



MODULE HANDBOOK

BIG DATA ANALYSIS

BACHELOR PROGRAMME

2023

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Module Handbook BDA
1st term

Module name:	Foreign Language 1: English for Academic Purposes																		
Code	IYa 1103																		
Trimester	1																		
Person responsible for the module	Group of instructors																		
Lecturer(s)	A.Ayazbayeva, A.Urazbekova, A.Seidin, Y. Verba, S.Burbekova, N.Ishmukhambetov, K. Hassenov, A.Bakenova, M.Zhenisbayeva, F. Omarova, T.Almas, A. Salkenova, A.Rahimzhanova, S. Zhalmagambetova, A. Musina, M.Smagulova, M. Abzhaparova, M. Amanzhol, A. Smagulova, A. Ichshanova, A.Ormanova																		
Language	English																		
Relation to curriculum	Bachelor programmes: 6B06101 Computer Science 6B06102 Software Engineering 6B06103 Big Data Analysis 6B04101 IT Management																		
Type of teaching	Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																		
Workload of course components and credits per trimester	<table><tr><td rowspan="2">ECTS credits</td><td colspan="2">Contact hours</td><td rowspan="2">ISIS</td><td rowspan="2">SIS</td><td rowspan="2">Total hours</td></tr><tr><td>Lectures</td><td>Practice sessions</td></tr><tr><td>5</td><td></td><td>50</td><td>10</td><td>90</td><td>150</td></tr></table>					ECTS credits	Contact hours		ISIS	SIS	Total hours	Lectures	Practice sessions	5		50	10	90	150
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Course assessment and forms of examination	<table><tr><td>Period</td><td>Assessment type</td><td>Number of points</td><td>Exam Form</td><td>Schedule (Week #)</td></tr><tr><td>1st attestation</td><td>Presentation about an IT invention</td><td>10</td><td>Oral defense</td><td>2nd week</td></tr></table>					Period	Assessment type	Number of points	Exam Form	Schedule (Week #)	1 st attestation	Presentation about an IT invention	10	Oral defense	2 nd week				
Period	Assessment type	Number of points	Exam Form	Schedule (Week #)															
1 st attestation	Presentation about an IT invention	10	Oral defense	2 nd week															

		Literature review (5+ sources)	10	Oral defense	4th week
		Quiz 1 (Textbook + APA)	10	Computer based	5 th week
		1st attestation total	30		
	2nd attestation	Facts and Opinions about an IT invention using APA in-text citations	10	Oral defense	6 th week
		Infomercials about an IT invention	10	Class demonstration with giving peer- feedback	8 th week
		Quiz 2 (Textbook + APA)	10	Computer based	10 th week
		2nd attestation total	30		
	Final Exam: Presentation “My invention”		40	TBA	During final exam session
	Cumulative total for the course = $0,3 * 1^{st} \text{ Att} + 0,3 * 2^{nd} \text{ Att} + 0,4 * \text{Final} = 100$.				
Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.				
Recommended prerequisites	General English				
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: • reading and analyzing the structure and content of primary research articles • evaluating the accuracy and reliability of various sources • listening and understanding speaker viewpoints and extension of agreement, both implicit and explicit • listening and analyzing types of supporting evidence: examples, definitions, and explanations • delivering cohesive and coherent presentations				

	• using persuasive language and evidence-based claims to deliver compelling speeches • thinking questions Students will have the skill to: • apply critical thinking skills to identify bias in academic texts • take notes from aural input for further study purposes • ask and respond with appropriate syntax and vocabulary to open-ended higher-order thinking questions • interact with peers to give and receive constructive feedback • collect, analyze, and synthesize information from multiple academic sources • write quotations, paraphrases and summaries using APA 7th edition citation style In terms of competences, students will be able to • recognize and critically evaluate a range of authentic academic texts • understand and interpret explicit and implicit messages in lectures, presentations, and interviews • communicate fluently and accurately in academic discussions • actively engage in formal discussions using complex sentence structures • draft and provide academic oral presentations • acknowledge, paraphrase, quote sources in APA citation style, 7th edition • use formal and informal language registers in an extended speech • develop public speaking skills • enhance self and peer assessment skills
Content	The course emphasizes active and participatory learning through assignments that require students use their growing academic English skills and critical thinking skills during and outside class hours. The students will enhance their public speaking skills by engaging in increasingly advanced exercises in delivering oral presentations, both spontaneous and prepared. The course This Syllabus is developed in accordance with the aims and learning outcomes of the BA degrees in Computer Science, Software Engineering, Big Data Analysis, Media Technologies, Mathematical and Computational Science, Cyber Security, Smart Technologies, Digital Journalism, IT Management, IT Entrepreneurship, Digital Public Administration and Services, Industrial Internet of Thing, so that the students can successfully apply their knowledge and skills gained in the course in other subjects, demonstrate their academic English language competence, and successfully accomplish the Astana IT University coursework assignments.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	<i>Main literature:</i> De Chazal, E., & McCarter, S. (2015). Oxford EAP. A Course in English for Academic Purposes. Upper-intermediate / B2. The textbook is on Moodle/Microsoft Teams. The audio and video materials are available at https://elt.oup.com/student/oxfordeap/b2?cc=kz&selLanguage=en oxfordlearnersbookshelf.com Oxford EAP B2 - 270785388838 <i>Recommended literature:</i> Coursera course: Speaking so that people listen. Language instructors will weekly post additional sources such as readings, PowerPoint presentations, and website links on Moodle.

Module name:	History of Kazakhstan
Code	
Trimester	1, 2, 3

Person responsible for the module	Assoc. Prof. N. Shayakhmet																								
Lecturer(s)	Assoc. Prof. S. Mamytova Assoc. Prof. Zh. Zhampeissova Assoc. Prof. A. Auzhanova Assoc. Prof. K. Battalov																								
Language	English																								
Relation to curriculum	Bachelor programmes: all specialties																								
Type of teaching	The lectures serve to introduce students to the theoretical and methodological basis of the course and new concepts on the history of Kazakhstan. Seminar sessions are aimed at developing the skills of analytical and axiological analysis in the study of events, processes and phenomena in the history of Kazakhstan. Instructor-supervised independent study (ISIS) involves a deeper study of course materials. Student’s independent study (SIS): self-study time, including the time required to prepare and complete all course assignments.																								
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Recommended prerequisites	World History, Geography
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: - Know and understand the main stages in the development of the history of Kazakhstan; - Correlation of the phenomena and events of the historical past with the general paradigm of the world-historical development of human society through critical analysis; Students will have the skill to: - have the skills of analytical and axiological analysis in the study of historical processes and phenomena of modern Kazakhstan; - be able to objectively and comprehensively comprehend the immanent features of the modern Kazakh model of development; In terms of Competences, students will be able: - to systematize and give a critical assessment of historical phenomena and processes in the history of Kazakhstan.
Content	The course content consists of 5 thematic blocks: ancient people and the formation of a nomadic civilization, Turkic civilization and the Great Steppe, Kazakhstan in modern times (XVIII - early XX centuries), Kazakhstan in the Soviet period, Independent Kazakhstan.
Media employed	Multimedia classrooms equipped with computer, and projection; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature: 1. History of Kazakhstan (Қазақ Елі): A 4-volume set of textbooks. Books 1-4 / T. Omarbekov, B. Karibaev, N. Nurtazina [et al.]. – Almaty: Qazaq University, 2021 2. Исмагулов О., Исмагулова А. Происхождение казахского народа. По данным физической антропологии. Алматы, 2017. – 196 с. 3. Кәрібаев Б.Б. Қазақ хандығының құрылу тарихы. – Алматы: «Сардар» баспа үйі, 2014. – 520 б. Supplementary literature: 1. Formation and development of present statehood of Kazakhstan. Foundation of the First President of the Republic of Kazakhstan – Elbasy. Nur-Sultan, 2019 2. Yuval Noah Harari (2014), Sapiens: A Brief History of Humankind. 3. M. Olcott (1996), The Kazakhs, The Stanford University.

Module name:	Linear Algebra
Code	
Trimester	1 for Software Engineering, Big Data Analysis, Computer Science, IT Management
Person responsible for the module	Assoc. Prof. M. Sergaziyev, PhD
Lecturer(s)	Syndar Satbayev M. Sergaziyev
Language	English

Relation to curriculum	Bachelor programmes: Media Technology, IT, Compulsory course.																																																					
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																																					
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Cumulative total for the course = 0,3 * 1 st Att + 0,3 * 2 nd Att + 0,4*Final = 100.																																																						
Requirements according to the examination regulations	The offline final exam for the course “Linear Algebra” includes theoretical and practical tasks for 80 minutes. The online final exam for the course “Linear Algebra” includes twenty theoretical and practical multiple-choice tasks for 80 minutes. Students will be given multichoice tasks in LMS and must give their answers by choosing one variant. At the completion of the exam, all works must be submitted in the Learning Management System (moodle.astanait.edu.kz). No late submissions are allowed in the exam																																																					
Recommended prerequisites	Linear Algebra, Calculus I, Calculus II, Discrete mathematics.																																																					
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: - To demonstrate knowledge of mathematical knowledge - To understand basic mathematical principles (proving, counting) - To solve counting problems using different enumeration methods - To understand fundamental properties of matrices including determinants, inverse																																																					

	matrices, matrix factorizations, eigenvalues, and linear transformations. Solve systems of linear equations. - To develop mathematical abilities in writing programs by computers. Students will have the skill to - Ability to write mathematical statements and problem solutions using mathematical symbols. - Understanding of key mathematical concepts and the application of appropriate tools to real problems. - Writing logical progressions of precise mathematical statements to justify and communicate your reasoning. In terms of Competences, students will be able to: 1) understand types of solutions of systems of linear equations and present them in different forms 2) compute the inverse of a matrix 3) be able to construct the matrix of a linear transformation in given basis 4) determine the dimension of a subspace and the rank of a matrix 5) compute determinants 6) know how to find null spaces and column spaces of matrices 7) know how to find eigenvalues and corresponding eigenvectors 8) perform the diagonalization of a matrix																							
Content	<table><tr><th>#</th><th>Abbreviation</th><th>Meaning</th></tr><tr><td>1</td><td>ISIS</td><td>Instructor-supervised independent work</td></tr><tr><td>2</td><td>SIS</td><td>Students' independent work</td></tr><tr><td>3</td><td>IP</td><td>Individual project</td></tr><tr><td>4</td><td>PA</td><td>Practical assignment</td></tr><tr><td>5</td><td>LW</td><td>Laboratory work</td></tr><tr><td>6</td><td>MCQ</td><td>Multiple choice quiz</td></tr></table>	#	Abbreviation	Meaning	1	ISIS	Instructor-supervised independent work	2	SIS	Students' independent work	3	IP	Individual project	4	PA	Practical assignment	5	LW	Laboratory work	6	MCQ	Multiple choice quiz		
#	Abbreviation	Meaning																						
1	ISIS	Instructor-supervised independent work																						
2	SIS	Students' independent work																						
3	IP	Individual project																						
4	PA	Practical assignment																						
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6	MCQ	Multiple choice quiz																						
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.																							
Reading list	Assigned reading materials and presentations should be read prior to class. Class lectures and discussions will proceed with supplemental and advanced topics, which could be difficult to understand unless students have read the assigned material. Readings are listed in the schedule section. All necessary updates and / or changes to the course will be reflected in the Learning Management System (moodle.astanait.edu.kz). Basic Literature: 1. Lecture presentations 2. David C. Lay, Steven R. Lay and Judi J. McDonald, Linear Algebra and Its Applications, 5th edition, 2016 3. George B. Thomas and Ross L. Finney, Calculus and Analytic Geometry, 9th Edition, 1998 Supplementary literature: 1. Introduction to linear Algebra. Gilbert Strang 2. Linear Algebra and Its Applications, by Gilbert Strang, 4th Edition 3. Beklemishev D.V. The Course in Analytical Geometry and Linear Algebra. Moscow: Nauka, 2012.																							

