MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF KAZAKHSTAN
AKTOBE REGIONAL UNIVERSITY NAMED AFTER K. ZHUBANOV

"APPROVE"
Acting Chairman of the Board - Rector of the
Aktobe Regional
University named after K. Zhubanov
_____ R.A. Beknazarov
"___" _____ 2021

MODULAR EDUCATIONAL PROGRAM

Code and name of the field of education: 6B05 – Natural Sciences, Mathematics and Statistics
Code and name of the field of study: 6B054 – Mathematics and Statistics
Code and name of the OP: 6B05401 – Mathematics
Level of education: Bachelor's degree
Awarded degree: Bachelor of Science in the educational program 6B05401 – Mathematics
Total credits: 240 academic credits / 240 ECTS
180 academic credits / 180 ECTS
120 academic credits / 120 ECTS

Year of Admission: 2021

Compilers:

Full name	Position	Contact Details
Employers:		
Beisov Zholdaskali Zhumabekovich	Head of the Department of Statistics of the Aktobe Region of the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan Deputy.	8-777-52-699-55
Mindygalieva Aliya Kumaevna	Director of the Branch of SB Sberbank JSC in Aktobe	8-777-212-83-18
Mynbayev Yerkin Mamaevich	Director of the Branch of SB Alfa Bank JSC	8-7132-70-40-32 8-702-326-11-44
Uteuov Aibek Baimuratovich	Head of the Technical Production Department "Production of Technological Production Equipment for the Oil and Gas Industry" of EcoExpressAktobe LLP	8-701-455-30-88
Students		
Sibagatova Perizat Muratkyzy	4th year student	8-775-907-46-40
Bóribaev Zhanibek Abylaıuly	3rd year student	8-777-453-24-01
Responsible compilers of the department:		
Akhmetova Aiymgul Utegulovna	Candidate of Physical and Mathematical Sciences, Associate Professor	8-702-240-99-33
Mynbaeva Sandugash Tabyldievna	Senior Lecturer, PhD	8-778-269-36-01
Reviewers:		
Seylova Roza Dzhambulovna	Candidate of Physical and Mathematical Sciences, Associate Professor of the Department of Information and Communication Technologies, Baishev University	8-701-405-88-49
Ibraeva Gulmira Temirgalievna	Candidate of Physical and Mathematical Sciences, Head of the Department of Natural Disciplines	8-771-518-43-21

	Military Institute of Air Defense Forces named after twice Hero of the Soviet Union T.Y. Begeldinov	

2. MISSION, VISION, VALUES:

Mission: Formation of human capital for innovative transformations of the region and the country

Vision: Leading positions in the national ranking and achieving the status of an anchor university in Kazakhstan

Values:

- ✓ Academic success
- ✓ Integrity
- ✓ Openness and cooperation
- ✓ Highest quality of education
- ✓ Social Activity and Civic Initiative
- ✓ Leadership and creativity
- ✓ Respect and attention to people
- ✓ Unity of science and innovation

3. MODEL OF A UNIVERSITY GRADUATE

- ✓ Has in-depth knowledge and understanding of the field of study
- ✓ Ready for professional self-realization in the modern world
- ✓ Entrepreneurial, able to make decisions and create new opportunities
- ✓ Adaptive to global challenges
- ✓ A person with high intelligence
- ✓ Has global citizenship

4. PASSPORT EP 6B05401 – MATHEMATICS

Application domain	The scope of application of EP 6B05401 – Mathematics is: general educational organizations, educational institutions and centers; organizations, institutions and enterprises related to the use of mathematical research methods.
Code and name of the educational program	6B05401 – Mathematics
Regulatory support	1. Law of the Republic of Kazakhstan "On Education" dated July 27, 2007 No319-III (with amendments and additions dated 04.07.2018); 2. Rules for the organization of dual education (Order of the Minister of Education and Science of the Republic of Kazakhstan dated January 21, 2016 No 50 (as amended, Order No455 dated 11.09.2018); 3. "Rules for the organization of the educational process on credit technology of education" (Order of the Minister of Education and Science of the Republic of Kazakhstan dated October 12, 2018 No 563) (with amendments and additions)**;** 4. Classifier of areas of training of personnel with higher and postgraduate education (Order of the Minister of Education and Science of the Republic of Kazakhstan dated October 13, 2018 No 569) (with amendments and additions); 5. About Trasley Qualifications Framework in the field of statistics; 6. State Compulsory Standard of Higher Education (Order of the Minister of Education and Science of the Republic of Kazakhstan dated October 31, 2018 No 604) (as amended, Order No 182 dated 05.05.2020); 7. Model Rules for the Activities of Educational Organizations Implementing Educational Programs of Higher and (or) Postgraduate Education (Order of the Minister of Education and Science of the Republic of Kazakhstan dated October 30, 2018 No 595) (as amended, Order No207 dated 18.05.2020); 8. Guidelines for the Use of The European Credit Transfer and Accumulation System (ECTS), European Union Publishing, 2015, ISBN 978-92-79-43562-1 (approved at the Ministerial Conference in Yerevan on May 14-15, 2015); 9. Standard Educational Programs of the Cycle of General Educational Disciplines for Organizations of Higher and (or) Postgraduate Education (Order of the Minister of Education and Science of the Republic of Kazakhstan dated October 31, 2018 No 603); 10. The system of coding of educational disciplines of higher and postgraduate education. State Educational Standards of the Republic of Kazakhstan 5.05.001-2005; 11. Professional Standard "Development of Big Data Processing and Storage Systems" (Appendix to the Order of the Deputy Chairman of the Board of the National Chamber of

