SYLLABUS
Fall semester 2025 – 2026 academic year
Educational program "Applied and Computational Mathematics (7M05404)"

ID and name of course	**Independent work of the student (IWM)**	**Number of credits**			**General number of credits**	**Independent work of the student under the guidance of a teacher (IWST)**
		Lectures (L)	**Practical classes (PC)**	**Lab. classes (LC)**		
OPNI 5301 Organization and planning of scientific research	3	1,7	3,3	-	5	5

ACADEMIC INFORMATION ABOUT THE COURSE				
Learning Format	**Cycle, component**	**Lecture types**	**Types of practical classes**	**Form and platform final control**
Offline	Obligatory	Problematic, analytical	Solution of practical problems, discussions on research methods in the field of mathematics, actuarial mathematics and computational sciences and statistics	Oral exam
Lecturer - (s)	Bektemessov Zholaman Maktagaliuly			
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Assistant - (s)				
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ACADEMIC COURSE PRESENTATION		
Purpose of the course	**Expected Learning Outcomes (LO) *** Describe what is the result of studying the course the student will be able to:	**Indicators of LO achievement (ID)**
The goal is training, scientific and scientific-pedagogical personnel at the world qualification requirements, the effective use of its educational, scientific, technological and innovation capacity for economic development and social objectives of the country.	1. (cognitive) Know the theoretical foundations of the organization of scientific research.	1.1 analyze the principles, methods, forms and means of organizing and planning scientific activities, know the principles of time management.
		1.2 to classify the methods of scientific and scientific-pedagogical research.
	2. (functional) Apply analytical data to research in mathematics, actuarial mathematics, computational sciences and statistics.	2.1 highlight the urgent problems of digitalization and the development of modern information and communication technologies in various industries and the education system.
		2.2 use modern scientific methods to solve research problems.
	3. (functional) Have a skill in public speaking.	3.1 manage voice modulation, have clear diction, master oratory
		3.2 to apply elements of pedagogical excellence for higher education.
	4. (systemic) Build management of socialization of research results.	4.1 present to the scientific community research achievements in the form of scientific articles, reports, multimedia presentations in accordance with

		accepted standards and formats of the professional community
		4.2 to highlight the research problem in the context of real professional activity and design programs for its study
Prerequisites	philosophy, psychology.	
Postrequisites	Doctoral students should know how to create and run scientific research project, scientific paper, master dissertation research and thesis.	
Learning Resources	**Literature:** main, additional. *1.* Novikov, DA, AL Sukhanov Models and mechanisms for managing research projects in universities. Moscow: Institute of Education Management RAO, 2005. - 80. *2.* RF Government Resolution N 568 on the approval of the Federal Program "Scientific and scientific-pedagogical personnel of innovative Russia" for 2009-2013. *3.* Federal Program "Scientific and scientific-pedagogical personnel of innovative Russia" for 2009- 2013. *4.* FTP "Research and development on priority directions of scientific-technological complex of Russia for 2007-2012" (in red. RF Government Decree of 18.08.2007 N 531, from 19.11.2008 N 857, from 27.01.2009 N 62). *5.* Tender documentation for the open competition for a state contract to perform exploratory research for public use under the federal target program "Scientific and scientific-pedagogical personnel of innovative Russia" for 2009-2013. - M., Ministry of Education and Science, 2011 *6.* B.I. Bedny, A.A. Mironos. Training of researchers in higher education. Status and trends in graduation, Nizhny Novgorod: Publishing House of UNN, 2008. - 219 p. *7.* Management dissertation advice / Arister NI, Resnick S., ed. FI Shamkhalov - 4th ed., Enlarged and revised. - Moscow: INFRA-M, 2011. - 319 p. *8.* Dissertation Management Q & A / NI Arister, Resnick SD, Sazykina OA, ed. FI Shamkhalov. - Moscow: INFRA-M, 2011. - 256. *9.* Workbook Scientific Secretary of the Dissertation Council. - Moscow: INFRA-M, 2011. - 175 p. **Research infrastructure** 1. teaching room **Professional scientific databases** 1. according to their master thesis **Internet resources** 1 http://elibrary.kaznu.kz/ru 2 https://files.eric.ed.gov/fulltext/ED575743.pdf 3 https://d32ogoqmya1dw8.cloudfront.net/files/facultyequity/sowing_seeds_solid_research.pdf 4 https://www.igi-global.com/dictionary/expanding-boundaries-learning/9134 http://cmp.felk.cvut.cz/~pajdla/cmp/phd/Comer/Comer-essay.dissertation.htm	

