

DROHOBYCH IVAN FRANKO STATE PEDAGOGICAL UNIVERSITY



APPROVED

Vice-rector for Scientific and Pedagogical Work
and Informatization

Volodymyr SHARAN

25 квітня 2023

SYLLABUS

INNOVATIVE TECHNOLOGIES IN EXTRACURRICULAR WORK IN MATHEMATICS IN PRIMARY SCHOOL

Field of Study: **01 Education/ Pedagogy**

Programme Subject Area: **013 Primary Education**

Educational Programme: **Primary Education**

Discipline Status: **optional**

Faculty of **Primary Education and Arts**

Fundamental Disciplines of Primary Education Department

Language of Instruction: **English**

Information on the Study of the Discipline:

Mode of study	Year of study	Semester	Total scope of the discipline hours	Number of hours						Term paper	Type of semester control	
				Auditory classes					Individual work		Credit	Exam
			Credits ECTS	Total	Lectures	Laboratory works	Practical classes	Seminars				
Full-time	2	3	150/5	56	16	–	40	–	94	–	+	–

The syllabus is based on the Educational Programme and the Curriculum for the specialists of **the second (Master's) level of higher education** (120 ECTS credits)

Author:

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Approved at the meeting of the Fundamental Disciplines of Primary Education Department

Protocol № 4 dated 14.03.2023

Head of the Department Volodymyr KOVALCHUK

Approved at the meeting of the Scientific and Methodological Council of the Faculty of Primary Education and Arts.

Protocol № 3 dated 29.03.2023

Approved at the meeting of the Scientific and Methodological Council of the University.

Protocol № 4 dated 25 квітня 2023

1. PURPOSE AND OBJECTIVES OF THE EDUCATIONAL DISCIPLINE

The educational discipline «**Innovative technologies in extracurricular work in mathematics in elementary school**» provides professional training of the future teacher in accordance with the needs of elementary school. In the process of studying the discipline, students acquire knowledge about the peculiarities of the organization of educational and game activities in extracurricular activities in mathematics, about the organization of educational cooperation of students and teachers in extracurricular work in mathematics, about the peculiarities of the use of interactive learning technologies in extracurricular work in mathematics in elementary school.

As a result of studying the educational discipline, the post-graduate student must master the following competencies:

General competencies:

- the ability to adapt and act in a new situation.
- the ability to abstract thinking, analysis and synthesis.
- the ability to generate new ideas (creativity).
- the ability to be critical and self-critical.
- appreciation and respect for diversity and multiculturalism

Professional competencies:

- the ability to organize the educational process in primary school using modern means, methods, techniques, pedagogical technologies.
- the ability to psychologically and pedagogically guide the personal development of elementary school students, in particular, children with special educational needs.
- awareness at the level of the basics of fundamental sciences and modern achievements of pedagogy and professional methods of primary school.
- the ability to self-education, self-improvement, self-realization in professional activities and competitiveness in the labor market.

2. PREREQUISITES FOR STUDYING THE EDUCATIONAL DISCIPLINE

A prerequisite for studying is mastering the disciplines "Methodology of teaching mathematics in primary school", "Modern methodological principles of teaching mathematics in primary school".

3. EXPECTED LEARNING OUTCOMES

Programme learning outcomes:

- critically consider the conceptual principles, goals, objectives, principles of functioning of primary education in Ukraine
- implement information and communication technologies and generate new ideas in the organization of the educational process of various types of primary education institutions.
- to carry out psychological and pedagogical guidance in the individual development of the personality of a child of primary school age
- to know and use in practical activities the legislative basis of primary education.
- possess the skills and abilities of analysis, forecasting, planning, organization of the educational process in primary school, taking into account the principles of child-centeredness, health care, inclusion, developmental learning, person-oriented approach, subject-subject interaction, competence approach.
- introduce into the educational process modern educational technologies and innovative methods of teaching, upbringing and development of children of primary school age

- apply modern didactic and methodical principles of teaching psychological and pedagogical disciplines in professional activity and choose appropriate technologies and methods.