	Entrepreneurs of the Republic of Kazakhstan "Atameken" No 259 dated December 24, 2019); 12. Regulations on the organization and conduct of professional practice and the definition of organizations as practice bases (Minutes No 13 of 12.08.2020); 13. Regulations on the current control of academic performance and intermediate certification (examination session) of students (protocol No13 dated 12.08.2020); 14. Regulations on the Final Attestation of Students (protocol No13 of 12.08.2020); 15. Regulations on the construction of a modular educational program (protocol No13 of 12.08.2020).
Profile card of training within the framework of the educational program	
Purpose of the EP	Training of highly qualified specialists in the fields of mathematics and statistics, the formation of a competent specialist capable of creatively and highly professionally solving socially significant problems in the professional field of activity at the modern scientific and practical level.
Qualification characteristics of a graduate	
Degree awarded:	Bachelor of Science in the degree programme 6B05401 – Mathematics
List of specialist positions	- specialist of research organizations; - specialist of educational organizations; - Banking Specialist; - specialist of insurance companies; - specialist in financial structures; - Data Mining Specialist.
Field of professional activity	- scientific research organizations; - educational organizations; - banking; - insurance companies; - financial structures.
Functions and types of educational activities	Functions of educational activities: - development of mathematical models and software systems for solving problems of natural sciences; - development of mathematical models and software systems for solving economic problems; - formulation and solution of problems of theoretical and applied mathematics, statistics and actuarial mathematics;

	- Conducting big data analysis. <u>Types of educational activities:</u> - scientific research; -Design; - organizational and technological, production and management; -Experimental; -Educational; -Predictive; - mathematical and economic; -Financial.
Dual training	This educational program provides dual training in three disciplines.

5. LEARNING OUTCOMES FOR EP 6B05401 – MATHEMATICS

1. Possess basic knowledge in the field of theoretical and applied mathematics, computer science and modern information technologies;
2. Have an understanding of entrepreneurship, legal norms, aspects of personal professional development and constantly strive for improvement, have the ability to build and implement promising lines of intellectual, cultural, moral and professional self-development and self-improvement; apply the basic provisions of academic honesty;
3. Be able to collect and interpret information to form judgments, taking into account social, ethical and scientific considerations, to ensure interdisciplinary links of mathematical and statistical courses with other disciplines;
4. Be able to solve problems in the main sections of mathematics, including actuarial mathematics and statistics;
5. Possess research skills in the use of information and communication technologies, software and skills in computer networks, be able to create databases and use Internet resources;
6. Possess fundamental training in the field of fundamental mathematics and computer science, willingness to use the acquired knowledge in professional activities, and demonstrate the ability to successfully and positively communicate in the state and other languages;
7. Be able to see the applied aspect in solving a scientific problem, correctly present and interpret the result; be able to analyze the result and correct the mathematical model underlying the problem;
8. To master the methods of mathematical and algorithmic modeling in the analysis of managerial tasks in the scientific and technical sphere, as well as in economics, business and humanitarian fields of knowledge;
9. Be fluent in Kazakh, Russian and foreign languages of instruction, basic methods and techniques of various types of oral and written communication within the competence of a specialist in the field of mathematics and statistics; know the general principles of academic writing;
10. Have the skills to independently master new knowledge and skills in the field of law, management and business.

6. Academic calendar for 2021-2025 (study period - 4 years)

w	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	1	2
1								M1							M2	S	S	S	V	V								M1							M2	S	S	EP	S/T	S/
w	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2								M1							M2	S	S	S	V	V								M1							M2	S	S	PP	PP	PP/S
w	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
3								M1							M2	S	S	S	V	V								M1							M2	S	S	PP	PP	PP/S
w	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
4								M1							M2	S	S	S	V	V	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	DP	DP	DP	DP	DP	V	SE	SE	DD	DI

6.1. Academic calendar for 2021-2024 (shortened period of study, 3 years)

w	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	1	
1								M1							M2	S	S	S	V	V								M1							M2	S	S	EP	S/T	
w	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
2								M1							M2	S	S	S	V	V								M1							M2	S	S	PP	PP	PP
w	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
3								M1							M2	S	S	S	V	V	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	DP	DP	DP	DP	DP	V	SE	SE	DD	D

6.2. Academic calendar for 2021-2023 (shortened period of study, 2 years)

w	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1								M1							M2	S	S	EP	EP	V	V								M1							M2	S	S	S
w	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2								M1							M2	S	S	V	V				M1			M2	S	PP	PP	PP	PP	PP	PP	PP	PP	V	V	SE	SE	DD

Symbols:
M - midterm control
S - examination session
S/T – summer term

Holidays: August 30 - Constitution Day

SE - state examination
DD – defend diploma thesis
DP - pre-diploma practice

PP - production practice

EP - Educational practice
V - vacation
Total weeks: theoretical training in the term -15 weeks
theoretical trimester training - 10 weeks,
quarterly - 8 weeks (4-course)

Holidays: December 16 – Kazakhstan Independence Day
Holidays: December 1 – Day of the First President of the Republic of Kazakhstan
Holidays: January 7 – Orthodox Christmas Day
Holidays: 8 марта – International Women's Day
March 21, 22, 23 – Nauryz
May 1 – Unity Day
May 9 – Victory Day
July 6 – Day of the Capital
Total weeks: examination session - 2-3 weeks
Total weeks: winter holidays - 1-2 weeks
Total weeks: summer holidays - 2-7 weeks
Total weeks: summer term - 6 weeks

7. Modular curriculum for 2021-2025 (training period - 4 years)

Cycle/Component	Code of the discipline	Name of the discipline	Term	Academic credits	Credit of ECTS	Form of control	Students' working time budget, hour						Distribution by course and terms							
													1 year		2 year		3 year		4 year	
							TOTAL	Number of classroo	classroom classes			independent. work	1-	2-	3-	4-	5-	6-	7-	8- term
									Lectu	lab	Pract	SIW								