Module name:	Information Communication Technologies
Code	
Trimester	1
Person	Senior lecturer E. Aitmukhanbetova, M.Sc.

responsible for the module																																																																						
Lecturer(s)	Zh.Sarsenova, M.Sc. M.Yermaganbetova, PhD																																																																					
Language	English																																																																					
Relation to curriculum	Bachelor programmes: Big Data Analysis, Software Engineering, IT Management. Compulsory course.																																																																					
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions are active sessions to develop student’s confidence through discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																																																					
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	Weekly quizzes on learn.astanait	10	Online test	weekly																																																																		
	Milestone 1	20	Submission of written reports	8 th week																																																																		
	End-term Exam	40	Test	10 th week																																																																		
	2nd attestation total	100																																																																				
Final Exam		100	Project Defence	During final exam session																																																																		
Cumulative total for the course = 0,3 * 1 st Att + 0,3 * 2 nd Att + 0,4*Final = 100.																																																																						

Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.
Recommended prerequisites	No prerequisites
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: • Computer systems; system concepts and architecture; • Software and operating Systems; human-Computer Interaction • Networks and Telecommunications; network Models; • Internet technologies, cloud and mobile technologies; • Database systems, data models; • Cybersecurity, cybercrime, common threats; • Multimedia technologies; • Smart technology, IoT, data analysis. Students will have the skill to • to understand the roles of ICT, and to differentiate computer systems and its subsystems; • to explain the purpose, content, and development trends of information and communication technologies, justify the choice of the most appropriate technology for solving specific problems; • to understand methods of collecting, storing, and processing information, ways of implementing information and communication processes; • to use Internet resources, cloud, and mobile services to search, store, process, and distribute information; In terms of Competences, students will be able to • to master modern computer technology and modern software for the definite task; • to acquire the ability to work in the global Internet; • to acquire skills of acquisition, analysis and processing of various types of information; • to create project activities in the specialty using modern information and communication technologies. • to acquire skills in work with academic, special and periodical literature in the field of information technology.
Content	This course is developed to learn the introduction to ICT and the idea of computer systems; to obtain understanding of computer systems, cybersecurity, smart technologies, human-computer interaction. Students acquire the concepts of relational databases, computer networks, cloud technologies, and gain extensive practical experience working on a project. In addition to the practical purpose, this course provides academic and educational purposes, helping to expand the horizons of students, improve their general culture and education.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature:

	1. Lecture notes (available on http://moodle.astanait.edu.kz) 2. June J. Parsons, New Perspectives on Computer Concepts 18th Edition—Comprehensive, Thomson Course Technology, a division of Thomson Learning, Inc Cambridge, MA, 2016. 3. Reema Thareja, Fundamentals of Computers. – Oxford University press: Oxford, 2014. 4. Information Communication Technologies (ISBN-978-601-7911-03-4, published by IITU, Almaty 2017). Supplementary literature: Online journals and articles.
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Module name:	Introudction to programming (C++)																		
Code																			
Trimester	1																		
Person responsible for the module	M.Sc Nursultan Khaimuldin																		
Lecturer(s)	Askar Khaimuldin, M.Sc. Aigerim Aibatbek, M.Sc. Nurlan Karimzhan MSIT Sayatbek Orazbekov M.Sc. Gulnara Mussina M.Sc.																		
Language	English																		
Relation to curriculum	Bachelor programmes: 6B06101 Computer Science 6B06102 Software Engineering 6B06103 Big Data Analysis 6B04101 IT Management Compulsory course.																		
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																		
Workload of course components and credits per trimester	<table><tr><td rowspan="2">ECTS credits</td><td colspan="2">Contact hours</td><td rowspan="2">ISIS</td><td rowspan="2">SIS</td><td rowspan="2">Total hours</td></tr><tr><td>Lectures</td><td>Practice sessions</td></tr><tr><td>5</td><td>20</td><td>30</td><td>10</td><td>90</td><td>150</td></tr></table>					ECTS credits	Contact hours		ISIS	SIS	Total hours	Lectures	Practice sessions	5	20	30	10	90	150
ECTS credits	Contact hours		ISIS	SIS	Total hours														
	Lectures	Practice sessions																	
5	20	30	10	90	150														
Course assessment and forms of examination	<table><tr><td>Period</td><td>Assessment type</td><td>Number of points</td><td>Exam Form</td><td>Schedule (Week #)</td></tr><tr><td rowspan="2">1st attestation</td><td>Contester problem set</td><td>60</td><td>Submission of written reports</td><td>Weekly</td></tr><tr><td>Mid-term Exam</td><td>40</td><td>MCQ and Practical exam</td><td>5th week</td></tr></table>					Period	Assessment type	Number of points	Exam Form	Schedule (Week #)	1 st attestation	Contester problem set	60	Submission of written reports	Weekly	Mid-term Exam	40	MCQ and Practical exam	5 th week
Period	Assessment type	Number of points	Exam Form	Schedule (Week #)															
1 st attestation	Contester problem set	60	Submission of written reports	Weekly															
	Mid-term Exam	40	MCQ and Practical exam	5 th week															

	<table><tr><td></td><td>1st attestation total</td><td>100</td><td></td><td></td></tr><tr><td rowspan="3">2nd attestation</td><td>Contester problem set</td><td>60</td><td>Submission of written reports</td><td>Weekly</td></tr><tr><td>End-term Exam</td><td>40</td><td>MCQ and Practical exam</td><td>10th week</td></tr><tr><td>2nd attestation total</td><td>100</td><td></td><td></td></tr><tr><td colspan="2">Final Exam</td><td>100</td><td>MCQ</td><td>During final exam session</td></tr><tr><td colspan="5">Cumulative total for the course = 0,3 * 1st Att + 0,3 * 2nd Att + 0,4*Final = 100.</td></tr></table>		1st attestation total	100			2nd attestation	Contester problem set	60	Submission of written reports	Weekly	End-term Exam	40	MCQ and Practical exam	10 th week	2nd attestation total	100			Final Exam		100	MCQ	During final exam session	Cumulative total for the course = 0,3 * 1 st Att + 0,3 * 2 nd Att + 0,4*Final = 100.				
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	2nd attestation total	100																											
Final Exam		100	MCQ	During final exam session																									
Cumulative total for the course = 0,3 * 1 st Att + 0,3 * 2 nd Att + 0,4*Final = 100.																													
Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.																												
Recommended prerequisites	Linear Algebra, Calculus I, Calculus II, Discrete mathematics.																												
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: • To demonstrate knowledge of C++ syntax • To understand basic programming principles • To solve programming problems using C++; • To apply elementary techniques involving arithmetic operators, mathematical and logic expressions in C++ programming • To develop C++ programs that use sequential files for input and output. Students will have the skill to • program with basic features of the C++ programming language • write C++ programs that use selection (if, switch, ternary operator) • write C++ programs that use loops (while, do-while, for) • understand basic use of arrays in C++ programming • understand functions in C++ programming • understand the concept of pointers in C++ programming • understand the usage of structs In terms of Competences, students will be able to • program with basic features of the C++ programming language • write C++ programs that use selection (if, switch, ternary operator) • write C++ programs that use loops (while, do-while, for) • understand basic use of arrays in C++ programming • understand functions in C++ programming • understand the concept of pointers in C++ programming • understand the usage of structs																												
Content	This course is developed to learn programming fundamentals and writing algorithms in C++ programming language. During this course, you will improve your programming skills, writing simple algorithms using C++ technologies.																												

Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature: 1. Lecture notes (available on moodle.astanait.edu.kz) 2. Paul & Harvey Deitel - C++ How to Program, 10th edition 3. Herbert Schildt. 2003. The Complete Reference C++, 4th edition. Supplementary literature: 1. http://contester.astanait.edu.kz:31001/ 2. https://cplusplus.com/

Module name:	Physical Education																																			
Code																																				
Trimester	1,2,3,4																																			
Person responsible for the module	Senior lector N. Shayakhmetov, master of pedagogical sciences Senior lector S. Askapov Teacher E. Zhanabekov Teacher S. Sadvokassova, master of pedagogical sciences																																			
Instructors	N. Shayakhmetov, Master of pedagogical sciences S. Askapov E. Zhanabekov S. Sadvokassova, Master of pedagogical sciences																																			
Language	English																																			
Relation to curriculum	Bachelor programmes: all educational programs																																			
Type of teaching	Practice sessions formation of social and personal competencies of students and the ability to purposefully use the means and methods of physical culture, ensuring the preservation, strengthening of health to prepare for professional activities; to the persistent transfer of physical exertion, neuropsychic stress and adverse factors in future work. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																			
Workload of course components and credits per trimester	<table><tr><td rowspan="2">ECTS credits</td><td colspan="2">Contact hours</td><td rowspan="2">ISIS</td><td rowspan="2">SIS</td><td rowspan="2">Total hours</td></tr><tr><td>Lectures</td><td>Practice sessions</td></tr><tr><td>8</td><td>-</td><td>80</td><td>-</td><td>160</td><td>240</td></tr></table>					ECTS credits	Contact hours		ISIS	SIS	Total hours	Lectures	Practice sessions	8	-	80	-	160	240																	
ECTS credits	Contact hours		ISIS	SIS	Total hours																															
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Course assessment and forms of examination	<table><tr><td>Period</td><td>Assessment type</td><td>Number of points</td><td>Exam Form</td><td>Schedule (Week #)</td></tr><tr><td rowspan="5">1st attestation</td><td>1. Control standards</td><td>100</td><td>Practice</td><td>3rd week</td></tr><tr><td>2. Control standards</td><td>100</td><td>Practice</td><td>4th week</td></tr><tr><td>3. Control standards</td><td>100</td><td>Practice</td><td>5th week</td></tr><tr><td>Mid-term Exam</td><td>$\frac{CS1+CS2+CS3}{3}$</td><td></td><td></td></tr><tr><td>1st attestation total</td><td>100</td><td></td><td></td></tr><tr><td>2nd attestation</td><td>1. Control standards</td><td>100</td><td>Practice</td><td>8th week</td></tr></table>					Period	Assessment type	Number of points	Exam Form	Schedule (Week #)	1 st attestation	1. Control standards	100	Practice	3 rd week	2. Control standards	100	Practice	4 th week	3. Control standards	100	Practice	5 th week	Mid-term Exam	$\frac{CS1+CS2+CS3}{3}$			1 st attestation total	100			2nd attestation	1. Control standards	100	Practice	8 th week
Period	Assessment type	Number of points	Exam Form	Schedule (Week #)																																
1 st attestation	1. Control standards	100	Practice	3 rd week																																
	2. Control standards	100	Practice	4 th week																																
	3. Control standards	100	Practice	5 th week																																
	Mid-term Exam	$\frac{CS1+CS2+CS3}{3}$																																		
	1 st attestation total	100																																		
2nd attestation	1. Control standards	100	Practice	8 th week																																

	2. Control standards	100	Practice	9 th week
	3. Control standards	100	Practice	10 th week
	Mid-term Exam	$\frac{CS1+CS2+CS3}{3}$		
	2nd attestation total	100		
	$\text{Total grade} = \frac{\text{Attestation total1} + \text{Attestation total2}}{2}$			
Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.			
Recommended prerequisites	Not required			
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: - values of physical culture and sports; the importance of physical condition of the body in human life; - factors that determine human health, the concept of a healthy image life and its components; - principles and patterns of physical education; - ways to monitor and evaluate physical state of the body; - methodological foundations of physical education, foundations self-improvement of physical qualities and personality traits; the influence of the conditions and nature of the work of a specialist on the choice of the content of industrial physical culture aimed at increasing in labor productivity. Students will have the skill to - adhere to a healthy lifestyle; - independently maintain and develop basic physical quality in the process of physical exercises; - select necessary applied physical exercises to adapt the body to various working conditions and specific environmental influences. In terms of Competences, students will be able to - apply various modern concepts in the field of physical culture; - use methods and methods of self-diagnosis, self-assessment, means health improvement for self-correction of health by various forms of motor activities that satisfy human needs in a rational use of free time; - use methods of selecting a set of physical exercises for health promotion; - use means and methods of applied physical trainings for endurance, speed, strength, flexibility and agility			

Content	The content of the program is based on the following conceptual positions: • general educational orientation of the process of physical education; • consistency of the educational process; • professional and applied orientation of physical education; • normative and methodological provision of education of students in the field of physical culture and sports;
Media employed	1) Youtube: 2) Nike training 3) Home workout Online journals, article, papers, books and internet resources
Reading list	Basic Literature: 1. "Theory and methods of physical education and sports: Moscow 2003" Zh.K. Kholodov, V.S. Kuznetsov 2. Dene mädenieti men sporttyn ilimi men adistemesi. -Oskemen, ShQMU baspasy. 2009 Uanbaev E.K., Uanbaeva F.Zh. 3. Sports theory: Оқу қыралы. - Pavlodar: PMPI, 2013. - 192 p. J.A. Usin, A.M. Mamytov, S.N. Askapov Supplementary literature: 1. The system of training athletes in Olympic sports: Moscow 2004: 820 st. Platonov V.N.