According to the requirements of the educational and professional programme, students must

know:

- plan, organize and effectively carry out educational work in mathematics;
- apply knowledge of pedagogy, psychology, methods of teaching mathematics in the process of using innovative technologies;
- to ensure that children acquire life experience, mathematical knowledge, abilities and skills necessary for their successful schooling;
- to be oriented in the method of implementing the technology of educational and game activities in extracurricular classes in mathematics in elementary school, the technology of organizing educational cooperation of students and teachers in extracurricular work in mathematics, the technology of differentiated learning in extracurricular work in mathematics in elementary school, the technology of individualization of the educational process in mathematics in extracurricular work.
- peculiarities of using modern information and communication technologies in extracurricular work in elementary school mathematics, interactive learning technologies in extracurricular work in mathematics.

be able:

- generalize the experience, implement the best pedagogical experience in one's own pedagogical work with children;
- use the content, forms of organization of pedagogical technologies during the study of mathematics in extracurricular activities;
- to select the optimal means when conducting forms for extracurricular work in mathematics;
- apply different types of visibility;
- form basic mathematical concepts in accordance with the current program with the help of innovative technologies in extracurricular activities.

CRITERIA FOR ASSESSMENT OF LEARNING OUTCOMES

The assessment is carried out according to the scales: 100-point, national and ECTS.

A (90 – 100) – credited:

receives a winner who knows how to plan, organize and effectively carry out educational work in mathematics; apply knowledge of pedagogy, psychology, methods of teaching mathematics in the process of using innovative technologies; to ensure that children acquire life experience, mathematical knowledge, abilities and skills necessary for their successful studies at school; successfully implements the technologies of educational and game activities in extracurricular mathematics classes in elementary school, technologies of educational cooperation between students and teachers, differentiated learning and individualization of the educational process in mathematics in extracurricular work; knows how to use modern information, communication and interactive technologies in extracurricular work in elementary school mathematics; knows how to choose the optimal means when conducting forms for extracurricular work in mathematics, use different types of visualization, knows

how to form basic mathematical concepts in accordance with the current program with the help of innovative technologies in extracurricular work classes.

B (82 - 89) – credited:

receives a winner who knows how to plan, organize and effectively carry out educational work in mathematics; apply knowledge of pedagogy, psychology, methods of teaching mathematics in the process of using innovative technologies; to ensure that children acquire life experience, mathematical knowledge, abilities and skills necessary for their successful studies at school; successfully implements the technologies of educational and game activities in extracurricular mathematics classes in elementary school, technologies of educational cooperation between students and teachers, differentiated learning and individualization of the educational process in mathematics in extracurricular work; knows how to use modern information, communication and interactive technologies in extracurricular work in elementary school mathematics; knows how to choose the optimal means when conducting forms for extracurricular work in mathematics, use different types of visualization, knows how to form basic mathematical concepts in accordance with the current program with the help of innovative technologies in extracurricular work classes, but does not know how to interpret them.

C (75 – 81) – credited:

receives a winner who knows how to plan, organize and effectively carry out educational work in mathematics; apply knowledge of pedagogy, psychology, methods of teaching mathematics in the process of using innovative technologies; to ensure that children acquire life experience, mathematical knowledge, abilities and skills necessary for their successful studies at school; successfully implements the technologies of educational and game activities in extracurricular mathematics classes in elementary school, technologies of educational cooperation between students and teachers, differentiated learning and individualization of the educational process in mathematics in extracurricular work; but failed to convincingly argue his answer, made insignificant inaccuracies.

D (67 – 74) – credited:

is awarded to a winner who knows how to plan, organize and effectively carry out educational work in mathematics; apply knowledge of pedagogy, psychology, methods of teaching mathematics in the process of using innovative technologies; to ensure that children acquire life experience, mathematical knowledge, abilities and skills necessary for their successful studies at school; successfully implements the technologies of educational and game activities in extracurricular mathematics classes in elementary school, technologies of educational cooperation between students and teachers, differentiated learning and individualization of the educational process in mathematics in extracurricular work; but did not manage to convincingly argue his answer, admitted insignificant inaccuracies, errors that he was able to correct on his own, knows how to draw conclusions.

E (60 – 66) – credited:

is awarded to a winner who knows how to plan, organize and effectively carry out educational work in mathematics in the process of using innovative technologies; to ensure that children acquire life experience, mathematical knowledge, abilities and skills necessary for their successful studies at school; did not manage to convincingly argue his answer, made insignificant inaccuracies, errors that he was able to correct on his own, knows how to draw conclusions.

FX (35 – 59) – not credited:

receives the winner who knows how to plan, organize and effectively carry out educational work in mathematics in the process of using innovative technologies; to ensure that children acquire life experience, mathematical knowledge, abilities and skills necessary for their successful studies at school; did not manage to convincingly argue his answer, made insignificant inaccuracies, mistakes that he was able to correct on his own, knows how to draw conclusions; gave the wrong answer to the question.