1. Module. - Language, 20 academic credits																					
GED OC	FL 1101	Foreign language	1,2	10	10	exam	300	90			90	50	160	5	5						
GED OC	K(R)L 1102	Kazakh (Russian) language	1,2	10	10	exam	300	90			90	50	160	5	5						
2. Module - General, 31 academic credits																					
GED OC	ICT 1103	Information and Communication Technologies (in English)	1	5	5	exam	150	45	15	15	15	25	80	5							
GED OC	SPKM 1104	Socio-Political Knowledge Module	1,2	8	8	exam.	240	80	40		40	40	120	4	4						
GED OC	MHK 1105	Modern History of Kazakhstan	2	5	5	SE	150	45	30		15	25	80		5						
GED OC	PE(1,2) 1(2) 1106	Physical education	1-4	8	8	DC	240				240			2	2	2	2				
BD UC	NS 1201	National spirituality	1	5	5	exam	150	45	30		15	25	80	5							
3. Module – Fundamentals of Mathematics, 13 academic credits																					
VK DB	FA 1202	Basics of Algebra	1	4	4	exam	120	40	20		20	20	60	4							
VK DB	FG 1203	Basics of Geometry	2	3	3	exam	90	30	15		15	15	45		3						
VK DB	MA(I) 1204	Mathematical Analysis I	2	5	5	exam	150	45	15		30	25	80		5						
DATABASE		Educational practice	2	1	1	report	30								1						
4.1. Module - Public Law, 10 academic credits																					
OOD KV	ACI 2107	Academic integrity	3	5	5	exam	150	45	30		15	25	80			5					
OOD OK	PHIL 2108	Philosophy	4	5	5	exam	150	45	30		15	25	80				5				
4.2. Module - Socio-Economic (OT: Actuarial Mathematics), 10 academic credits																					
OOD KV	FBE 2107	Basics of Business and Entrepreneurship	3	5	5	exam	150	45	30		15	25	80			5					
OOD OK	PHIL 2108	Philosophy	4	5	5	exam	150	45	30		15	25	80				5				
5.1. Module - Additional Chapters of Mathematical Analysis, 19 academic credits																					
VK DB	CAL(II) 2205	Mathematical Analysis II	3	4	4	exam	120	40	20		20	20	60			4					
BD KV	PSPHM 2206	Practicum on Solving of Problems of Higher Mathematics (in English)	3	5	5	exam	150	45			45	25	80			5					
BD KV	CAL(II) 2207	Mathematical Analysis III	4	6	6	exam	180	60	30		30	30	90				6				
VK DB	DE 2208	Differential equations	4	4	4	exam	120	40	20		20	20	60				4				
5.2. Module - Selected Chapters of Mathematical Analysis (OT: Actuarial Mathematics), 19 academic credits																					
VK DB	CAL(II) 2205	Mathematical Analysis II	3	4	4	exam	120	40	20		20	20	60			4					
BD KV	PSEMP 2206	Practicum on Solving of Problems of Elementary Mathematics (in English)	3	5	5	exam	150	45			45	25	80			5					

BD KV	DICFV 2207	Differential and integral calculus of functions of several variables	4	6	6	exam	180	60	30		30	30	90				6					
VK DB	DE 2208	Differential equations	4	4	4	exam	120	40	20		20	20	60				4					
6.1. Additional Chapters of Algebra and Geometry, 18 academic credits																						
BD KV	AGC 2209	Additional chapters of geometry	3	5	5	exam	150	45	15		30	25	80			5						
BD KV	ANTh 2210	Algebra and Number Theory	3	5	5	exam	150	45	15		30	25	80			5						
BD KV	FM 2211	Financial Mathematics (dual education)	4	5	5	exam	150	45	15		30	25	80				5					
DATABASE		Production practice	4	3	3	report	90										3					
6.2. Module – Mathematical Models in Economics (OT: Actuarial Mathematics), 18 academic credits																						
BD KV	ME 2209	Mathematics in Economics	3	5	5	exam	150	45	15		30	25	80			5						
BD KV	MEM 2210	Modeling a market economy	3	5	5	exam	150	45	15		30	25	80			5						
BD KV	GThS 2211	General Theory of Statistics	4	5	5	exam	150	45	15		30	25	80				5					
DATABASE		Production practice	4	3	3	report	90										3					
7.1. Module – Fundamentals of Programming, 9 academic credits																						
BD KV	DMML 2212	Discrete Mathematics and Mathematical Logic	3	4	4	exam	120	40	20		20	20	60			4						
BD KV	Prog 2213	Programming	4	5	5	exam	150	45	15	10	20	25	80				5					
7.2. Module – Fundamentals of Algorithms and Data Structure (OT: Actuarial Mathematics), 9 academic credits																						
BD KV	DMEML 2212	Discrete Mathematics with Elements of Mathematical Logic	3	4	4	exam	120	40	20		20	20	60			4						
BD KV	ADS 2213	Algorithms and data structures	4	5	5	exam	150	45	15	10	20	25	80				5					
8.1. Module – Databases, Numerical and Statistical Methods, 15 academic credits																						
BD KV	DTh 3214	Database theory	5	5	5	exam	150	45	15	10	20	25	80					5				
PD VK	NM 3301	Numerical methods	6	5	5	exam	150	45	15	10	20	25	80						5			
BD KV	SMDA 3215	Statistical data analysis methods	6	5	5	exam	150	45	15	10	20	25	80						5			
8.2. Module – Client-Server Applications, Numerical Methods and Statistics (OT: Actuarial Mathematics), 15 academic credits																						
BD KV	DCSDA 3214	Development of client-server database applications	5	5	5	exam	150	45	15	10	20	25	80					5				
PD VK	NM 3301	Numerical methods	6	5	5	exam	150	45	15	10	20	25	80						5			
BD KV	FBS 3215	Finance and banking statistics (dual education)	6	5	5	exam	150	45	15	10	20	25	80						5			
9. Module – Multivariate Analysis in Geometry and Function Theory, 15 academic credits																						
PD VK	DGT 3302	Differential Geometry and Topology	5	5	5	exam	150	45	15		30	25	80					5				
PD VK	EFThFA 3303	Elements of the theory of functions and functional analysis	5	5	5	exam	150	45	15		30	25	80					5				
PD VK	ThFCV 3304	The theory of functions of a complex variable	6	5	5	exam	150	45	15		30	25	80						5			
10. Module – Applied Mathematics, 10 academic credits																						