2nd term

Module name:	Foreign Language 2: English for Academic Purposes
Code	IYa 1103
Trimester	2
Person responsible for the module	Group of instructors
Lecturer(s)	A.Ichshanova, A.Ayazbayeva, A.Urazbekova, A.Seidin, Y. Verba, S.Burbekova, N.Ishmukhambetov, K. Hassenov, A.Bakenova, M.Zhenisbayeva, F.Tolesh, F. Omarova, T.Almas, A. Salkenova, A.Rahimzhanova, S. Zhalmagambetova, A. Musina, M.Smagulova, M. Abzhaparova, M. Amanzhol, A. Bakenova, A. Ormanova
Language	English
Relation to curriculum	Bachelor programmes: 6B06101 Computer Science 6B06102 Software Engineering 6B06103 Big Data Analysis 6B04101 IT Management
Type of teaching	Practice sessions (seminars) are active sessions to develop student's confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student's independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.

Workload of course components and credits per trimester						
	ECTS credits	Contact hours		ISIS	SIS	Total hours
		Lectures	Practice sessions			
	5		50	10	90	150
Course assessment and forms of examination						
	Period	Assessment type	Number of points	Exam Form	Schedule (Week #)	
	1 st attestation	Syllabus Quiz	2	Computer based	1 st week	
		APA in-text citation Quiz	5	Computer based	2 nd week	
		Paraphrasing and Summarising activity	8	Oral defense	3 rd week	
		Introduction structure Quiz	5	Computer based	4 th week	
		Midterm Grammar – Vocabulary Quiz	10	Computer based	5 th week	
		1st attestation total	30			
	2nd attestation	Writing an evidence-based problem or solution paragraph	5	Submission of written work	6 th week	
		In-class group presentation “Dos and don’ts of academic writing.	5	Oral defense	7 th week	
		Paragraph and conclusion structure quiz	5	Computer based	8 th week	
		APA referencing Quiz	5	Computer based	9 th week	
		Endterm Grammar-Vocabulary Quiz	10	Computer based	10 th week	
		2nd attestation total	30			
	Final Exam		40	Computer based quiz	During final exam session	
	Cumulative total for the course = 0,3 * 1st Att + 0,3 * 2nd Att + 0,4*Final = 100.					

Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.
Recommended prerequisites	Foreign Language 1: English for academic purposes
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: • developing writing and reading abilities in a variety of academic settings • developing listening and speaking skills through lectures, seminars and presentations within a university context Students will have the skill to: • follow a range of formal and informal discussions in academic contexts • follow lectures and presentations • take notes from aural input for further study purposes • participate in formal and informal classroom discussions and conversations • ask and respond with appropriate syntax and vocabulary to open-ended higher-order thinking questions • Interact with peers to give and receive constructive feedback In terms of competences, students will be able to • apply critical reading skills • write summaries of academic literature • know the key components of an academic essay • how to construct an effective thesis statement • how to build clear topic sentences • how to paraphrase and how to conclude essays
Content	English for Academic Purposes is designed to help students focus on basic skills in academic writing, reading, listening and speaking with an emphasis on the rules of academic English style, research and academic vocabulary and academic language use. The course is developed in accordance with the aims and learning outcomes of the educational requirements of the BA degrees in Computer Science, Software Engineering, Big Data Analysis, Media Technologies, Mathematical and Computational Science, Cyber Security, Smart Technologies, Digital Journalism, IT Management, IT Entrepreneurship, Digital Public Administration and Services, Industrial Internet of Thing, so that the students can successfully apply their knowledge and skills gained in the course in other subjects, demonstrate their academic English language competence, and successfully accomplish the Astana IT University coursework assignments.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Main literature: 1. De Chazal, E., & Moore, J. (2021). <i>Oxford EAP: A Course in English for Academic Purposes</i>. Advanced/C1. Oxford University Press. 2. The audio and video materials are available at https://elt.oup.com/student/oxfordeap/c1?cc=kz&selLanguage=en 3. Paterson, K. (2017). <i>Oxford Grammar for EAP</i>. London: Oxford University Press. Supplementary literature: 4. Bailey, S. (2018). <i>Academic Writing: A Handbook for International Students</i> (5th ed.). Routledge.

	5. Language instructors will weekly post additional sources such as readings, PowerPoint presentations, and website links on Moodle
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Module name:	Second foreign language-Chinese language																																							
Code	IYa 1103																																							
Trimesters	1-2																																							
Person responsible for the module	Senior-lecturer, Master of pedagogical sciences Musina A.O																																							
Lecturer(s)	A.Musina, M.Sc.																																							
Language	Chinese																																							
Relation to curriculum	Bachelor programmes: 6B06101 Computer Science 6B06102 Software Engineering 6B06103 Big Data Analysis 6B04101 IT Management Elective course																																							
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																							
Workload of course components and credits per trimester	<table><tr><td rowspan="2">ECTS credits</td><td colspan="2">Contact hours</td><td rowspan="2">ISIS</td><td rowspan="2">SIS</td><td rowspan="2">Total hours</td></tr><tr><td>Lectures</td><td>Practice sessions</td></tr><tr><td>10</td><td>-</td><td>100</td><td>20</td><td>180</td><td>300</td></tr></table>					ECTS credits	Contact hours		ISIS	SIS	Total hours	Lectures	Practice sessions	10	-	100	20	180	300																					
ECTS credits	Contact hours		ISIS	SIS	Total hours																																			
	Lectures	Practice sessions																																						
10	-	100	20	180	300																																			
Course assessment and forms of examination	<table><tr><td>Period</td><td>Assessment type</td><td>Number of points</td><td>Exam Form</td><td>Schedule (Week #)</td></tr><tr><td rowspan="4">1st attestation</td><td>Assignment 1</td><td>30</td><td>Submission of written work</td><td>Weekly</td></tr><tr><td>Assignment 2</td><td>30</td><td>Written</td><td>3rd week</td></tr><tr><td>Mid-term Exam</td><td>40</td><td>Written</td><td>5th week</td></tr><tr><td>1st attestation total</td><td>100</td><td></td><td></td></tr><tr><td rowspan="3">2nd attestation</td><td>Assignment 3</td><td>30</td><td>Submission of written work, text and essay on the certain topic</td><td>Weekly</td></tr><tr><td>Assignment 4</td><td>30</td><td>Written</td><td>8th week</td></tr><tr><td>End-term Exam</td><td>40</td><td>Written</td><td>10th week</td></tr></table>					Period	Assessment type	Number of points	Exam Form	Schedule (Week #)	1 st attestation	Assignment 1	30	Submission of written work	Weekly	Assignment 2	30	Written	3 rd week	Mid-term Exam	40	Written	5 th week	1st attestation total	100			2nd attestation	Assignment 3	30	Submission of written work, text and essay on the certain topic	Weekly	Assignment 4	30	Written	8 th week	End-term Exam	40	Written	10 th week
Period	Assessment type	Number of points	Exam Form	Schedule (Week #)																																				
1 st attestation	Assignment 1	30	Submission of written work	Weekly																																				
	Assignment 2	30	Written	3 rd week																																				
	Mid-term Exam	40	Written	5 th week																																				
	1st attestation total	100																																						
2nd attestation	Assignment 3	30	Submission of written work, text and essay on the certain topic	Weekly																																				
	Assignment 4	30	Written	8 th week																																				
	End-term Exam	40	Written	10 th week																																				

		2nd attestation total	100		
	Final Exam		100	Mixed format	During final exam session
	Cumulative total for the course = $0,3 * 1^{st} \text{ Att} + 0,3 * 2^{nd} \text{ Att} + 0,4 * \text{Final} = 100$.				
Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.				
Recommended prerequisites	Foreign language 1 and 2				
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: - improving the reading technique for the pinyin transcription and hieroglyphs - recognizing meaningful phonemes, rhythmic patterns, phrases - understanding dialogues and video materials - understanding the main content of texts Students will have the skill to: - write hieroglyphs - compose and analyze the structure of the hieroglyph, to determine the key blocks of hieroglyphs - compose a written message of different volume and content within the studied topics - write composition, short essay, interactive dialogues etc. - develop vocabulary and sentence structure - use in everyday situations through various forms of oral practice - express themselves with the right words and phrases - read and write short paragraphs In terms of competences, students will be able to: - understand basic communication - develop communicative skills - use oral and written Chinese at the beginner level. - acquire new vocabulary consolidated through conversation stressing the relationship - between language and culture				
Content	Chinese Language is designed to help students focus on basic skills in listening, reading, writing and speaking with an emphasis on the rules of simplified Chinese. This course is developed in accordance with the BA degree in Smart Technologies, IT Entrepreneurship, Computer Science, Telecommunication Systems, Cybersecurity, IT Management, Digital Journalism, Media Technology, Big Data, Software Engineering and Industrial Automation Program aims and learning outcomes.				
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.				
Reading list	<i>Main:</i> Practical course of Chinese language. In 2 volumes. 2 volumes Alexander Fedorovich Kondrashevsky				

	Eastern book publishing house, 2018 ISBN 978-5-907086-04-3 Сирко Е.В. (2006). 北京语言大学出版社,新使用汉语课本1课本 Сирко Е.В. (2006). 北京语言大学出版社, 新使用汉语课本1课本 exercise book Recommended: Teaching manual of Chinese for students of non-linguistic specialties (1st year), 2021, Musina A.O.
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Module name:	German language A1.2																																					
Code																																						
Trimester	1 and 2																																					
Person responsible for the module	A. Baizhanova, MSc																																					
Lecturer(s)	Baizhanova, MSc.																																					
Language	English, German																																					
Relation to curriculum	6B06101 - Computer Science; 6B06102 – Software Engineering; 6B06103 – Big Data Analysis; 6B04101 - IT Management. Non-compulsory course.																																					
Type of teaching	Lectures serve to introduce new grammar topics and vocabulary. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the topics. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																					
Workload of course components and credits per trimester	<table><tr><td rowspan="2">ECTS credits</td><td colspan="2">Contact hours</td><td rowspan="2">ISIS</td><td rowspan="2">SIS</td><td rowspan="2">Total hours</td></tr><tr><td>Lectures</td><td>Practice sessions</td></tr><tr><td>10</td><td></td><td>100</td><td>20</td><td>180</td><td>300</td></tr></table>					ECTS credits	Contact hours		ISIS	SIS	Total hours	Lectures	Practice sessions	10		100	20	180	300																			
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	Lectures	Practice sessions																																				
10		100	20	180	300																																	
Course assessment and forms of examination	<table><tr><td>Period</td><td>Assessment type</td><td>Number of points</td><td>Exam Form</td><td>Schedule (Week #)</td></tr><tr><td rowspan="2">1st attestation</td><td>Projekt 1. Mein Tag</td><td>20</td><td>Submission and defense of presentation</td><td>5th week</td></tr><tr><td>Quiz</td><td>10</td><td>Written</td><td>5th week</td></tr><tr><td rowspan="2">2nd attestation</td><td>Projekt 2. Mein Lieblingsfest</td><td>20</td><td>Submission and defense of presentation</td><td>10th week</td></tr><tr><td>Quiz</td><td>10</td><td>Written</td><td>10th week</td></tr><tr><td colspan="2">Final Exam</td><td>40</td><td>Oral</td><td>During final exam session</td></tr><tr><td colspan="5"></td></tr></table>					Period	Assessment type	Number of points	Exam Form	Schedule (Week #)	1 st attestation	Projekt 1. Mein Tag	20	Submission and defense of presentation	5 th week	Quiz	10	Written	5 th week	2nd attestation	Projekt 2. Mein Lieblingsfest	20	Submission and defense of presentation	10 th week	Quiz	10	Written	10 th week	Final Exam		40	Oral	During final exam session					
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1 st attestation	Projekt 1. Mein Tag	20	Submission and defense of presentation	5 th week																																		
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2nd attestation	Projekt 2. Mein Lieblingsfest	20	Submission and defense of presentation	10 th week																																		
	Quiz	10	Written	10 th week																																		
Final Exam		40	Oral	During final exam session																																		

	Cumulative total for the course = $0,3 * 1st\ Att + 0,3 * 2nd\ Att + 0,4 * Final$.
Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.
Recommended prerequisites	German language A1.1
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: - rules for reading, pronunciation and writing of vowels, consonants and letter combinations; - the lexical side of speech in the volume of levels A1.2 (including both stylistically neutral lexical units and elements of everyday colloquial speech) ; - the main grammatical structures characteristic of oral and written speech of everyday communication (at level A1.2). Students will have the skill to: - understand individual phrases and frequently used vocabulary, in statements on topics related directly to the student (for example, basic personal and family data, shopping, place of residence, work); - understand the main points in short, clear and simple messages and announcements. - read and understand the content of short, simple texts; - find specific, easily predictable information in simple texts of everyday communication: in advertisements, brochures, menus, schedules, announcements; - understand short, simple letters of a personal nature; - communicate in simple typical situations that require a direct exchange of information within the framework of familiar topics and activities; - use simple phrases and sentences, talk about their family and other people, living conditions, studies, daily activities in the form of a series of short simple phrases and sentences in the form of a list. In terms of competences, students will be able to: - use the basics of writing (recording information, making a plan, making notes); - conduct everyday correspondence; - deliver a public speech (to form an oral message, a monologue, to make a report, a presentation); dialogical speech (to implement a basic communication).
Content	German Language A1.2 is designed to prepare students to use German for their needs and interests in real-life situations and work. Additionally, this course will further give the students the possibility to communicate on general social topics, free communication in English speaking environment and understanding texts of general use. Much emphasis is placed on speaking, reading and writing skills and on the projects to represent the learners' achievement.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.