F (0 – 34) – not credited:

awarded to a student who has shown ignorance of a significant part of the educational material; makes significant mistakes in answering questions.

5. MEANS OF DIAGNOSIS OF LEARNING OUTCOMES

- a) a control paper (control test);
- b) an individual task;
- c) an interview with the lecturer;
- d) laboratory work credit.

6. CONTENT OF THE EDUCATIONAL DISCIPLINE

Topic 1. The technology of organizing educational and game activities in extracurricular mathematics classes in elementary school.

Methodological features of the application of educational and game technology in extracurricular work. Types and forms of organization of educational games in extracurricular mathematics classes. Practical approaches to the use of educational and game technology in extracurricular work in mathematics.

Topic 2. Technology of organization of educational cooperation of students and teachers in extracurricular work in mathematics.

Technology of educational cooperation as the main form of interaction between students and teachers. Forms and methods of organizing the technology of educational cooperation in extracurricular classes in mathematics.

Topic 3. Differentiated learning technology in extracurricular work in mathematics in elementary school

Conceptual foundations of the application of differentiated learning technology in extracurricular work in mathematics. Psychological and pedagogical foundations of the organization of differentiated teaching in mathematics. Practical foundations of the implementation of differentiated learning in the prescribed work in mathematics

Topic 4. Technology of individualization of the educational process in mathematics in extracurricular work.

Psychological and pedagogical aspects of the content of individualization of education. Basic principles of the technology of individualization of the educational process in mathematics in extracurricular work. Methods, forms and methods of individualization of learning in extracurricular work in mathematics

Topic 5. Modern information and communication technologies in extracurricular work in elementary school mathematics

Peculiarities of the application of information and communication technologies of learning in extracurricular work in mathematics. Psychological-pedagogical and sanitary-hygienic requirements for the use of ICT tools in extracurricular work.

Multimedia provision of various forms of extracurricular work Implementation of software tools in extracurricular mathematics classes

Topic 6. Project technologies in extracurricular work in elementary school mathematics

The essence and content of design learning technologies. Peculiarities of the organization of project technology in extracurricular mathematics classes. The project method as an effective means of organizing the developmental and cognitive activity of younger schoolchildren. Means of organization of project technology of education

Topic 7. Peculiarities of using interactive learning technologies in extracurricular work in mathematics

Content of interactive technologies in mathematics. Formation of students' cognitive activity during the use of interactive technologies. Practical use of interactive exercises in extracurricular mathematics.

Topic 8. Peculiarities of the use of alternative learning technologies in extracurricular activities of primary school

Integration processes in modern primary school. Alternative modern learning technologies in the extracurricular bot of primary school. Use of M. Montessori and M. Zaitsev technologies in extracurricular mathematics classes

Topics of practical classes:

1. Technology of organizing educational and game activities in extracurricular mathematics classes in elementary school
2. Technology of organization of educational cooperation of students and teachers in extracurricular work in mathematics
3. Differentiated learning technology in extracurricular work in mathematics in elementary school
4. Technology of individualization of the educational process in mathematics in extracurricular work
5. Modern information and communication technologies in extracurricular work in elementary school mathematics
6. Project technologies in extracurricular work in elementary school mathematics
7. Peculiarities of using interactive learning technologies in extracurricular work in mathematics
8. Peculiarities of using alternative learning technologies in extracurricular activities of primary school

7. INDIVIDUAL WORK

Independent work is the main means of assimilation of educational material by master's students in the time free from classroom classes. It involves independent study of subjects of the discipline; development of scientific works, textbooks, educational and methodical manuals; preparation of mandatory modular tasks; preparation of a selective practical task based on a critical review of scientific publications; presentation of the results of a selective task at practical classes, etc.

1. Elaboration of articles and publications in periodicals and magazines "Primary School" and others. on issues of this discipline

2. Give a complete analysis of the article:

Кобернік Г. Особливості застосування інтерактивних технологій навчання на уроках математики / Г. Копернік // Початкова школа.-2007.-№9.-С.13-16; №10.-С.21-25; №11.-С.16-21.

Комар О.А. Підготовка майбутніх учителів початкової школи до застосування інтерактивних технологій. / О.А. Комар – Умань: РВЦ «Софія», 2008. – 32с.

Хромишин Л.І. Ігрові ситуації як засіб розвитку і спілкування школярів /Л.І. Хромишин // Початкова школа. – 1984. – № 1. – С. 60-61.