Academic course policy	The academic policy of the course is determined by the Academic Policy and the Policy of Academic Integrity of Al-Farabi Kazakh National University . Documents are available on the main page of IS Univer . **Integration of science and education.** The research work of students, undergraduates and doctoral students is a deepening of the educational process. It is organized directly at the departments, laboratories, scientific and design departments of the university, in student scientific and technical associations. Independent work of students at all levels of education is aimed at developing research skills and competencies based on obtaining new knowledge using modern research and information technologies. A research university teacher integrates the results of scientific activities into the topics of lectures and seminars (practical) classes, laboratory classes and into the tasks of the IWST, IWS, which are reflected in the syllabus and are responsible for the relevance of the topics of training sessions and assignments. **Attendance.** The deadline for each task is indicated in the calendar (schedule) for the implementation of the content of the course. Failure to meet deadlines results in loss of points. **Academic honesty.** Practical/laboratory classes, IWS develop the student's independence, critical thinking, and creativity. Plagiarism, forgery, the use of cheat sheets, cheating at all stages of completing tasks are unacceptable. Compliance with academic honesty during the period of theoretical training and at exams, in addition to the main policies, is regulated by the "Rules for the final control" , "Instructions for the final control of the autumn / spring semester of the current academic year" , "Regulations on checking students' text documents for borrowings". Documents are available on the main page of IS Univer . **Basic principles of inclusive education.** The educational environment of the university is conceived as a safe place where there is always support and equal attitude from the teacher to all students and students to each other, regardless of gender, race / ethnicity, religious beliefs, socio-economic status, physical health of

	the student, etc. All people need the support and friendship of peers and fellow students. For all students, progress is more about what they can do than what they can't. Diversity enhances all aspects of life. All students, especially those with disabilities, can receive counseling assistance by phone / e- mail zholaman.bektemessov@kaznu.kz. **Integration MOOC (massive open online course).** In the case of integrating MOOC into the course, all students need to register for MOOC. The deadlines for passing MOOC modules must be strictly observed in accordance with the course study schedule. **ATTENTION!** The deadline for each task is indicated in the calendar (schedule) for the implementation of the content of the course, as well as in the MOOC. Failure to meet deadlines results in loss of points.

INFORMATION ABOUT TEACHING, LEARNING AND ASSESSMENT

Score-rating letter system of assessment of accounting for educational achievements

Grade	Digital equivalent points	points, % content	Assessment according to the traditional system
A	4.0 _	95-100	Great
A-	3.67	90-94	
B+	3.33	85-89	Fine
B	3.0	80-84	
B-	2.67	75-79	
C+	2.33	70-74	
C	2.0	65-69	Satisfactorily
C-	1.67	60-64	
D+	1.33	55-59	
D	1.0	50-54	
FX	0,5	25-49	Unsatisfactory
F	0	0-24	

Assessment Methods

Criteria-based assessment is the process of correlating actual learning outcomes with expected learning outcomes based on clearly defined criteria. Based on formative and summative assessment.

Formative assessment is a type of assessment that is carried out in the course of daily learning activities. It is the current measure of progress. Provides an operational relationship between the student and the teacher. It allows you to determine the capabilities of the student, identify difficulties, help achieve the best results, timely correct the educational process for the teacher. The performance of tasks, the activity of work in the classroom during lectures, seminars, practical exercises (discussions, quizzes, debates, round tables, laboratory work, etc.) are evaluated. Acquired knowledge and competencies are assessed.

Summative assessment - type of assessment, which is carried out upon completion of the study of the section in accordance with the program of the course. Conducted 3-4 times per semester when performing IWM. This is the assessment of mastering the expected learning outcomes in relation to the descriptors. Allows you to determine and fix the level of mastering the course for a certain period. Learning outcomes are evaluated.

