty (PC)</i> | | | | | | | | | | | | | |
| PC 1 | • | | | | • | | • | | | | • | | |
| PC 2 | | | | | • | • | • | | • | • | | • | |
| PC 3 | | | | | • | | • | | | | • | • | |
| PC 4 | | | | | • | | • | | | | | • | |
| PC 5 | | | | | • | | | • | | | | • | |
| PC 6 | | | | | • | • | • | | • | • | • | • | |
| PC 7 | • | | | • | | • | | • | • | | • | | • |
| PC 8 | | • | • | • | | | | | | | • | | |
| PC 9 | | | | | | | • | | • | | • | | • |
| PC 10 | | | | | | • | | | • | • | | | |
| PC 11 | • | | • | | • | | | | | | • | | |
| PC 12 | | | | | • | | | | • | | • | • | • |

Appendix B

Matrix of Provision of Programme Learning Outcomes by the Relevant Components of the Educational Programme
Mandatory Components of the Educational and Scientific Programme

| | MC 01 | MC 02 | MC 03 | MC 04 | MC 05 | MC 06 | MC 07 | MC 08 | MC 09 | MC 10 | MC 11 | MC 12 | MC 13 |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| PLO 1 | • | | | | • | | • | | • | | • | | • |
| PLO 2 | | | | • | | | • | | • | | • | | • |
| PLO 3 | | | | | • | | • | | | | | • | |
| PLO 4 | | | | | • | | • | | | | | • | |
| PLO 5 | | | | | • | • | • | | • | • | • | | • |
| PLO 6 | | | | | • | | • | | • | | • | • | |
| PLO 7 | | | | | • | | • | | | | | • | |
| PLO 8 | | | | | | | • | | • | • | • | | |
| PLO 9 | | | | | • | | • | | • | | | • | |
| PLO 10 | | | | | | • | • | | • | • | | • | |
| PLO 11 | | | | | • | | | | | | | • | |
| PLO 12 | | | | | • | • | • | | • | • | • | | |
| PLO 13 | | | | | | • | | | | • | | | |
| PLO 14 | | | | | • | | | • | | | | • | |
| PLO 15 | | • | • | • | | | | | | | • | | |
| PLO 16 | • | | | • | | • | | | • | | • | | • |
| PLO 17 | | • | • | • | | | | | | | • | | |
| PLO 18 | • | | | • | | | | • | • | | • | | • |
| PLO 19 | • | | | | | | | | • | | • | | • |
| PLO 20 | • | | | • | | | | | | | • | | • |
| PLO 21 | | • | • | • | | | | | | | • | | |
| PLO 22 | | | | | • | | • | | • | | • | | |
| PLO 23 | | | | | | | | | • | | • | • | • |
| PLO 24 | | | | | • | | | | • | | • | • | • |