PD VK	PThMS 3305	Theory of Probability and Mathematical Statistics	5	5	5	exam	150	45	15		30	25	80					5			
VK DB	Eco 3216	Econometrics	6	5	5	exam	150	45	15		30	25	80						5		
11.1. Module – Theoretical and Mathematical Physics and Boundary Value Problems, 20 academic credits																					
BD KV	BVPODE 3217	Boundary value problems of ordinary differential equations	5	5	5	exam	150	45	15		30	25	80					5			
VK DB	AW 3218	Academic Writing	5	5	5	exam	150	45	15		30	25	80					5			
BD KV	EMPh 3219	Equations of Mathematical Physics	6	5	5	exam	150	45	15		30	25	80						5		
PD		Production practice	6	5	5	report	150												5		
11.2. Module – Theoretical and Mathematical Physics and Stability Theory (OT: Actuarial Mathematics), 20 academic credits																					
BD KV	STh 3217	Theory of sustainability	5	5	5	exam	150	45	15		30	25	80					5			
VK DB	AW 3218	Academic Writing	5	5	5	exam	150	45	15		30	25	80					5			
BD KV	MMPhI 3219	Methods of Mathematical Physics	6	5	5	exam	150	45	15		30	25	80						5		
PD		Production practice	6	5	5	report	150												5		
12.1. Module – Differential Equations and Their Applications, 23 academic credits																					
BD KV	CVOM 4220	Calculus of Variations and Optimization Methods	7	3	3	exam	90	30	15		15	15	45							3	
PD KV	IE 4306	Integral equations	7	5	5	exam	150	45	15		30	25	80							5	
PD KV	MTh 4307	Matrix Theory	7	5	5	exam	150	45	15		30	25	80							5	
PD KV	NCEMPh 4308	Non-classical equations of mathematical physics	7	5	5	exam.	150	45	15		30	25	80							5	
PD KV	PhThM 4309	Physics and Theoretical Mechanics	7	5	5	exam	150	45	15		30	25	80							5	
12.2. Module – Economic and Statistical (OT: Actuarial Mathematics), 23 academic credits																					
BD KV	OR 4220	Operations research	7	3	3	exam	90	30	15		15	15	45							3	
PD KV	EMM 4306	Economic and mathematical modeling	7	5	5	exam	150	45	15		30	25	80							5	
PD KV	AM 4307	Actuarial Mathematics	7	5	5	exam	150	45	15		30	25	80							5	
PD KV	SA 4308	Statistical analysis	7	5	5	exam	150	45	15		30	25	80							5	
PD KV	FCS 4309	Financial Computing statistics (Dual Education)	7	5	5	exam	150	45	15		30	25	80							5	
13.1. Module – Maple Programming and Forecasting, 25 academic credits																					
PD KV	MP 4310	Programming in the Maple system	7	5	5	exam	150	45	15	10	20	25	80							5	
PD KV	MMF 4311	Mathematical Methods of Forecasting	7	5	5	exam	150	45	15	10	20	25	80							5	
DATABASE		Production practice	8	10	10	report	300														10
DATABASE		Pre-graduate practice	8	5	5	report	150														5
13.2. Module – Solving Problems in MathCAD, Mathlab and Big Data (OT: Actuarial Mathematics), 25 academic credits																					

PD KV	SSPMCADM 4310	Solving statistical problems in MathCAD, Mathlab	7	5	5	exam	150	45	15	10	20	25	80							5	
PD KV	BDAS 4311	Big Data Analytical Systems	7	5	5	exam	150	45	15	10	20	25	80							5	
DATABASE		Production practice	8	10	10	report	300														10
DATABASE		Pre-graduate practice	8	5	5	report	150														5
		Final attestation	**8**	**12**	**12**	**GEE**	**360**														**12**
TOTAL		on a cycle GED OC		51	51		1530	395	115	15	505	215	680	21	21	2	7	0	0	0	0
TOTAL		on a cycle GED EC		5	5		150	45	30	0	15	25	80	0	0	5	0	0	0	0	0
TOTAL		**on a cycle GED**		**56**	**56**		**1680**	**440**	**145**	**15**	**520**	**240**	**760**	**21**	**21**	**7**	**7**	**0**	**0**	**0**	**0**
TOTAL		on a cycle BD UC		35	35		1050	330	150	0	180	175	545	9	8	4	4	5	5	0	0
TOTAL		on a cycle BD		58	58		1740	535	185	30	320	290	915	0	0	19	16	10	10	3	0
TOTAL		on a cycle BD EC		19	19		570	0	0	0	0	0	0	0	1	0	3	0	0	0	15
TOTAL		**on a cycle BD**		**112**	**112**		**3360**	**865**	**335**	**30**	**500**	**465**	**1460**	**9**	**9**	**23**	**23**	**15**	**15**	**3**	**15**
TOTAL		on a cycle PD UC		25	25		750	225	75	10	140	125	400	0	0	0	0	15	10	0	0
TOTAL		on a cycle PD		30	30		900	270	90	20	160	150	480	0	0	0	0	0	0	30	0
TOTAL		on a cycle PD EC		5	5		150	0	0	0	0	0	0	0	0	0	0	0	5	0	0
TOTAL		**on a cycle PD**		**60**	**60**		**1800**	**495**	**165**	**30**	**300**	**275**	**880**	**0**	**0**	**0**	**0**	**15**	**15**	**30**	**0**
		TOTAL CREDITS:		**240**	**240**		**7200**	**1800**	**645**	**75**	**1320**	**980**	**3100**	**30**	**30**	**30**	**30**	**30**	**30**	**33**	**27**