Reading list	Basic Literature: Niebisch, D., Penning-Hiemstra, S., Specht, F., Bovermann, M., Pude, A., Reimann, M. (2022). Hueber Verlag. Schritte International Neu. A1.2. The textbook is on Moodle/Microsoft Teams.
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Module name:	Cultural Studies																																							
Code																																								
Trimester	2 trimester (all majors of bachelor degree; depending on the RUPs of programmes)																																							
Person responsible for the module	Assoc. Prof. A. Uyzbayeva, PhD																																							
Lecturer(s)	Assoc. Prof. A. Uyzbayeva, PhD Assistant professor, A. Rakhimzhanova, PhD																																							
Language	English																																							
Relation to curriculum	Bachelor programmes: History of Kazakhstan, Philosophy. Compulsory course.																																							
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																							
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	End-term MCQ (multiple-choice quiz)	30	Test	10 th week
	Lectures online academy	10	Quiz	Weekly
	2nd attestation total	100		
	Final Exam	100	MCQ	During final exam session
	Cumulative total for the course = $0,3 * 1^{st} \text{ Att} + 0,3 * 2^{nd} \text{ Att} + 0,4 * \text{Final} = 100$.			
Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.			
Recommended prerequisites	History of Kazakhstan.			
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: - theories and approaches to the study of culture; - the basic principles of culture; - description and analysis of the current problems in culture; - critical thinking and applying it in practice Students will have the skill to - to explain and interpret knowledge (concepts, ideas, theories) in cultural studies; - to explain the socio and ethical values of society as a product of integration processes; - to explain the nature of situations in various spheres of social communication based on the content of theories and ideas of cultural studies discipline; - to present information reasonably about the various stages of cultural development in Kazakhstan; - to express correctly and defend reasonably own opinion on socially significant issues. In terms of Competences, students will be able to - communicate constructively in different environments, collaborate in teams and negotiate, show tolerance, express and understand different viewpoints; - select and use reference materials; - locate, organize, and interpret information, and take notes.			
Content	This course is oriented to reveal the features of national culture development in the context of the global culture and civilization. Topics include: structure of culture, language of culture, semiotics of culture, anatomy of culture, and historical development of culture in Kazakhstan from ancient times until modern days.			
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle, Online academy (https://learn.astanait.edu.kz/).			

Reading list	Basic Literature: 1. Gabitov T. «Actual Problems of Kazakh Culture. Kazakh Culture Challenges». - Saarbrücken: Lambert publishing, 2016. 2. Handbook of Cultural Studies and Education. /P.T. Peter. - 1 ed. - Great Britain: Routledge and Taylor & Francis Group, 2019. - 531 p. - ISBN 9780815385097: 52800.00. 3. Introducing Cultural Studies /L. Brian. - 3 ed. - Oxon: Routledge, 2017. - 459 p. - ISBN 9781138915725: 27500.00. 4. Cultural Studies: Theory and Practice/ B. Chris, A. J. Emma. - 5 ed. - Great Britain: SAGE Publications, 2016. - 722 p. - ISBN 9781473919457: 28900.00. Supplementary Literature: 1. Murashcenkova, N.V. (2022), Ethnic, Civic, and Global Identities as Predictors of Emigration Activity of Student Youth in Belarus, Kazakhstan, and Russia (article). Cultural-Historical Psychology, 2022 Vol.18, No. 3. doi:10.17759/chp.2022180314 2. Globalisation and culture (article)(http://socialalternatives.com/) - Culture, Tradition and Globalisation: Some Philosophical Questions - Vol. 35 No. 1, 2016 3. Seksenbayeva, G. (2019) Archives and Records (article) Formation and development of the Central State Archive of cinema, photographic materials and sound records of the Kazakh SSR (1943–1991). The Journal of the Archives and Records Association. Vol.40 No.3 (https://doi.org/10.1080/23257962.2019.1592746) 4. Hall G., Birchall C. New cultural studies: adventures in theory - Edinburgh University Press. 2006 // https://web.p.ebscohost.com/ehost/detail/detail?vid=0&sid=05424f3f-d996-4bd1-b47f-b61e26c93c2a%40redis&bdata=Jmxhbm9cnUmc2l0ZT1laG9zdC1saXZl#AN=179721&db=nlebk 5. D. Jones, M. Marion. The dynamics of counterpoint in Asian Studies - Albany: SUNY Press. 2014//https://web.p.ebscohost.com/ehost/detail/detail?vid=0&sid=4e0c27a1-9014-4623-8465-bd3895859b57%40redis&bdata=Jmxhbm9cnUmc2l0ZT1laG9zdC1saXZl#AN=706808&db=nlebk 6. L. Steiner, C. Christians Key concepts in critical cultural studies - rbana [Ill.] : University of Illinois Press. 2010//https://web.p.ebscohost.com/ehost/detail/detail?vid=0&sid=2159bc8c-a4e8-4956-a40a-02c527a53f23%40redis&bdata=Jmxhbm9cnUmc2l0ZT1laG9zdC1saXZl#db=nlebk&AN=569700 7. Journal of Muslim Minority Affairs. Apr2002, Vol. 22 Issue 1, p11. 28p. (doi: 10.1080/13602000220124818) - Soviet Nationality, Identity, and Ethnicity in Central Asia: Historic Narratives and Kazakh Ethnic Identity 8. Archives and Records (article) Formation and development of the Central State; Archive of cinema, photographic materials and sound records of the Kazakh SSR
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	(1943–1991) - Formation and development of the Central State Archive of cinema, photographic materials and sound records of the Kazakh SSR (1943–1991) (https://doi.org/10.1080/23257962.2019.1592746) 9. Культурология [Текст]: учебник. / Л.П. Воронкова - 2-е изд. - Москва: Юрайт, 2021. - 202с. - ISBN 978-5-534-07934-0: 8800.00. 10. Культурология [Текст]: учебное пособие для СПО / под ред. И.Ф. Кефели. - 2-е изд. - Москва : Юрайт, 2021. - 165с. - ISBN 978-5-534-89560-5: 7500.00.
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Module name:	Discrete Mathematics																										
Code	DM 1205																										
Trimester	2																										
Person responsible for the module	Assoc. Prof. Nurlan Ismailov, PhD																										
Lecturer(s)	Nurlan Ismailov Shynar Abutalipova Tolkynay Yelemes Moldir Toleubek																										
Language	English																										
Relation to curriculum	Bachelor programmes: 6B06101 Computer Science 6B06102 Software Engineering 6B06103 Big Data Analysis 6B04101 IT Management Compulsory course.																										
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																										
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Course assessment and forms of examination	<table><tr><td>Period</td><td>Assessment type</td><td>Number of points</td><td>Exam Form</td><td>Schedule (Week #)</td></tr><tr><td rowspan="4">1st attestation</td><td>Problem Sets</td><td>20</td><td>Submission of written reports</td><td>2nd week and 4th weeks</td></tr><tr><td>Quiz</td><td>20</td><td>Written</td><td>3rd week</td></tr><tr><td>Mid-term Exam</td><td>60</td><td>Written</td><td>5th week</td></tr><tr><td>1st attestation total</td><td>100</td><td></td><td></td></tr></table>					Period	Assessment type	Number of points	Exam Form	Schedule (Week #)	1 st attestation	Problem Sets	20	Submission of written reports	2 nd week and 4 th weeks	Quiz	20	Written	3 rd week	Mid-term Exam	60	Written	5 th week	1 st attestation total	100		
Period	Assessment type	Number of points	Exam Form	Schedule (Week #)																							
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	Quiz	20	Written	3 rd week																							
	Mid-term Exam	60	Written	5 th week																							
	1 st attestation total	100																									

	2nd attestation	Problem Sets	20	Submission of written reports	7 th week and 9 th
		Quiz	20	Written	8 th week
		End-term Exam	60	Written	10 th week
		2nd attestation total	100		
	Final Exam		100	Written	During final exam session
Cumulative total for the course = 0,3 * 1 st Att + 0,3 * 2 nd Att + 0,4*Final = 100.					
Requirements according to the examination regulations	In case if the student did not attend more than 30% of the classes without any reasonable excuses, the teacher has a right to mark him as “not graded”, and the student wouldn’t be admitted to the exam. In other words, students must participate in at least 70% of all online/offline class time, otherwise he/she fails the course.				
Recommended prerequisites	No prerequisites (it is enough to know school mathematics program well)				
Module objectives/intended learning outcomes	Course goal(s): Course goal is to familiarize students with an initial base in mathematics such as sets, basic of combinatorics and graph theory. The main goal is to be able to apply above-mentioned tools to problems in postrequisites courses. By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: - To demonstrate knowledge of mathematical knowledge; - To understand basic mathematical principles (proving, counting, understanding discrete objects); - To solve counting problems using different enumeration methods; - To apply basic techniques involving discrete objects such as sets, functions, graphs and mathematical expressions in discrete mathematics; - To develop mathematical abilities in writing programs by computers. Students will have the skill to: - Basic school mathematical knowledge; - Ability to construct examples and counterexamples In terms of Competences, students will be able to: - Learn main proof techniques of mathematics; - Be familiar with important discrete objects; - Understand counting principles of combinatorics; - Be able to transform discrete problems into simple forms; - Describe programing questions in terms of graphs and trees.				
Content	The course includes logics, set theory, functions, and fundamental principles of counting, number theory, inclusion-exclusion principle, recurrence relations, graph theory.				
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Goodnotes; Microsoft Teams; LMS Moodle.				
Reading list	1. Lecture presentations. Main textbooks: 2. E. Goodaire and M. Parmenter Discrete Mathematics with Graph Theory (third edition); 3. Kenneth H. Rosen. Discrete Mathematics and Its Applications (seventh edition); Additional textbooks:				

	4. Ralph P. Grimaldi. Discrete and Combinatorial Mathematics (fifth edition); 5. А.С. Джумадиляев, Элементы дискретной математики, Алматы, 2004; 6. Д. Андерсон Дискретная математика и комбинаторика. 2004; Open Online Resources 1. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-042j-mathematics-for-computer-science-fall-2010/ 2. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-042j-mathematics-for-computer-science-spring-2015/index.htm
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Module name:	Web Technologies 1 (Front End)																															
Code																																
Trimester	2																															
Person responsible for the module	Zhantileuov Eldiyar M.Sc.																															
Lecturer(s)	G. Yegemberdiyeva, M.Sc. A. Salkenov, M.Sc.																															
Language	English																															
Relation to curriculum	Bachelor programmes: 6B06101 Computer Science 6B06102 Software Engineering 6B06103 Big Data Analysis 6B04101 IT Management Compulsory course.																															
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																															
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	1 st attestation total	100																														
	Assignment 3	40	Project	7 th week																												

	2nd attestation	Assignment 4	40	Project	9 th week
		End-term Exam	40	MCQ	10 th week
		2nd attestation total	100		
	Final Exam		100	Final Project Defense	During final exam session
	Cumulative total for the course = $0,3 * 1^{st} \text{ Att} + 0,3 * 2^{nd} \text{ Att} + 0,4 * \text{Final} = 100$.				
Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.				
Recommended prerequisites	Basic programming skills				
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: • Create, debug, and maintain professional websites; • Gather, organize, and present information to help a client make business-critical decisions; • Interact, collaborate and communicate effectively with the instructor and fellow students Students will have the skill to • Understanding of web development; • Good knowledge in web development including CSS and JavaScript technologies. In terms of Competences, students will be able to • Organize, browse, edit and manage a variety of file types; • Develop, validate and debug interactive websites using HTML, CSS, Bootstrap and JavaScript; • Deliver short, easy presentations and documents that are well considered, compelling and supported by evidence; • Present findings in an organized and compelling manner; • Discuss the notion that every problem has multiple solutions, each with its own advantages and disadvantages, and that success is tied to finding the technical solution that best fits into the non-technical dimensions of a specific problem				
Content	Course goal is to introduce students to web development based on technologies such as HTML, CSS, JavaScript. Furthermore, it will cover Bootstrap and JQuery. this course materials will assist students in developing skills necessary to work as a Frontend Web Developer.				
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.				
Reading list	Basic Literature: 6. Ben Frain. Responsive Web Design with HTML5 and CSS: Develop future-proof responsive websites using the latest FITMT-S and CSS techniques, 3rd Edition.				