3. Work out the content of Н. Altshuller's creative personality development technology.

4. Reveal the content of Sh. Amonashvili's technology

5. Work out the content of the technology of integrated learning in extracurricular mathematics classes

6. Work out the features of using intellectual games in extracurricular mathematics classes

7. Develop a general outline of an extracurricular activity in mathematics

8. FORMS OF CURRENT AND FINAL CONTROL

The form of final control of the student's progress in the discipline is a credit. Assessment questions are formed on the basis of theoretical material presented at lectures and on the basis of questions that are provided for independent study by students.

Crediting according to voucher No. 2 and in front of the commission is carried out in writing with evaluation on a scale.

The content of the colloquium is a set of questions of a theoretical nature, the formulation of the main provisions of the discipline, definitions and is estimated at *20 points*.

The content of the interview with the lecturer is a set of questions of a theoretical nature, the formulation of the main provisions of the discipline, definitions and is estimated at *10 points*

The content of the independent work on the academic discipline is a list of questions and methodical tasks from a certain section of the discipline and is estimated at *30 points*.

The content of the control work on the academic discipline is a list of questions, test tasks of both closed and open form, methodical tasks and is estimated at *40 points*.

Assessment of the results of full-time students' studies is carried out in written and oral form with the assessed on a scale of 100.

Distribution of 100 points between types of work:

<i>Individual task</i>	<i>Control paper (control test)</i>	<i>Interview with the lecturer</i>	<i>Colloquium</i>	<i>Sum</i>
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30	40	10	20	100
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The discipline is studied in one semester, the form of final control is a credit. The student's knowledge is assessed on a 100-point scale. Assessment questions are formed on the basis of theoretical material presented at lectures and on the basis of questions that are provided for independent study by students.

Re-examination is carried out in writing with assessment on the 100-point scale.

9. TOOLS, EQUIPMENT, SOFTWARE

Multimedia support; platforms Zoom, Classroom and others.

10. RECOMMENDED SOURCES OF INFORMATION

MAIN:

1. Антонов В. М. Дистанційне навчання: підручник. Херсон: Видавничий центр «ШтрихТ», 2011. 160 с.
2. Биков В.Ю. та ін. Інформаційне забезпечення навчально-виховного процесу: інноваційні засоби і технології. К.: Атака, 2006. 288 с.
3. Триус Ю.В., Стеценко І. В., Оксамитна Л.П., Франчук В.П., Герасименко І.В. Використання системи електронного навчання MOODLE для контролю і оцінювання навчальної діяльності студентів ВНЗ: методичний посібник / За ред. Ю.В. Триуса. Черкаси: МакЛаут, 2010. 200 с.
4. Вишнівський В.В., Гніденко М.П., Гайдур Г.І., Ільїн О.О. Організація дистанційного навчання. Створення електронних навчальних курсів та електронних тестів: навчальний посібник. Київ: ДУТ, 2014. 140 с. [Web-ресурс]. URL: http://www.dut.edu.ua/uploads/1_786_40131752.pdf.
5. Кадемія М. Ю., Шахіна І. Ю. Інформаційно-комунікаційні технології в навчальному процесі: навч. посібник. Вінниця: ТОВ «Планер». 2011. 220 с
6. Карташова Л. А., Чхало О.М. Створення персонального навчального середовища: застосування відкритого й загальнодоступного web-інструментарію. *Комп'ютер у школі та сім'ї*. 2017. № 4. С. 19–24.
Кухаренко В.М., Березенська С.М., Бугайчук К.Л. Теорія та практика змішаного навчання: монографія / за ред. В.М. Кухаренка. Харків: «Міськдрук», НТУ «ХПІ», 2016. 284 с.
7. Кухаренко В. М. Теорія та практика змішаного навчання: монографія. Харків: «Міськдрук», НТУ «ХПІ», 2016. 284 с.
8. Мартинюк Г. Педагогічні умови підготовки майбутніх вчителів до професійної діяльності з використанням інформаційних технологій URL: http://ii.npu.edu.ua/files/Zbirnik_KOSN/14/33.pdf
9. Михайліченко М.В., Рудик Я.М. Освітні технології: навч.посібник. Київ: ЦП «КОМПРИНТ», 2016. 583 с.
10. Положення про дистанційне навчання. Затверджене наказом МОН України №466 від 25.04.2013. URL: zakon2.rada.gov.ua/laws/show/z0703-13.
11. Про затвердження Положення про електронний підручник: Наказ МОН України від 24.05. 2018 р. за № 621/32073 (зміни від 29.05.2019 р. за № 748). URL: <https://zakon.rada.gov.ua/laws/show/z0621-18#n14>.
12. Про затвердження Положення про електронні освітні ресурси: Наказ МОН України від 01.10.2012 № 1060 (зміни від 29.05.2019 р. за № 749). URL: <https://zakon.rada.gov.ua/laws/show/z165-12>.