8.1 Map of the educational program 6B05401 – Mathematics

Cycle/Component	Code of the discipline	Name of the discipline	Term	Academics. credits	Credits of ECTS	Learning Results
1	*2*	*3*	*4*	*5*	*6*	*7*
1. Module. - Language, 20 academic credits						
GED OC	FL 1101	Foreign language	1,2	10	10	LR-9
GED OC	K(R)L 1102	Kazakh (Russian) language	1,2	10	10	LR-9
2. Module – General, 31 academic credits						
OOD OK	ICT 1103	Information and Communication Technologies	1	5	5	RO-1, RO-5
OOD OK	SPKM 1104	Socio-Political Knowledge Module	1,2	8	8	RO-2, RO-3

OOD OK	MH 1105	Modern History of Kazakhstan	2	5	5	RO-3
OOD OK	PhE 1(2)106	Physical education	1-4	8	8	RO-2
VK DB	NS 1201	National spirituality	1	5	5	RO-2, RO-3
3. Module – Fundamentals of Mathematics, 13 academic credits						
VK DB	FA 1202	Fundamentals of Algebra	1	4	4	RO-1, RO-4, RO-6
VK DB	FG 1203	Fundamentals of Geometry	2	3	3	RO-1, RO-2, RO-4
VK DB	CAL(I) 1204	Calculus I	2	5	5	RO-1, RO-4, RO-6
DATABASE		Educational practice	2	1	1	RO-1, RO-4, RO-5
4.1. Module - Public Law, 10 academic credits						
OOD KV	AI 2107	Academic integrity	3	5	5	RO-2
OOD OK	Phil 2108	Philosophy	4	5	5	RO-2, RO-3
4.2. Module - Socio-Economic (OT: Actuarial Mathematics), 10 academic credits						
OOD KV	FBE 2107	Fundamentals of Business and Entrepreneurship	3	5	5	RO-2, RO-8, RO-10
OOD OK	Phil 2108	Philosophy	4	5	5	RO-2, RO-3
5.1. Module - Additional Chapters of Mathematical Analysis, 19 academic credits						
VK DB	Cal(II) 2205	Calculus II	3	4	4	RO-1, RO-4, RO-5, RO-6
BD KV	PSPHM 2206	Practicum on Solving Problems of Higher Mathematics	3	5	5	RO-4, RO-6, RO-7, RO-9
BD KV	CAL(II) 2207	Calculus III	4	6	6	RO-1, RO-4, RO-5, RO-6
VK DB	DE 2208	Differential equations	4	4	4	RO-1, RO-4, RO-6, RO-7
5.2. Module – Selected Chapters of Mathematical Analysis (OT: Actuarial Mathematics), 19 academic credits						
VK DB	CAL(II) 2205	Calculus II	3	4	4	RO-1, RO-4, RO-5, RO-6
BD KV	PSEMP 2206	Practicum on Solving Elementary Mathematics Problems	3	5	5	RO-4, RO-6, RO-9
BD KV	DICFMV 2207	Differential and integral calculus of functions of many variables	4	6	6	RO-1, RO-2, RO-4
VK DB	DE 2208	Differential equations	4	4	4	RO-1, RO-4, RO-6, RO-7
6.1. Module – Additional Chapters of Algebra and Geometry, 18 academic credits						
BD KV	AGC 2209	Additional Geometry Chapters	3	5	5	RO-1, RO-4, RO-6, RO-7
BD KV	ANTh 2210	Algebra and Number Theory	3	5	5	RO-1, RO-4, RO-6
BD KV	FM 2211	Financial Mathematics (dual education)	4	5	5	RO-4, RO-5, RO-7, RO-8
DATABASE		Internship	4	3	3	RO-1, RO-4, RO-5, RO-6
6.2. Module – Mathematical Models in Economics (OT: Actuarial Mathematics), 18 academic credits						
BD KV	ME 2209	Mathematics in Economics	3	5	5	RO-1, RO-5, RO-8
BD KV	MEM 2210	Market Economy Modeling	3	5	5	RO-7, RO-8, RO-10
BD KV	GThS 2211	General Theory of Statistics	4	5	5	RO-3, RO-4, RO-7, RO-8

DATABASE		Internship	4	3	3	RO-1, RO-4, RO-5, RO-6
7.1. Module – Fundamentals of Programming, 9 academic credits						
BD KV	DMML 2212	Discrete Mathematics and Mathematical Logic	3	4	4	RO-1, RO-4, RO-7
BD KV	Prog 2213	Programming	4	5	5	RO-1, RO-5, RO-8
7.2. Module – Fundamentals of Algorithms and Data Structure (OT: Actuarial Mathematics), 9 academic credits						
BD KV	DMEML 2212	Discrete Mathematics with Elements of Mathematical Logic	3	4	4	RO-1, RO-4, RO-7
BD KV	ADS 2213	Algorithms and data structures	4	5	5	RO-1, RO-5, RO-8
8.1. Module – Databases, Numerical and Statistical Methods, 15 academic credits						
BD KV	DTh 3214	Database theory	5	5	5	RO-1, RO-5, RO-8
PD VK	NM 3301	Numerical methods	6	5	5	RO-1, RO-7, RO-8
BD KV	SMDA 3215	Statistical methods of data analysis	6	5	5	RO-3, RO-4, RO-7, RO-8
8.2. Module – Client-Server Applications, Numerical Methods and Statistics (OT: Actuarial Mathematics), 15 academic credits						
BD KV	DCSDA 3214	Development of client-server database applications	5	5	5	RO-1, RO-5, RO-8, RO-10
PD VK	NM 3301	Numerical methods	6	5	5	RO-1, RO-7, RO-8
BD KV	FBS 3215	Financial and Banking Statistics (dual education)	6	5	5	RO-4, RO-7, RO-8, RO-10
9. Module – Multivariate Analysis in Geometry and Function Theory, 15 academic credits						
PD VK	DGT 3302	Differential Geometry and Topology	5	5	5	RO-1, RO-4, RO-5, RO-6
PD VK	EFThFA 3303	Elements of Function Theory and Functional Analysis	5	5	5	RO-1, RO-4, RO-5, RO-6
PD VK	ThFCV 3304	Theory of functions of a complex variable	6	5	5	RO-1, RO-4, RO-5, RO-6
10. Module – Applied Mathematics, 10 academic credits						
PD VK	PThMS 3305	Probability Theory and Mathematical Statistics	5	5	5	RO-3, RO-4, RO-7
VK DB	Eco 3216	Econometrics	6	5	5	RO-4, RO-8, RO-9
11.1. Module – Theoretical and Mathematical Physics and Boundary Value Problems, 20 academic credits						
BD KV	BVPODE 3217	Boundary value problems of ordinary differential equations	5	5	5	RO-1, RO-6, RO-7
VK DB	AW 3218	Academic Writing	5	5	5	RO-5, RO-9
BD KV	EMPh 3219	Equations of Mathematical Physics	6	5	5	RO-1, RO-6, RO-7
PD		Internship	6	5	5	RO-1, RO-4, RO-6
11.2. Module – Theoretical and Mathematical Physics and Stability Theory (OT: Actuarial Mathematics), 20 academic credits						