	7. Flanagan David. JavaScript: The Definitive Guide. 8. Jon Duckett. .JavaScript and .jQuery: interactive front-End Web Development.
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Module name:	Object-oriented programming (Java)																																			
Code																																				
Trimester	2																																			
Person responsible for the module	Senior-lecturer A. Khaimuldin, MSc																																			
Lecturer(s)	1. Chingis Kharmyssov, PhD 2. Ryspayeva Marya 3. Nurgazina Dana 4. Smakova Saida 5. Khaimuldin Nursultan, MSc 6. Baizhaksynov Daniyar 7. Aimukhambetov Olzhas																																			
Language	English																																			
Relation to curriculum	Bachelor programmes: Software Engineering, Computer Science. (<i>Programmes under accreditation are listed</i>)																																			
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																			
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Period	Assessment type	Number of points	Exam Form	Schedule (Week #)																																
1 st attestation	Assignments	40	Submission of solutions (java files)	2 nd week 4 th week																																
	Quiz	20	MCQ	3 rd week																																
	Mid-term Exam	40	MCQ	5 th week																																
	1 st attestation total	100																																		
2nd attestation	Assignments	40	Submission of solutions (Project milestones)	7 th week 9 th week																																
	Quiz	20	MCQ	8 th week																																

	End-term Exam	40	Project defence	10 th week
	2nd attestation total	100		
	Final Exam	100	MCQ	During final exam session
	Cumulative total for the course = $0,3 * 1^{st} \text{ Att} + 0,3 * 2^{nd} \text{ Att} + 0,4 * \text{Final} = 100.$			
Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.			
Recommended prerequisites	Introduction to Programming 1.			
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: • The concepts of object-oriented design, data abstraction, encapsulation, polymorphism, data hiding, and inheritance. • Java specifics: language features, JVM, GC, JDBC, etc. • Divide and Conquer strategy in the context of objects. • Object-Oriented design principles by Robert C. Martin (SOLID). • Identifying the boundaries of an object according to the level of abstraction. • Working with data from different sources: console, file, database, etc. • Coding in general using interfaces and behavior segregation. • Dividing responsibilities among classes and components. • Creational design patterns (Singleton, Builder, Factory). Students will have the skill to • Construct well-designed classes for effective problem solving without violating the boundaries of responsibility. • Improve the structure of software programs by organizing classes into modules. • Frame the objects in the problem domain to those in the program. • Construct efficiently aligned interfaces with concrete area of behavior coverage. • Cope with troubleshooting and error handling. • Set a connection to various databases using JDBC. • Write a sequential and readable code. In terms of Competences, students will be able to • Increase productivity by using libraries and reusable code. • Obtain flexibility through the principles of polymorphism. • Build scalable and maintainable software. • Design a class that serves as a program module or package. • Apply gathered knowledge in the development process.			

Content	This course covers object-oriented programming principles and techniques using Java programming language. Topics include classes, abstraction, data hiding, encapsulation, inheritance, polymorphism, programming paradigms and SOLID principles. Additionally, the course provides the basic concepts for software design and reuse.
Media employed	Multimedia classrooms equipped with computer, projection, and audio system; Whiteboard; Microsoft Teams; LMS Moodle, JetBrains IDEA, Postgres.
Reading list	Basic Literature: 9. Paul Deitel. Java How to Program : Early Objects / D. Paul, D. Harvey. - 11 ed. - Harlow : Pearson, 2018. - 1286 p. - ISBN 978-1-29222385-8 : 49900,00.004.43 - D 33. 10. Robert C. Martin Series. Clean Architecture : A craftsman's Guide to Software Structure and Design / Robert C. Martin Series. - Boston : Addison-Wesley, 2018. - 404 p. - ISBN 978-0-13-449416-6 : 23720.00. 004 - M29. Supplementary literature: 1. Brahma Dathan. Object-Oriented Analysis, Design and Implementation: An Integrated Approach / D. Brahma, R. Sarnath. - 2 ed. - India : Springer, 2015. - 471 p. - ISBN 9783319242781 : 31500.00 2. Bruce Eckel. Thinking in Java / E. Bruce. - 4 ed. - USA : MindView, 2006. - 1482 p. - ISBN 978-0-13-187248-6 : 27300.00.004 E38.

3d term

Module name:	Calculus 1																		
Code																			
Trimester	3																		
Person responsible for the module	Prof. B.Mukanova, Dr.Phys-Math. Sci.																		
Lecturer(s)	B.Mukanova																		
Language	English																		
Relation to curriculum	Bachelor programmes: 6B06101 Computer Science 6B06102 Software Engineering 6B06103 Big Data Analysis 6B04101 IT Management Compulsory course.																		
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student's confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student's independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																		
Workload of course components and credits per trimester	<table border="1"> <tr> <th rowspan="2">ECTS credits</th><th colspan="2">Contact hours</th><th rowspan="2">ISIS</th><th rowspan="2">SIS</th><th rowspan="2">Total hours</th></tr> <tr> <th>Lectures</th><th>Practice sessions</th></tr> <tr> <td>5</td><td>30</td><td>20</td><td>10</td><td>90</td><td>150</td></tr> </table>					ECTS credits	Contact hours		ISIS	SIS	Total hours	Lectures	Practice sessions	5	30	20	10	90	150
ECTS credits	Contact hours		ISIS	SIS	Total hours														
	Lectures	Practice sessions																	
5	30	20	10	90	150														

Course assessment and forms of examination	Period	Assessment type	Number of points	Exam Form	Schedule (Week #)
	1 st attestation	Problem Sets	40	Submission of written reports	Weekly
		Quiz	20	written or online test	4 th week
		Mid-term Exam	40	Written	5 th week
		1st attestation total	100		
	2nd attestation	Problem Sets	40	Submission of written reports	Weekly
		Quiz	20	Written or online test	9 th week
		End-term Exam	40	Written	10 th week
		2nd attestation total	100		
	Final Exam		100	Written	During final exam session
Cumulative total for the course = 0,3 * 1 st Att + 0,3 * 2 nd Att + 0,4*Final = 100.					
Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.				
Recommended prerequisites	Secondary scholar Mathematics course.				
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: - Limits of sequences and their properties - Continuity and properties of continuous functions - Derivatives and their applications in extremum problems - Antiderivatives and methods to evaluate them - Definite integrals in 1D and 2D cases - Gradient and its properties - Improper integrals Students will have the skill to - Use both the limit definition and rules of differentiation to differentiate functions. - Sketch the graph of a function using asymptotes, critical points, the derivative test for increasing/decreasing functions, and concavity. - Apply differentiation to solve applied max/min problems. - Evaluate integrals both by using the Fundamental Theorem of Calculus. - Evaluate integrals using advanced techniques of integration, such as substitutions and integration by parts. - Use L'Hospital's rule to evaluate certain indefinite forms.				

	• Apply integration to compute arc lengths, volumes of revolution and surface areas. • Determine convergence/divergence of improper integrals and evaluate convergent improper integrals. • Compute the gradient of the multidimensional function. • Evaluate elementary double integrals and apply them to compute areas and volumes. In terms of Competences, students will be able • to understand concepts related to limits, continuity, derivatives and basic integrals; • to understand concepts of multidimensional functions, partial derivatives, gradient, double and multidimensional integrals; • to work with these concepts numerically, graphically and analytically; • to apply above-mentioned tools to problems in prerequisites courses;
Content	The course covers differentiation and integration of functions of one variable and basic concepts of multidimensional Calculus, with applications.
Media employed	University is equipped with Multimedia Studio to prepare the online content of the lectures. Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature: 1. Thomas' Calculus. By George b. Thomas, revised by J.Hass, C.Heil, M.D.Weir, Pearson Publishing Company. 14n edition 2. George b. Thomas, Jr., Ross L. Finney, Calculus and Analytic Geometry. Part II. Addison-Wesley Publishing Company. 9 th edition. Supplementary literature: 3. G. N. Berman, A collection of problems on a course of Mathematical Analysis 4. Г.М.Фихтенгольц. Основы математического анализа, Т.1, Изд-е 9-ое, Изд. Лань – 2008. – 448 с. 5. Ибрашев Х.И., Еркеғұлов Ш.Т. Математикалық анализ курсы. - Алматы, 1970. 6. Темірғалиев Н.Т. Математикалық анализ. 1 бөлім. - Алматы: Мектеп, 1987.

Module name:	Web Technologies (Backend)
Code	
Trimester	3
Person responsible for the module	Zhantileuov Eldiyar M.Sc.
Lecturer(s)	Bakhytzhan Beisembiyev, MSc Gulnara Abitova, PhD Yelaman Apushev, MS, Yerlan Orakbayev, MS
Language	English
Relation to curriculum	Bachelor programmes: Big Data Analysis, Software Engineering, IT Management. (<i>Programmes under accreditation are listed</i>) Compulsory course.
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student's confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material.

	Student's independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.					
Workload of course components and credits per trimester						
	ECTS credits	Contact hours		ISIS	SIS	Total hours
		Lectures	Practice sessions			
	5	30	20	10	90	150
Course assessment and forms of examination	Period	Assessment type	Number of points	Exam Form	Schedule (Week #)	
	1 st attestation	Assignment 1	20	Mini Project	2 nd week	
		Assignment 2	20	Mini Project	3 rd week	
		Assignment 3	20	Mini Project	4 th week	
		Mid-term Exam	40	Coding Challenge	5 th week	
		1st attestation total	100			
	2 nd attestation	Assignment 1	20	Mini Project	7 th week	
		Assignment 2	20	Mini Project	8 th week	
		Assignment 3	20	Mini Project	9 th week	
		End-term Exam	40	Written	10 th week	
		2nd attestation total	100	Coding Challenge		
	Final Project		100	Demonstration	During final exam session	
	Cumulative total for the course = 0,3 * 1 st Att + 0,3 * 2 nd Att + 0,4*Final = 100.					
	Requirements according to the examination regulations	Course and university policies include:				
Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school).						
Late submissions are not accepted.						
No cheating, duplication, falsification of data, plagiarism, and crib						
	Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.					
Recommended prerequisites	Basic programming, Web Technologies 1 (Front-End), Databases					
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: - To create, debug, and maintain dynamic websites and use gathered knowledge of creating dynamic web sites with chosen framework and database; - To use different APIs, to write own RESTfUI API; - To deploy web application;					

	● To manage and present information to support making a business- critical decision; ● To interact, collaborate and communicate effectively with your instructor and fellow students; Students will have the skill to ● Understanding of back-end development; ● Good knowledge in web development including understanding of MVC, chosen framework, SQL/NoSQL, HTML, CSS and JavaScript or other programming languages and backend tools and technologies; In terms of Competences, students will be able to ● Installing development environment of creating website on chosen framework; ● Interact web application with SQL/NoSQL as well as with front- end; ● Create a database application; ● Learn how to secure code; ● Deliver short, easy presentations and documents that are well considered, compelling and supported by evidence; ● Research and evaluate information; ● Present findings in an organized and compelling manner; ● Discuss the notion that every problem has multiple solutions, each with its own advantages and disadvantages, and that success is tied to finding the technical solution that best fits into the non-technical dimensions of a specific problem.
Content	"WEB 'fechnologies 2 (Back End)" is a 10-week course and it provides the knowledge to design and develop dynamic, database-driven web applications. This collrse covers in depth the most important techniques widely used by web developers. Students learn how to connect to database and perform practices with tlie database to create database-driven forms both with SQL and NoSQL databases. Also, course includes knowledge to gain skills including work with APIs, building RESTful APIs, deployment and modern security coucepts' usage.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature: 1. Web Development with Node and Express: Leveraging the .JavaScript Stack by Ethan Brown - Published by O'Reilly Media, Inc.,2019. 2. Beginning Nodejs, Express & MongoDB Development by Greg, Lim.2019 3. JavaScript & jQuery. The Missing Manual by David Sawyer McFarland. - Published by O'Reilly Media, Inc., 2015.