Formative and summative assessment	Points % content
Activity at lectures	5
Work in practical classes	20
Independent work	25
Design and creative activity	10
Final control (exam)	40
TOTAL	100

Calendar (schedule) for the implementation of the content of the course. Methods of teaching and learning.

A week	Topic name	Number of hours	Max. ball
	MODULE 1		
1	**L-1.** Introductory lecture. General. Dissertation research and Science.	1	
	S-1. Applied aspects of extreme problems in Computation Mathematics, Computer Science, IT, Software.	2	
2	**L-2.** The basic principles of the organization and planning of scientific research. Analysis of the methods and principles of research. Determination theme or thesis research.	1	
	S-2. Basic requirements for preparation of applications for research grants.	2	
3	**L-3.** Attracting graduate students in science: scientific and educational projects. Competitive research funding. Requirements for writing a thesis.	1	
	S-3. Search capabilities of individual positions in Kazakhstan, Russia, and foreign research laboratories.	2	
4	**L-4.** Scientific methods.	1	
	S-4. Network European educational programs	2	
5	**L-5.** Experiment**.**	1	
	S-5. Preparation and discussion of the mini-grant applications on topics of research and discussion.	2	40
	MODULE 2		
6	**L-6.** Statistical methods of research.	1	
	S-6. Analysis and discussion of the typical examples of the completed application form to take part in the competition and report on performance of a government contract.	2	25
7	**L-7.** Language and style.	1	
	S-7. Preparation and order acceptance reporting	2	35
Midterm control 1			**100**
8	**L-8.** Publication of research results. Preparation of scientific publications. Structural elements of the dissertation. Normative documentation.	1	

	S-8. Distribution of scientific journals on the number of requests. Impact factor journals	2	10
9	**L-9.** Scientific work. Scientific creation	1	
	S-9. Parsing problem situations that arise under assessing the effectiveness of labor researchers and teachers in higher education.	2	10
10	**L-10.** Classification of network resources on liability, completeness of content, placement, and conditions of access.	1	
	S-10. Access IP addresses and accounts. Open, subscription and one-time accesses. The effect of the fifth point.	2	10
MODULE 3			
11	**L-11.** Copyright in the network area and its implications for users. Patenting.	1	
	S-11. Legal and technical tools for copyright protection.	2	10
12	**L-12.** Tools of self-motivation	1	
	S-12. Preparing reports for conferences and other scientific events	2	10
13	**L-13.** The organizational aspects of the work on the dissertation	1	
	S-13. The base principals of Time-management.	2	10
14	**L-14.** Methodology of scientific work in the performance of the research	1	
	S-14. Thesis and the abstract preparation	2	20
15	**L-15.** Fundamentals of technology commercialization research and development. Commercialization strategies.	1	
	S-15. Intellectual Property. Formation of intangible assets. Development of competitive advantages of enterprises	2	20
Midterm control 2			**100**
Final control (exam)			**100**
TOTAL for course			**100**

Dean _____ Zh.M. Bektemessov

Head of Department of Mathematical and Computer Modeling _____ S.D. Maussumbekova

Lecturer _____ Zh.M. Bektemessov

RUBRICATOR OF THE SUMMATIVE ASSESSMENT

CRITERIA EVALUATION OF LEARNING OUTCOMES

Issued at the request of the teacher for each planned summative assessment (IWST)

TEMPLATE

Task name (points, % content from 100% MC, copy from the calendar (graphics) implementation of the content of the training course, methods of teaching and learning

Criterion	**"Excellent"** **Max. weight in %**	**"Good"** **Max. weight in %**	**"Satisfactory"** **Max. weight in %**	**"Unsatisfactory"** **Max. weight in %**

Example 1. Written assignment "My professional history" (25% of 100% MC)