BD KV	STh 3217	Stability theory	5	5	5	RO-1, RO-6, RO-7
VK DB	AW 3218	Academic Writing	5	5	5	RO-5, RO-9
BD KV	MMPh 3219	Methods of Mathematical Physics	6	5	5	RO-1, RO-6, RO-7
PD		Internship	6	5	5	RO-1, RO-4, RO-6
12.1. Module – Differential Equations and Their Applications, 23 academic credits						
BD KV	CVOM 4220	Calculus of Variations and Optimization Methods	7	3	3	RO-1, RO-7, RO-8
PD KV	IE 4306	Integral equations	7	5	5	RO-1, RO-7
PD KV	MTh 4307	Matrice theory	7	5	5	RO-1, RO-5
PD KV	NCEMPh 4308	Non-classical equations of mathematical physics	7	5	5	RO-1, RO-6, RO-7
PD KV	PhTM 4309	Physics and Theoretical Mechanics	7	5	5	RO-1, RO-7
12.2. Module – Economic and Statistical (OT: Actuarial Mathematics), 23 academic credits						
BD KV	IR 4220	Operations research	7	3	3	RO-4, RO-7, RO-8
PD KV	EMM 4306	Economic and mathematical modeling	7	5	5	RO-4, RO-6, RO-8
PD KV	AM 4307	Actuarial Mathematics	7	5	5	RO-4, RO-7, RO-8
PD KV	SA 4308	Statistical analysis	7	5	5	RO-3, RO-4, RO-7
PD KV	FCS 4309	Financial Computation Statistics (Dual Education)	7	5	5	RO-3, RO-4, RO-7
13.1. Module – Maple Programming and Forecasting, 25 academic credits						
PD KV	MP 4310	Maple programming	7	5	5	RO-1, RO-5, RO-8
PD KV	MMF 4311	Mathematical Methods of Forecasting	7	5	5	RO-4, RO-7, RO-8
DATABASE		Internship	8	10	10	RO-1, RO-2, RO-4, RO-10
DATABASE		Pre-graduation practice	8	5	5	RO-4, RO-7, RO-8
13.2. Module – Solving Problems in MathCAD, Mathlab and Big Data (OT: Actuarial Mathematics), 25 academic credits						
PD KV	SSPMCADM 4310	Solving statistical problems in MathCAD, Mathlab	7	5	5	RO-1, RO-3, RO-4, RO-5
PD KV	BDAS 4311	Big Data Analytical Systems	7	5	5	RO-1, RO-5, RO-7, RO-8
DATABASE		Internship	8	10	10	RO-1, RO-2, RO-4, RO-10
DATABASE		Pre-graduation practice	8	5	5	RO-4, RO-7, RO-8

8.2 Matrix of Discipline and Learning Outcomes EP 6B05401 – Mathematics

Matrix of the ratio of discipline and learning outcomes - 6B05401 – Mathematics

№	Learning Results / Name of discipline	LR 1	LR 2	LR 3	LR 4	LR 5	LR 6	LR 7	LR 8	LR 9	LR 10
1.	Foreign language									+	
2.	Kazakh (Russian) language									+	
3.	ICT 1105 Information and communication technologies (in English)	+				+					
4.	The socio political knowledge module		+	+							
5.	Modern history of Kazakhstan			+							
6.	Physical education		+								
7.	National spirituality		+	+							
8.	Basics of algebra	+			+		+				
9.	Basics of geometry	+	+		+						
10.	Mathematical Analysis I	+			+		+				
11.	Educational practice	+			+	+					
12.	Academic integrity		+								
13.	Philosophy		+	+							
14.	Basics of business and entrepreneurship		+						+		+
15.	Mathematical Analysis II	+			+	+	+				
16.	Practicum on solving of problems of higher mathematics (in English)				+		+	+		+	
17.	Mathematical Analysis III	+			+	+	+				
18.	Differential equations	+			+		+	+			
19.	Practicum on solving of problems of elementary mathematics (in English)				+		+			+	
20.	Differential and integral calculus of functions of several variables	+	+		+						
21.	Additional chapters of geometry	+			+		+	+			
22.	Algebra and Number Theory	+			+		+				
23.	Financial Mathematics				+	+		+	+		
24.	Mathematics in Economics	+				+			+		
25.	Modeling a market economy							+	+		+
26.	General theory of statistics			+	+			+	+		
27.	Discrete mathematics and mathematical logic	+			+			+			
28.	Programming	+				+			+		
29.	Discrete mathematics with elements of mathematical logic	+			+			+			
30.	Algorithms and data structures	+				+			+		
31.	Database theory	+				+			+		