Module name:	Coding Lab
Code	
Trimester	3
Person responsible for the module	Aimukhambetov O. Senior lecturer
Lecturer(s)	Aimukhambetov, Kuatbayeva A., Nurgazy M.
Language	English

Relation to curriculum	6B06101 “Computer Science”, 6B06102 “Software Engineering”																																							
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																							
Workload of course components and credits per trimester	<table><tr><td rowspan="2">ECTS credits</td><td colspan="2">Contact hours</td><td rowspan="2">ISIS</td><td rowspan="2">SIS</td><td rowspan="2">Total hours</td></tr><tr><td>Lectures</td><td>Practice sessions</td></tr><tr><td>5</td><td>30</td><td>20</td><td>10</td><td>90</td><td>150</td></tr></table>					ECTS credits	Contact hours		ISIS	SIS	Total hours	Lectures	Practice sessions	5	30	20	10	90	150																					
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Course assessment and forms of examination	<table><tr><td>Period</td><td>Milestones compliance</td><td>Number of points</td></tr><tr><td rowspan="5">1st Attestation</td><td>1. Project Proposal</td><td>20</td></tr><tr><td>2. Project Plan (schedule graph must be included)</td><td>20</td></tr><tr><td>3. Milestone 1</td><td>20</td></tr><tr><td>4. Milestone 2</td><td>20</td></tr><tr><td>5. Milestone 3</td><td>20</td></tr><tr><td rowspan="5">2nd Attestation</td><td>1. Milestone 4</td><td>20</td></tr><tr><td>2. Milestone 5</td><td>20</td></tr><tr><td>3. Milestone 6</td><td>20</td></tr><tr><td>4. Milestone 7</td><td>20</td></tr><tr><td>5. Milestone 8 (Must include at least 60% of working project)</td><td>20</td></tr><tr><td rowspan="3">Final exam</td><td>- Presentation</td><td>25</td></tr><tr><td>- Documentation report</td><td>25</td></tr><tr><td>- Project</td><td>50</td></tr><tr><td>Total</td><td>0,6 * Attestation + 0,4*Final</td><td></td></tr></table>					Period	Milestones compliance	Number of points	1 st Attestation	1. Project Proposal	20	2. Project Plan (schedule graph must be included)	20	3. Milestone 1	20	4. Milestone 2	20	5. Milestone 3	20	2 nd Attestation	1. Milestone 4	20	2. Milestone 5	20	3. Milestone 6	20	4. Milestone 7	20	5. Milestone 8 (Must include at least 60% of working project)	20	Final exam	- Presentation	25	- Documentation report	25	- Project	50	Total	0,6 * Attestation + 0,4*Final	
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Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.																																							
Recommended prerequisites	“Introduction to Programming”, “Web technologies”, “Object Oriented Programming”, “Introduction to Databases”																																							
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: ● Communication - Students can express their ideas clearly and effectively, both verbally and in written form.																																							

	● Collaboration - Students can work as a team to achieve common goals. ● Knowledge application - Students can make links across different areas of knowledge and to generate, develop and evaluate ideas and information related to the project. ● Independent learning - Students can learn on their own, reflect on their learning and improve upon it. ● Students should understand and discriminate the strengths and weaknesses of scheduling policies, interposes communication methods and memory management issues in timesharing systems. ● Students should evaluate the relevant issues that will enable them to make informed judgments about computer information protection and security. ● Having identified the key problems and issues of processing in a multiprocessing environment, students will develop a more efficient and effective software writing style. ● Students should be able to recognize, describe, find and retrieve the professional information from their project works. ● Use repetition in logo to create algorithms. ● Create simple programs in scratch 2 with a clear goal. ● Can debug basic code ● Predict the behavior of programs Students will have the skill to ● Create sequences of instructions ● Recognise patterns in code ● Use software to create basic programs. ● Debug simple programs by using logical reasoning to predict the actions instructed by the code. ● Understand that programs execute by following precise and unambiguous instruction. In terms of competences, students will be able to ● Critically evaluate the data and information; ● Learn to express their creativity using coding and technology ● making exciting, personal ideas come to life through coding (this serves as the prime motivator for students to learn, play and push their coding skills further every day) ● learn to visualize a process that accomplishes a task in their project ● reflect on their thinking and learning to transfer to new challenges ● excite about learning and exploring coding and technologies on their 'own time'
Content	This course will introduce project design and implementation and where the main idea is to give to students the practical knowledge of programming and the opportunity to make real projects. During this course, each group of students is allocated active hours with teachers to discuss about their projects and their achievements. The objective of this course is to introduce students to the fundamentals of computer programming, programming language and problem solving. It is designed as the first course for computer science majors. The emphasis is on the fundamentals concepts of computer science, including structured and object-oriented programming, syntax, semantics, testing/debugging, implementation, documentation, and recursion using the any programming language. Students will be exposed to development on using text editing and programming skills.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature:

	- Walpole, Myers, Myers, Ye. Probability and Statistics for Engineers and Scientists. 9th edition. 2016, Pearson. - Sheldon Ross. Introduction to Probability and Statistics for Engineers and Scientists. 5th edition. 2014, Elsevier. - Sheldon Ross. First Course in Probability. 10th edition. 2019, Pearson Education. Supplementary literature: L. Wasserman. All of Statistics. Springer, 2005 - Lange, Applied Probability. Springer, 2015 - Jobson: Applied Multivariate Data Analysis, Volume I: Regression and Experimental Design.
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Module name:	Innovation Lab																													
Code																														
Trimester	3																													
Person responsible for the module	Aimukhambetov O. Senior lecturer																													
Lecturer(s)	Aimukhambetov, Kuatbayeva A., Nurgazy M.																													
Language	English																													
Relation to curriculum	6B06101 “Computer Science”, 6B06102 “Software Engineering”																													
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																													
Workload of course components and credits per trimester	<table><tr><td rowspan="2">ECTS credits</td><td colspan="2">Contact hours</td><td rowspan="2">ISIS</td><td rowspan="2">SIS</td><td rowspan="2">Total hours</td></tr><tr><td>Lectures</td><td>Practice sessions</td></tr><tr><td>5</td><td>30</td><td>20</td><td>10</td><td>90</td><td>150</td></tr></table>					ECTS credits	Contact hours		ISIS	SIS	Total hours	Lectures	Practice sessions	5	30	20	10	90	150											
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	5. Milestone 8 (Must include at least	20																												

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Final exam	- Presentation	25											
	- Documentation report	25											
	- Project	50											
Total	0,6 * Attestation + 0,4*Final												
Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.												
Recommended prerequisites	“Introduction to Programming”, “Web technologies”, “Object Oriented Programming”, “Introduction to Databases”												
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: ● Generate idea - Students should identify a problem and solution, in which area it can be important. ● Building a business plan - information on selected industry, operations, finances and a market analysis should be included. ● Communication - Students can express their ideas clearly and effectively, both verbally and in written form. ● Collaboration - Students can work as a team to achieve common goals. ● Independent learning - Students can learn on their own, reflect on their learning and improve upon it. ● Students should understand and discriminate the strengths and weaknesses of scheduling policies, interposes communication methods and memory management issues in timesharing systems. ● Build a customer base, who will use the product. Students will have the skill to ● Create presentation of idea or product ● Create templates on Figma ● Use software to create basic programs. ● Debug simple programs by using logical reasoning to predict the actions instructed by the code. ● Test the product to find out some disadvantages or add features. In terms of competences, students will be able to ● Critically evaluate the data and information; ● Learn to express their creativity using presentation skills. ● making exciting, personal ideas come to life through coding (this serves as the prime motivator for students to learn, play and push their coding skills further every day) ● work in team and delegate tasks ● learn to visualize a process that accomplishes a task in their project ● test own product with assess of some group of users												
Content	This course will introduce project design and implementation and where the main idea is to know how to start new projects and the opportunity to make them real.												

	During this course, each group of students is allocated active hours with teachers to discuss about their projects and their achievements. The objective of this course is to introduce students to the fundamentals of computer programming, programming language and problem solving. It is designed as the first course for computer science majors. The emphasis is on the fundamentals concepts of computer science, including structured and object-oriented programming, syntax, semantics, testing/debugging, implementation, documentation, and recursion using the any programming language. Students will be exposed to development on using text editing and programming skills.																						
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.																						
Reading list	Basic Literature: 1. Walpole, Myers, Myers, Ye. Probability and Statistics for Engineers and Scientists. 9th edition. 2016, Pearson. 2. Sheldon Ross. Introduction to Probability and Statistics for Engineers and Scientists. 5th edition. 2014, Elsevier. 3. Sheldon Ross. First Course in Probability. 10th edition. 2019, Pearson Education. Supplementary literature: 1. L. Wasserman. All of Statistics. Springer, 2005 2. Lange, Applied Probability. Springer, 2015 3. Jobson: Applied Muhivariate Data Analysis, Volume I: Regression and Experimental Design.																						
Module name:	Algorithms and Data Structures																						
Code																							
Trimester	3																						
Person responsible for the module	Senior-lecturer Aigerim Aibatbek, M.Sc.																						
Lecturer(s)	A.Aibatbek, M.Sc., A. Kyzyrkanov M.Sc., N. Karimzhan MSIT , G. Mussina M.Sc.																						
Language	English																						
Relation to curriculum	Bachelor programs: Computer Science, Smart Technologies. Compulsory course.																						
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are online sessions to develop student's confidence through new examples and discussions on the problems. Lab Sessions are offline sessions where a topic is reinforced with additional exercises and quizzes. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student's independent study (SIS): Self-study time including the time required to prepare for and complete all course assignments.																						
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	Lecture s	Practice sessions	Lab sessions																				
5	20	10	20	10	90	150																	

Course assessment and forms of examination	Period	Assessment type	Number of points	Exam Form	Schedule (Week #)
	1 st attestation	Assignments: Assignment 1, Assignment 2	40	Submission of code answers	Weekly
		Quiz 1	20	Multiple Choice questions and practical task	3 rd week
		Mid-term Exam	40	Multiple Choice Questions and practical task	5 th week
		1st attestation total	100		
	2 nd attestation	Assignments: Assignment 3, Assignment 4	40 20 20	Submission of code answers	Weekly
		Quiz 2	20	Multiple Choice Questions and practical task	8 th week
		End-term Exam	40	Multiple Choice Questions and practical task	10 th week
		2nd attestation total	100		
	Final Exam		100	Multiple Choice Questions	During final exam session
	Cumulative total for the course = $0,3 * 1^{st} \text{ Att} + 0,3 * 2^{nd} \text{ Att} + 0,4 * \text{Final} = 100$.				
Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.				
Recommended prerequisites	“Introduction to programming C++”, “Object-oriented programming (Java)”				
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will be able to: - Choose appropriate algorithms and data structures for storing data, searching and sorting, as well as implementing those algorithms. - Analyze the runtime performance of various algorithms and programs in terms of the size of their inputs, averages, best, and worst cases. Students will have the skill to - To conceptualize many programming issues at a higher level through algorithms and data structures; - To understand a core group of basic data structures; - To know the tradeoffs of each studied data structure so as to employ the appropriate one for a given situation;				

	• To improve understanding of recursive methods; • To analyze data structures and their algorithms for asymptotic behavior. In terms of competences, students will have: • Sound knowledge in various algorithms and data structures; • Knowledge of complexity theory basics.
Content	“Algorithms and Data Structures” is a 10-week course, where the main focus is designed on solving computational problems that involve collections of data. Students will study a core set of data abstractions, data structures, and algorithms that provide a foundation for creating and maintaining efficient programs and algorithms in particular, and software in general. Topics include: recursion; asymptotic analysis and Big-O notation; physical data structures: array, linked list; logical data structures: hash tables, tree; sorting algorithms: bubble sort, merge sort, quick sort; searching algorithms: linear and binary search; graph; searching algorithms: BFS and DFS; dynamic programming.
Media employed	Classrooms equipped with computer, projection, whiteboard; Microsoft teams, LMS Moodle, Learn Astana IT platform.
Reading list	Basic Literature: 11. Lecture notes (available on moodle.astanait.edu.kz); 12. Brian Christian. Algorithms To Live By: The Computer Science of Human Decision / C. Brian, G. Tom. - Great Britain: William Collins, 2017. - 351 p. - ISBN 9780007547999 : 12900.00.392 - C 56 ; 13. Thomas H. Cormen, Introduction to Algorithms, The MIT Press, 4th Edition, 2022. Supplementary literature: 3. Aditya Y. Bhargava - Grokking Algorithms: An Illustrated Guide for Programmers and Other Curious People, Manning; 1st edition (May 1, 2016); 4. Loiane Groner, Learning JavaScript Data Structures and Algorithms, 2014.