Criterion	"Excellent" 20-25%	"Good" 15-20%	"Satisfactory" 10-15%	"Unsatisfactory" 0-10%
Understanding Theories and concepts of professional identity and professionalism of a teacher	Deep understanding of theories, concepts of professional identity and teacher professionalism. Relevant and relevant links (citations) to key sources are provided.	Understanding theories, concepts of professional identity and teacher professionalism. Links (citations) to key sources are provided.	Limited understanding of theories, concepts of professional identity and teacher professionalism. Limited references (citations) to key sources are provided.	Superficial understanding / lack of understanding of theories, concepts of professional identity and professionalism of the teacher. Relevant references (citations) to key sources are not provided.
Awareness of key issues of professional identity and professionalism of teachers in Kazakhstan	Links well the key concepts of professional identity and teacher professionalism with the context of Kazakhstan. Excellent substantiation of arguments with evidence from empirical research (for example, based on interviews or statistical analysis).	Links the concepts of professional identity and teacher professionalism with the context of Kazakhstan. Supports arguments with evidence from empirical research.	Limited connection of the concepts of professional identity and professionalism of teachers with the context of Kazakhstan. Limited use of evidence from empirical research.	There is little or no connection between the concepts of a teacher's professional identity and the context of Kazakhstan. Little or no use of empirical research.
Policy proposal or practical recommendations/suggestions	Offers sound policy and/or practical recommendations, proposals for improving the professional identity and professionalism of teachers in Kazakhstan.	Offers some policy and/or practical recommendations, proposals for enhancing the professional identity and professionalism of teachers in Kazakhstan	Limited policy and practical recommendations. Recommendations are non-essential, not based on rigorous analysis, and are shallow.	Little or no policy and practice advice, or advice of very low quality.
Letter, APA style	The writing demonstrates clarity, conciseness and correctness. Strictly follows the APA style.	The letter demonstrates clarity, conciseness and correctness. Basically follows the APA style.	The letter has some key errors and clarity needs to be improved. There are mistakes in following the APA style.	The writing is unclear, it is difficult to follow the content. Lots of mistakes in following the APA style.

Example 2. Group presentation "Teaching profession in Kazakhstan" (30% of 100% RK)

Criterion	"Excellent" 25-30%	"Good" 20-20%	"Satisfactory" 15-20%	"Unsatisfactory" 0 – 15%
Understanding theories and concepts of the professional identity of the teacher and the teaching profession	Deep understanding of theories, concepts of the professional identity of the teacher and the teaching profession.	Understanding theories, concepts of the professional identity of the teacher and the teaching profession.	Limited understanding of theories, concepts of the professional identity of the teacher and the teaching profession.	Superficial understanding / lack of understanding of theories, concepts of the professional identity of the teacher and the teaching profession.
Awareness of key issues of the professional identity of the teacher and the teaching profession in Kazakhstan	Competent correlation of the key concepts of the professional identity of the teacher and the teaching profession with the context of Kazakhstan. Excellent substantiation of arguments with evidence from empirical research (for example, based on interviews or statistical analysis).	There is a connection between the concepts of professional identity of a teacher and the teaching profession with the context of Kazakhstan. The arguments are backed by evidence from empirical research.	Limited correlation of the professional identity of the teacher and the concepts of the teaching profession with the context of Kazakhstan. Limited use of evidence from empirical research	Insignificant connection / lack of connection between the concepts of the teacher's professional identity and the context of Kazakhstan. Little or no empirical research is used.
Pilot Study	Excellent use of the results of pilot studies (interviews or surveys) in the presentation	Good use of the results of pilot studies (interviews or surveys) in the presentation.	Satisfactory use of the results of pilot studies (interviews or surveys) in the presentation.	Poor use of the results of pilot studies (interviews or surveys) in the presentation.
Suggestion of policy or practical recommendations/suggestions	Offers very good policy and/or practical advice or suggestions for improving the professional identity and teaching profession in Kazakhstan.	Offers some policy and/or practical recommendations or suggestions for improving the professional identity and teaching profession in Kazakhstan.	Limited policy and practical recommendations. Recommendations are non-essential, not based on rigorous analysis, and are shallow.	Little or no policy and practice advice, or advice of very low quality.
Presentation, teamwork	Excellent, attractive presentation, excellent quality of visuals, slides, materials, excellent teamwork.	Good engagement, good quality visuals, slides or other materials, good teamwork.	Satisfactory level of involvement, satisfactory quality of materials, satisfactory level of teamwork.	Low engagement, low quality content, poor teamwork.