32.	Numerical methods	+						+	+		
33.	Statistical data analysis methods			+	+			+	+		
34.	Development of client server database applications	+				+			+		+
35.	Finance and banking statistics				+			+	+		+
36.	Differential geometry and topology	+			+	+	+				
37.	Elements of the theory of functions and functional analysis	+			+	+	+				
38.	The theory of functions of a complex variable	+			+	+	+				
39.	Theory of Probability and Mathematical Statistics			+	+			+			
40.	Econometrics				+				+	+	
41.	Boundary value problems of ordinary differential equations	+					+	+			
42.	Academic writing					+				+	
43.	Equations of mathematical physics	+					+	+			
44.	Theory of sustainability	+					+	+			
45.	Methods of mathematical physics	+					+	+			
46.	Calculus of variations and optimization methods	+						+	+		
47.	Integral equations	+						+			
48.	Matrix Theory	+				+					
49.	Non-classical equations of mathematical physics	+					+	+			
50.	Physics and Theoretical Mechanics	+						+			
51.	Operations research				+			+	+		
52.	Economic and Mathematical Modeling				+		+		+		
53.	Actuarial Mathematics				+			+	+		
54.	Statistical analysis			+	+			+			
55.	Financial Computing statistics			+	+			+			
56.	Programming in the Maple system	+				+			+		
57.	Mathematical methods of forecasting				+			+	+		
58.	Pre graduate practice				+			+	+		
59.	Production practice						+	+	+		
60.	Solving statistical problems in MathCAD, Matlab	+		+	+	+					
61.	Big Data analytical systems	+				+		+	+		
	Total	**34**	**8**	**10**	**31**	**18**	**19**	**28**	**22**	**6**	**4**

9.1 Summary Table Reflecting the Volume of Credits Disbursed by Modules of the Educational Program (duration of study - 4 years)

Course	Semester	Quantity modules to be mastered	Number of disciplines studied		Number of academic credits							Total in academic hours	ECTS	Number of exams	Number of Tests/Reports
			OK/VK	KV	Theoretical teaching	Training practice	Production practice	Pre-graduation practice	Physical education	Final certification	Altogether				
1	1	3	6	-	28				2		30	900	30	6	1
	2	3	6	-	27	1			2		30	900	30	6	2
2	3	5	1	5	28				2		30	900	30	6	1
	4	5	2	3	25		3		2		30	900	30	5	2
3	5	4	4	2	30						30	900	30	6	-
	6	4	3	2	25		5				30	900	30	5	1
4	7	2	-	7	33						33	990	33	7	-
	8	1					10	5		12	27	810	27		2
Altogether:		**13**	**22**	**19**	**196**	**1**	**18**	**5**	**8**	**12**	**240**	**7200**	**240**	**41**	**9**

9.2 Summary Table Reflecting the Volume of Credits Disbursed by Modules of the Educational Programme (duration of study - shortened, 3 years)

Curric ulum	Semest er	Quanti ty modul	Number of disciplines studied	Number of academic credits	Total in acade mic	ECTS	Numbe r of exams	Numbe r of

			OK/VK	KV	Theoretical teaching	Training practice	Production practice	Pre-graduation practice	Physical education	Final certification	Altogether				Tests/Reports
1	1	3	6	-	28				2		30	900	30	6	1
	2	2	5	1	27	1			2		30	900	30	6	2
2	3	3	2	4	30						30	900	30	6	
	4	3	3	2	25		5				30	900	30	5	1
3	5	2	4	3	33						33	990	33	7	
	6	1					10	5		12	27	810	27		2
Altogether:		**9**	**20**	**10**	**143**	**1**	**15**	**5**	**4**	**12**	**180**	**5400**	**180**	**30**	**6**

9.3 Summary Table Reflecting the Volume of Credits Disbursed by Modules of the Educational Program (duration of study - shortened, 2 years)

Curric ulum	Semest er	Quanti ty modul	Number of disciplines studied	Number of academic credits	Total in acade mic	ECTS	Numbe r of exams	Numbe r of

			OK/VK	KV	Theoretical teaching	Training practice	Production practice	Pre-graduation practice	Physical education	Final certification	Altogether				Tests/Reports
1	1	4	2	4	28	2					30	900	30	6	1
	2	4	4	2	30						30	900	30	6	
2	3	3	5	2	34						34	1020	34	7	
	4	3	1	1	7		2	5		12	26	780	26	2	2
Altogether:		**7**	**12**	**9**	**99**	**2**	**2**	**5**		**12**	**120**	**3600**	**120**	**21**	**3**

10. RESOURCE SUPPORT OF THE EDUCATIONAL PROGRAM 6B05401 – MATHEMATICS

Resource provision is formed on the basis of the requirements for the conditions for the implementation of bachelor's degree programs in the field of training 6B05401 – Mathematics and includes:

-Staffing;

- educational, methodological and information support;
- material and technical support.

10.1 Staffing

The implementation of the bachelor's degree program should be provided by scientific and pedagogical personnel who, as a rule, have a basic education corresponding to the profile of the discipline taught, and are systematically engaged in scientific and (or) scientific and methodological activities.

The share of full-time teachers in their total number, including in the cycles of basic and major disciplines of the state compulsory standard of education, should be at least 80%, the share of teachers with academic degrees and titles in the number of full-time teachers should be at least 50%.

The graduating department is the Department of Mathematics. The staff of the department is staffed in accordance with the legislation of the Republic of Kazakhstan and the Rules for competitive filling of positions of scientific and pedagogical staff of higher educational institutions.