4th term

Module name:	The Kazakh Language (B2)
Code	K(R)Ya 1104 K(R) Ya 2105
Trimester	4
Person responsible for the module	Assoc. Prof. G.Kamiyeva, PhD Assoc. Prof. B. Dinayeva, PhD Assoc. Prof. S. Sapina, PhD
Lecturer(s)	G.Kamiyeva, B.Dinayeva, S.Sapina
Language	Kazakh language
Relation to curriculum	Bachelor programmes: Computer Science, Software Engineering, Big Data Analysis, Industrial Automation, Media Technologies, Cyber Security, Telecommunication Systems, IT Management, Digital Journalism. Compulsory course.
Type of teaching	Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.
Workload of	

course components and credits per trimester	ECTS credits	Contact hours	ISIS	SIS	Total hours
		Practice sessions			
	5	50	50	50	150
Course assessment and forms of examination	Period	Assessment type	Number of points	Exam Form	Schedule (Week #)
	1 st attestation	Problem Sets	30	Submission of written reports	Weekly
		Quiz	30	Written	3 rd week
		Mid-term Exam	40	Written	4 th week
		1st attestation total	100		
	2 nd attestation	Problem Sets	30	Submission of written reports	Weekly
		Quiz	30	Written	7 th week
		End-term Exam	40	Written	9 th week
		2nd attestation total	100		
	Final Exam		100	Written	During final exam session
	Cumulative total for the course = $0,3 * 1^{st} \text{ Att} + 0,3 * 2^{nd} \text{ Att} + 0,4 * \text{Final} = 100.$				
Requirements according to the examination regulations	Course and university policies include:				
	Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.				
Recommended prerequisites	B1 level of the Kazakh language				
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: - the syntaxes of the general Kazakh language in speaking, reading, listening and writing; - functional language for general communication, - rules of word building. Students will have the skill to - determine the specific vocabulary related to the topic and use it in everyday life - use words, phrases and grammatical structures appropriately - read the text fluently - interpret information given in texts - use the syntax rules in the Kazakh language In terms of Competences, students will be able to - understand the content of various types of texts - ask and answer questions in various situations				

	• write dictation according to KAZTEST requirements • compose texts in a written form
Content	The subject "Kazakh language" is intended for students at the B2 level. Practical Kazakh language is intended for teaching the Kazakh language to students of Russian departments. The curriculum of the Kazakh language is based on the latest linguistic and methodological achievements of the teaching of the Kazakh language. The educational-methodological complex is based on a modular training system. The proposed program takes into account the educational levels of students, the purpose, value and positions of the lesson, types of speaking activities; It consists of content that meets the requirements of listening, speaking, writing.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature: 1. Zhakanova J.R., Igenova A.A. Kazakh language. Advanced Level: Tutorial. Nur-Sultan, 2019. - 195 p. 2. Abduova B.S., Asanova U.O. Kazakh language: a study tool for Russian-speaking groups. - Astana, 2017. -282 p. 3. Balabekov A.K., Bozbaeva-Hung A.T., Dosmambetova G.K., Salykhova B.O., Khazimova A.Zh.. Kazakh language: textbook for intermediate and advanced level. National testing center. - Astana: 2017 4. Kuzekova, Z.S. Functional practical grammar of the Kazakh language: textbook. - Astana: Foliant, 2015.- 180 p. 5. Dinaeva B.B., Kamieva G.K. Kazakh language. Educational tool for IT students. - Astana, 2023. - 200 p. Supplementary literature: 1. Bainbridge J. Media and journalism: a new approach to theory and practice: textbook [Text]: textbook/ Zh. Bainbridge, N. Gok, L. Tainan .- Almaty : Davir, 2019.- 592 p. (100 new textbooks). 2. Ter-Minasova S.G. Language and intercultural communication: textbook [Text]: textbook/ S.G. Ter-Minasova.- Almaty: National Translation Bureau, 2018.- 320 p. (100 new textbooks). 3. Dinaeva B.B., Sapina S.M. Theoretical and practical foundations of academic literacy. Educational tool. Revised 2nd Edition. - Nur-Sultan, 2020. -200 p.

Module name:	Kazakh language (for foreigners). Elementary (A1)
Code	K(R)Ya 1104 K(R) Ya 2105
Trimester	4
Person responsible for the module	Assoc. Prof. B. Dinayeva, PhD
Lecturer(s)	B. Dinayeva,
Language	Kazakh language
Relation to curriculum	Bachelor programmes: Software Engineering, IT Management. Compulsory course.
Type of teaching Тип преподавания	Practice sessions bring students' reading, listening, writing and speaking skills to a level where they can understand. Student's independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.
Workload of	

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Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.																																																					
Recommended prerequisites	Level 0																																																					
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: - the communicative competence of the language learner based on the "letter/sound-word-phrase" model; - using the language patterns in various situations; - spelling rules, paying attention to punctuation and reading intonation and pausing. Students will have the skill to - master the sound features and pronunciation of words; - read the text fluently. - speak in a short dialogues. In terms of Competences, students will be able to - determine the specific vocabulary related to the topic and use it in everyday																																																					

	life; • use words, phrases and grammatical structures appropriately; • read according to the orthographic norm of the Kazakh language; • write information about him/herself, family, address, etc.; • write simple dictation according to KAZTEST requirements.
Content	The subject "Kazakh language" is intended for students at the A1 level. A1 level is studied by foreign students as an initial level, at the end of the course students should learn 1200-1300 words. At the A1 level, students should be able to read texts in the Kazakh language, tell information about themselves, understand and express everyday words. The "Kazakh language" A1 level course teaches the student to use the Kazakh language at a basic level through reading, writing, listening, and pronunciation skills.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list Список для чтения	Basic Literature: 1. L. Beysenbaeva, A. Balabekov, A. Zhakypzhanova "Kazakh language" textbook for relatives abroad (A1 - basic level). - Nur-Sultan, 2021. 2. N. Dauletkereeva, N. Nurmagambetova, A. Smykova "Kazakh language" textbook for relatives abroad (A1 - basic level). - Nur-Sultan, 2021. 3. G.K. Dosmambetova, A.K. Balabekov, A.T. Bozbaeva-Hung, A.D. Seisenova. Kazakh language. Simple level A1. Textbook. - Astana: National Testing Center, 2016. -268 p. Supplementary literature: 1. Tileshov E., Turlybekova J., Kayupova N. Let's learn Kazakh. - Astana: "Rukhaniyat", 2010. 2. Bekturova A.Sh., Bekturov Sh.K. Kazakh language for all. - Almaty: Atamura, 2004. -720 p.

Module name:	Russian Language
Code	K(R)Ya 1104
Trimester	4
Person responsible for the module	Assoc. Prof. L.Orazgalieva, candidate of philological sciences
Lecturer(s)	Zhusupov A.E. –a.zhussupov@astanait.edu.kz, Assoc. Prof., candidate of philological sciences Orazgalieva L.M. – Laura.Orazgaliyeva@astanait.edu.kz , Assoc. Prof., candidate of philological sciences, Assoc. Prof., candidate of philological sciences Moldachmetova Z.N. –z.moldakhmetova@astanait.edu.kz, Assoc. Prof., candidate of philological sciences Shaheen A.A. –a.shaheen@astanait.edu.kz, Assoc. Prof., candidate of philological sciences Malikova Zh.D. zhanar.malikava@astanait.edu.kz , Assoc. Prof., candidate of philological sciences
Language	Russian
Relation to curriculum	6B06101 – Computer Science, 6B06102 – Software Engineering, 6B06103 – Big Data Analysis, 6B06104 – Industrial Automation, 6B06105 – Media Technologies, 6B06301 – Cyber Security, 6B06201 – Telecommunication Systems, 6B04101 – IT Management , 6B06202- Smart Technologies, 6B03201 – Digital Journalism, 6B06106 –Mathematical and Computational science. Compulsory course.

Type of teaching	Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																																					
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Recommended prerequisites	Cultural studies																																																					
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: - conveying the factual content of texts, formulating their conceptual information, describe inferential knowledge (pragmatic focus) of both the entire text and its individual structural elements; - interpreting the information of the text, to explain in the scope of the certification requirements the stylistic and genre specificity of the texts of the socio-cultural, socio-political, official business and professional spheres of communication. Students will have the skill to - request and communicate information in accordance with the situation of communication, evaluate the actions and deeds of participants, use information as a tool to influence the interlocutor in situations of knowledge and communication in accordance with certification requirements;																																																					

	- discuss ethical, cultural, socially significant issues in discussions, express their point of view, defend it with arguments, critically evaluate the opinion of interlocutors. In terms of Competences, students will be able to - compose everyday, socio-cultural, official and business texts in accordance with generally accepted norms, functional orientation, using lexical-grammatical and pragmatic material of a certain certification level adequate to the goal.
Content	The course of the Russian language as a discipline of the general education cycle is designed for students of groups with the Kazakh language of instruction at universities, is studied in accordance with the requirements of the State Standard. The course is aimed at developing the language personality of the student, who is able to carry out cognitive and communicative activities in Russian in the areas of interpersonal, social, professional, intercultural communication in the context of the implementation of state trilingual programs and the spiritual modernization of national consciousness.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature: 1. Русский язык для IT специалистов. Составители: Молдахметова З.Н, Маликова Ж.Д., Оразгалиева Л.М., Жусупов А.Е. – Астана, 2022. - 133 с. 2. Ахметжанова А.И. Русский язык: культура речи. – Алматы, «Қазақ университеті», 2018. - 120 с. 3. Русский язык для академических целей: учебное пособие для студентов факультетов естественных наук (коллектив составителей). – Алматы, 2018. – 134 с. Supplementary literature: http://www.gramota.ru/ http://insight.glos.ac.uk/researchmainpage/ResearchCentres/WAM/PGWAM/Documents/portsmouth_harvard_guide.pdf https://scholar.google.com/scholar?q=Galimzhan+seilov&btnG=&hl=ru&as_sdt=0%2 http://festival.1september.ru http://www.antonchehov.ru/ http://www.ajtmatov.ru/ http://www.lihachev.ru/ https://uwaterloo.ca/centre-for-teaching-excellence/teaching-resources/teaching-tips/developing-assignments/cross-discipline-skills/promoting-assessing-critical-thinking

Module name:	Calculus 2
Code	
Trimester	4
Person responsible for the module	Assoc. Prof. Madi Raikhan, PhD
Lecturer(s)	Madi Raikhan, PhD, Kassabek Samat, PhD, Chiganbayeva Diana, PhD Satbayev Syndar, Msc
Language	English

Relation to curriculum	Bachelor programmes: Big Data Analysis, Software Engineering, IT. Compulsory course.																																																					
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																																					
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	Mid-term Exam	60	Written	5 th week																																																		
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Final Exam		100	Written	During final exam session																																																		
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Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.																																																					
Recommended prerequisites	Linear Algebra, Calculus I.																																																					
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student should finish this class with: an understanding of limits and continuity of functions of several variables.																																																					