13. Триус Ю. В., Герасименко І. В., Франчук В. М. Система електронного навчання ВНЗ на базі MOODLE: Методичний посібник. Черкаси, 2012. 220 с.

INTERNET-RESOURCES:

14. Цифровий освітній ресурс з дисципліни «Технології електронного навчання»: система Moodle_IDGU / Мізюк В. А. [Web-ресурс]. URL: <https://idgu.in.ua>
15. Офіційний сайт системи Google Classroom. [Web-ресурс]. URL: classroom.google.com
16. Офіційний сайт системи Moodle. [Web-ресурс]. URL: <http://moodle.com/https://moodle.org/>
17. Навчання в дома : практичні поради для вчителів від психологині Світлани Ройз URL: <https://nus.org.ua/articles/navchannya-vdoma-praktychni-porady-dlya-vchyteliv-vid-psychologyni-svitlany-rojz/>
18. Як технічно організувати дистанційне навчання – по-крокова інструкція URL: <https://nus.org.ua/articles/yak-tehnichno-organizuvaty-dystantsijne-navchannya-pokrokovaya-instruktsiya/>
19. 35 інструментів для дистанційного навчання – добірка НУШ URL: <https://nus.org.ua/articles/30-instrumentv-dlya-dystantsijnogo-navchannya-dobirka-nush/>
20. Практики та підходи до дистанційного навчання – рекомендації для вчителів URL: <https://nus.org.ua/articles/praktyky-ta-pidhody-do-dystantsijnogo-navchannya-rekomendatsiyi-dlya-vchyteliv/>
21. Чотири сервіси, які допоможуть організувати дистанційне навчання URL: <https://nus.org.ua/articles/chotyry-servisy-yaki-dopomozhut-organizuvaty-dystantsijne-navchannya/>
22. Як працювати в Google-клас: покрокова інструкція URL: <https://nus.org.ua/articles/yak-pratsyuvaty-v-google-klas-pokrokovaya-instruktsiya/>
23. Усе в одному місці : як програма Discord допоможе організувати дистанційне навчання URL: <https://nus.org.ua/articles/use-v-odnomu-mistsi-yak-programa-discord-dopomozhe-organizuvaty-dystantsijne-navchannya/>
24. Як використовувати YouTube у дистанційному навчанні URL: <https://nus.org.ua/articles/yak-vykorystovuvaty-youtube-u-dystantsijnomu-navchanni/>
25. Як розробити дистанційний урок для 1-2 класів – інструкція від учительки URL: <https://nus.org.ua/articles/yak-rozrobyty-dystantsijnij-urok-dlya-1-2-klasiv-instruktsiya-vid-vchytelky/>
26. Дистанційне навчання в 3-4 класах: інструкції, приклади уроків та комунікації з батьками URL: <https://nus.org.ua/articles/dystantsijne-navchannya-v-3-4-klasi-instruktsiyi-pryklady-urokiv-ta-komunikatsiyi-z-batkamy/>
27. 10 лайфхаків для вчителів і порада батькам – вчителька математики про дистанційне навчання URL: <https://nus.org.ua/articles/10-lajfhakiv-dlya-vchyteliv-i-porada-batkam-vchytelka-matematyky-pro-dystantsijne-navchannya/>
28. Як організувати дистанційне навчання для дітей з ООП. Досвід учителів URL: <https://nus.org.ua/articles/yak-organizuvaty-dystantsijne-navchannya-dlya-ditej-z-oor-dosvid-vchyteliv/>
29. Дистанційне навчання: як зацікавити учнів – поради від учительки URL: <https://nus.org.ua/articles/dystantsijne-navchannya-yak-zatsikavyty-uchniv-porady-vid-uchytelky/>
30. Освіта після пандемії. Тренди майбутнього шкільної освіти URL: <https://nus.org.ua/view/osvita-pislya-pandemiyi-chastyna-2-trendy-majbutnogo-shkilnoyi-osvity/>

31. STEM-освіта – світовий тренд, що прийшов до України URL:
<https://mind.ua/openmind/20185700-steam-osvita-svitovij-trend-shcho-prijshov-do-ukrayini>