The total number of full-time teachers at the Department of Mathematics is 28 teachers, including 2 Doctors of Science, 11 Candidates of Science, 2 Doctor of PhD, 1 Honored SAMBO Coach of the Republic of Kazakhstan and 8 Masters. The share of full-time teachers in their total number, including in the cycles of basic and major disciplines of the state compulsory standard of education, is 88%, the share of teachers with academic degrees and titles in the number of full-time teachers is 57%.

10.2 Educational, methodological and information support

Educational, methodological and information support includes: standard, educational and working curriculum of the discipline, syllabus, control and measuring materials, active handouts, didactic materials, regulatory documents regulating the types of educational activities.

The educational program in the specialty 6B05401 – Mathematics is provided with educational and methodological documentation and materials for all academic disciplines of the curriculum, including the working curriculum of the discipline, syllabus, control and measuring materials, active handouts, didactic materials, etc.

Each student has access to the Internet, including the electronic library of the university, the AF RSTL, KazNEB, Web of Knowledge (Thomson Reuters) and Web of Science, Scopus, Springer and the resources of the university's scientific library. The library fund is equipped with printed and electronic publications, educational and scientific literature in all disciplines of the specialty. In addition, students have access to the fund of the RSTL AF, including access to the dissertation fund of the RSL. Educational, methodological and information support of the educational process meets the requirements of higher education.

10.3 Logistics

In the implementation of EP 6B05401 – Mathematics, the material and technical base is used to ensure the conduct of all types of classes provided for by the working curriculum and corresponding to the current sanitary and fire safety rules and standards.

The material and technical base is provided by the presence of an educational building (at 263 Br. Zhubanovykh Street) with flow classrooms, equipped classrooms and laboratories, computer classes for classes.

For the implementation of EP 6B05401 – Mathematics, the Faculty of Physics and Mathematics has the necessary classroom fund, methodological and specialized classrooms ("Cabinet of Theory and Methods of Teaching Mathematics", "Named Auditorium of Doctor of Philological Sciences, Professor D.U. Umbetzhanov", "Multilingualism Room"), computer classes and special laboratories ("Analytics of Streaming Data and Machine Learning", "Architecture of Computer Systems and Modernization of Personal Computers", "Information Database Management Systems and Systems", "Computer Modeling and Numerical Methods", "Software Development Tools", "System Programming", "Algorithmization and Programming Technologies", "Computer Graphics", "Mechanics and Molecular Physics", "Electricity and Magnetism", "Atomic Physics").

These classrooms meet the sanitary and hygienic standards for classrooms of higher educational institutions of the Republic of Kazakhstan. The available classroom fund of the EP fully meets the need for classrooms for students of 1-4 courses.

11. CHARACTERISTICS OF THE ENVIRONMENT OF THE ARU IM. K. ZHUBANOV, WHICH ENSURES THE DEVELOPMENT OF GENERAL CULTURAL AND SOCIO-PERSONAL COMPETENCIES OF GRADUATES

The university has all the necessary conditions and opportunities to ensure the formation and development of general cultural and socio-personal competencies of graduates.

An integral part of the educational process is educational work, the purpose of which is the formation of a professional, harmoniously developed and morally stable personality. Particular attention in educational work is focused on the issues of academic discipline, culture of behavior, appearance

of students, education of patriotism, citizenship, sense of responsibility, decency, honesty, loyalty to professional duty, law-abiding, respectful attitude to each other and others. Educational work is carried out in the following areas:

- education of civil and spiritual and moral culture;
- education of aesthetic culture;
- education of physical culture and the formation of a healthy lifestyle;
- education of environmental culture;
- labor education.

As a basic regulatory document for the organization of the educational process at the university, the "Concept of Educational Work" and intra-university regulatory documents have been developed, such as the Regulation "On Self-Government", the Regulation "On the Organization of Educational Work at ARSU named after K. Zhubanov", the Regulation "On the Council for the Prevention of Offenses", the Regulation "On the Council of Curators", the Regulation "On Curatorial Work", the Regulation "On the School of Legal Knowledge", the Regulation "On the Sports Club", the Regulation "On the Debate Club" etc.

To organize educational work at the university, the Department for Educational Work and Youth Policy was created, which includes the Department for Work with Students and Youth Organizations and the Department for Social and Cultural Work. In addition, the university has a student parliament, a student dormitory council, the headquarters of student labor brigades, a council of curators, a sports club, a council for the prevention of offenses, etc.

For the organization of cultural work and the formation of a healthy lifestyle, the university has a sufficient material and technical base:

- Palace of Youth;
- Palace of Students;
- Two sports complexes;
- Sports facility;
- 3 separate gyms;
- Stadium with a running track and a grass football field;
- Tennis court;
- Shooting range;
- Student multidisciplinary clinic;
- Modern library.

For the harmonious development of the personality, which contributes to the strengthening of moral, civic, patriotic and general cultural competencies of students and undergraduates, the Debate Clubs "Ritor", "Zaman Bizdiki", the School of Legal Knowledge, the Student Theater "Zhubanov Zhastary", the Club of Young Poets "Tarazy", "English-club", "Education club", "Universial programmer-club", KVN Club, Student Legal Clinic "Themis", Charity Club "Umiten Uzilmesin", Club volunteers "Zhubanov zhyluy", dance circles "ARSU STAR" and "Big Fam", "Mansap" School of Public Service, sports sections, etc.

AGREED:

Head of the Department of Statistics of the Aktobe region of the Committee according to the statistics of the Ministry of National Economy of the Republic of Kazakhstan	Beisov Zh.Zh.
Deputy. Director of the Branch of SB Sberbank JSC in Aktobe	Mindygalieva A.K.
Director of the branch of SB Alfa Bank JSC	Mynbaev E.M.
Head of the Technical Production Department "Production of Technological of Production Equipment for the Oil and Gas Industry" by EcoExpressAktobe LLP	Uteuov A.B.

Considered at a meeting of the Academic Council of the University Minutes No __ of "___" _____ 2021