	- the ability to compute partial derivatives and directional derivatives. - an understanding of linear approximation for multi-variable functions. - an introduction to optimization of multi-variable functions using the second derivative test and Lagrange Multipliers. - an understanding of infinite number series, functional series, (i.e., Power series, Taylor series, Fourier series) and applications. - the ability to evaluate iterated integrals. - the ability to use multiple integrals to calculate areas, volumes, masses and centers of mass for standard plane regions and solids. - an introduction to line integrals, path-independence, potential functions, and surface integrals. Students will have the skill to - Demonstrate knowledge of mathematical knowledge. - Understand basic mathematical principles (proving, solving). - Understand surface sketching, partial derivatives, directional derivatives, geometry of curves, geometry of surfaces, maxima and minima, infinite series, ODE, multiple integrals, line and surface integral. - Develop mathematical abilities in writing programs by computers. In terms of competences, students will be able to - write mathematical statements and problem solutions using mathematical symbols. - understanding of key mathematical concepts and the application of the main mathematical tools.
Content	The distinct feature of this part of the course is its focus on multi-dimensional analysis, as opposed to the one-dimensional analysis that you learned in Calculus I. This course covers the function of several variables, partial derivative, surface sketching, partial derivatives, directional derivatives, geometry of curves, geometry of surfaces, maxima and minima, infinite series, ODE, multiple integrals, line and surface integral. The ideas of calculus I-II apply to numerous areas of human knowledge such as engineering, physics, mathematics, biology, and many others.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature: - W George b. Thomas, Jr., Ross L. Finney, Calculus and Analytic Geometry. Part II. Addison-Wesley Publishing Company. 14 th edition. - Lecture presentations. Supplementary literature: - Sherman K. Stein, Anthony Barcellos. Calculus and analytic geometry, 5th ed. - McGraw-Hill, Inc.1992. S. L. Ross, Differential Equations – John Wiley & Sons, 1984, 3rd ed. G. N. Berman, A collection of problems on a course of Mathematical Analysis

Module name:	Computer Organization and Architecture 1
Code	
Trimester	2, 1
Person responsible for the module	Sandibek Umirov, Master of technical science in Computer system and Software, senior-lecturer, s.umirov@astanait.edu.kz, Astana IT University, Expo, C1.3.352.
Lecturer(s)	Dana Yespenbetova

Language	English																																																					
Relation to curriculum	Bachelor programmes: 6B06101 “Computer Science” 6B06102 “Software Engineering” 6B06104 “Industrial Automation” 6B06105 “Media Technologies” 6B06201 “Telecommunications” 6B06301 “Cyber Security «Compulsory course.																																																					
Type of teaching	Lectures Online Video lecture Practice sessions (seminars) Lab works with hardware devices and software. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																																					
Workload of course components and credits per trimester	<table><tr><td rowspan="2">ECTS credits</td><td colspan="2">Contact hours</td><td rowspan="2">ISIS</td><td rowspan="2">SIS</td><td rowspan="2">Total hours</td></tr><tr><td>Lectures</td><td>Practice sessions</td></tr><tr><td>5</td><td>20</td><td>30</td><td>10</td><td>90</td><td>150</td></tr></table>					ECTS credits	Contact hours		ISIS	SIS	Total hours	Lectures	Practice sessions	5	20	30	10	90	150																																			
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Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib																																																					

	Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.
Recommended prerequisites	Students should have the following skills and knowledge: • PC and Internet navigation skills • Basic Windows and Linux system concepts • Basic Networking concepts • Binary and Hexadecimal understanding • Awareness of basic programming concepts
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. Course goal is to introduce the students to computer hardware and software, as well as operating systems, mobile devices, networking concepts, IT security and troubleshooting. These course materials will assist you in developing the skills necessary to work as a technician in the field of IT. The primary objective of this course is to prepare students for entry-level positions in the IT field within several different working environments. Job titles include enterprise technician, IT administrator, field service technician, and PC technician. A remote-based work environment where client training, operating systems, and connectivity issues are emphasized. Job titles include remote support technician, help desk technician, call center technician, IT specialist. In addition, students will gain confidence with the components of desktop and laptop computers by learning the proper procedures for hardware and software installations, upgrades, and troubleshooting. Students will have the skill to • Describe the components of a computer • Assemble a computer system, install an operating system, and troubleshoot using system tools and diagnostic software • Students develop problem solving, critical thinking, collaboration, communication, negotiation, and entrepreneurial skills, which can help them succeed today's global workplace. • Network • Configure Firewall Settings • Virtualization and Cloud Computing • Use Mobile, Linux, and macOS Operating Systems • Write IT Documentation • Remote Technician In terms of Competences, students will be able to • Explain, install, and navigate an operating system; upgrade components based on customer needs and perform preventive maintenance and advanced troubleshooting. • Describe, remove, and replace select components of a laptop; upgrade components based on customer needs and perform preventive maintenance and advanced troubleshooting. • Describe, remove, and replace select components of a printer/scanner; perform preventive maintenance and troubleshooting. • Describe and install a network; upgrade components based on customer needs and perform preventive maintenance and advanced troubleshooting. • Apply good communication skills and professional behavior while working with customers.

	• Perform advanced installation of a desktop computer tower; select components based on customer needs and perform preventive maintenance and advanced troubleshooting. • Upgrade security components based on customer needs and perform preventive maintenance and advanced troubleshooting.
Content	The course designed for people who are new to the study of information technology, and does not require any prior skills.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle. Hardware(Printers, PC, Screws, Tools, Crimping tools, Server, Ip camera, Cables, VirtualBox)
Reading list	• Complete A+ Guide to IT Hardware and Software. Cheryl A. Schmidt • Computer Organization and Architecture. Eighth edition, William Stallings. • Structures Computer Organization. Sixth edition. Andrew S. Tanenbaum, Todd Austin. • Official Cert Guide CCNA 200-301. Volume 1. Wendell Odom. • Official Cert Guide CCNA 200-301. Volume 2. Wendell Odom. • Windows 10. Second Edition. Joan Lambert.

Module name:	Database Management Systems																		
Code																			
Trimester	4																		
Person responsible for the module	Senior Lecturer N. Assanova, M.Sc																		
Lecturer(s)	Dariya Bissengaliyeva, M.Sc.																		
Language	English																		
Relation to curriculum	Bachelor programmes: Big Data Analysis, Software Engineering, Computer Science, IT Management,																		
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																		
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Course assessment and forms of examination	<table><tr><td>Period</td><td>Assessment type</td><td>Number of points</td><td>Exam Form</td><td>Schedule (Week #)</td></tr><tr><td rowspan="2">1st attestation</td><td>Laboratory works</td><td>45</td><td>Submission of tasks solved</td><td>2nd and 4th weeks</td></tr><tr><td>Quiz</td><td>25</td><td>MCO Test</td><td>3rd week</td></tr></table>					Period	Assessment type	Number of points	Exam Form	Schedule (Week #)	1 st attestation	Laboratory works	45	Submission of tasks solved	2 nd and 4 th weeks	Quiz	25	MCO Test	3 rd week
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1 st attestation	Laboratory works	45	Submission of tasks solved	2 nd and 4 th weeks															
	Quiz	25	MCO Test	3 rd week															

		Mid-term Exam	30	Mixed tasks exam (theory and practice)	5 th week
		1st attestation total	100		
	2nd attestation	Problem Sets	30	Submission of tasks solved	7 th and 9 th weeks
		Quiz	30	MCQ Test	8 th week
		End-term Exam	40	Mixed tasks exam (theory and practice)	10 th week
		2nd attestation total	100		
	Final Exam		100	Mixed tasks exam (theory and practice)	During final exam session
	Cumulative total for the course = $0,3 * 1^{st} \text{ Att} + 0,3 * 2^{nd} \text{ Att} + 0,4 * \text{Final} = 100$.				
Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.				
Recommended prerequisites	ICT or basic computer knowledge				
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge to: - choose and apply appropriate methodologies and techniques to solve corresponding tasks on the way of implementing the kind of service's pipelines. - analyze the runtime performance of various approaches and commands in terms of the size of their requests, averages, best, and worst cases. - understand the fundamentals of relational databases. - provide a consistent layer of data and control redundancies. - use PostgreSQL built-in functions for complex tasks. - create transactions to solve business challenges. - perform calculations across a set of rows using window and aggregate functions. - enhance query performance by using indexes. - look at a query plan to find possible solutions to the problems occurred. Students will have the skill to: - Design a database. - Design transactional blocks to group related queries. - Use the PostgreSQL supplied built-in functions to solve sophisticated problems. - Describe the features and syntax of PostgreSQL. - Use PostgreSQL programming constructs and conditionally control code flow.				

	- Handle runtime errors. In terms of Competences, students will be able to: - design methodology for databases and verify their structural correctness. - implement databases and applications software primarily in the relational model. - use querying languages, primarily PostgreSQL, and other database supporting software; - apply the theory behind various database models and query languages. - implement security and integrity policies relating to databases.
Content	“Database Management Systems” is a course, which focuses on concepts and structures necessary to design and implement a database management system. Various modern data models, data security and integrity, and concurrency will be discussed.
Media employed	Multimedia classrooms equipped with computer, projection, and audio system; Whiteboard; Microsoft Teams; LMS Moodle; Software Applications for managing Databases (PostgreSQL server, pgAdmin, Command Line Tools, DataGrip, online diagramming applications).
Reading list	Basic Literature: - Postgres: The first experience, P.Luzanov, E.Rogov, I.Levshin, 2020. - Fundamentals of Database Systems, 7th Edition, R.Elmasri, S.Navathe, 2016 - Jan L.Harrington. Relational Database Design and Implementation / L.H.Jan. – 4 ed. – Amsterdam : Elsevier Inc., 2016. – 689p. – ISBN 978-0-12-804399-8 : 35900.00.004.65 – J 23.

Module name:	Analytic methods in Computer Science (A Foundation for Computer Science)				
Code					
Trimester	4 for the educational program Software Engineering, Big Data Analysis, Computer Science				
Person responsible for the module	Assoc. Prof. Nurlan Ismailov, PhD				
Lecturer(s)	Nurlan Ismailov				
Language	English				
Relation to curriculum	Bachelor programmes: Big Data Analysis, Software Engineering, IT Management. Elective course.				
Type of teaching	Lectures serve to introduce new concrete examples and solution of them, Furthermore, it develops and provides solving methods based on these examples theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.				
Workload of		Contact hours	ISIS	SIS	Total hours

course components and credits per trimester	ECTS credits	Lectures	Practice sessions				
	5	30	20	10	90	150	
Course assessment and forms of examination	Period	Assessment type	Number of points	Exam Form	Schedule (Week #)		
	1st attestation	Problem Sets	20	Submission of written reports	2nd week and 4th weeks		
		Quiz	20	Written	3rd week		
		Mid-term Exam	60	Written	5th week		
		1st attestation total	100				
	2nd attestation	Problem Sets	20	Submission of written reports	7th week and 9th		
		Quiz	20	Written	8th week		
		End-term Exam	60	Written	10th week		
		2nd attestation total	100				
	Final Exam		100	Written	During final exam session		
	Cumulative total for the course = 0,3 * 1st Att + 0,3 * 2nd Att + 0,4*Final = 100.						
	Requirements according to the examination regulations	In case if the student did not attend more than 30% of the classes without any reasonable excuses, the teacher has a right to mark him as “not graded”, and the student wouldn’t be admitted to the exam. In other words, students must participate in at least 70% of all online/offline class time, otherwise he/she fails the course.					
	Recommended prerequisites	“Discrete Mathematics” or “Algorithms and Data structures”, or “Algorithms”.					
Module objectives/intended learning outcomes	Course goal(s): The course presents mathematical materials necessary for the Computer Science student to approach the study of many advanced topics in theoretical Computer Science at the graduate level. By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: - To demonstrate knowledge of mathematical knowledge; - To understand basic mathematical principles (proving, counting, understanding discrete objects); - To solve counting problems using different enumeration methods; - To develop mathematical abilities in writing programs by computers. Students will have the skill to - To understand basic mathematical principles (proving, counting, understanding discrete objects). -To learn main analytic methods through concrete examples from enumerative combinatorics, number theory and discrete mathematics, probability. - To analyze different mathematical methods.						

	- To solve concrete problems using different enumeration methods. - To develop mathematical abilities in writing programs by computers. Skills & Competences: - Basic school mathematical knowledge - Ability to construct examples and counterexamples - Working with discrete objects In terms of Competences, participants will be able to: -become familiar with different mathematical methods in combinatorics, number theory, discrete mathematics, and statistics. -apply skills acquired in discrete mathematics, linear algebra and/or computation to the analysis and calculation of graph properties; - describe programing questions in terms of graphs and trees. -understand concrete problems as a unifying abstraction of natural and computing systems; -are enabled and motivated to begin independent project / research work in discrete mathematics and computation.- Understand counting principles of combinatorics; - Be able to transform discrete problems into simple forms; - Describe programing questions in terms of graphs and trees.
Content	The course includes recursions, sums, integer functions, elementary number theory, binomial coefficients, special numbers, generating functions, discrete probability, asymptotics.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Goodnotes; Microsoft Teams; LMS Moodle.
Reading list	1. Lecture slides/presentations/notes. Main textbooks: 2. R. Graham, D. Knuth, O. Patashnik, Concrete Mathematics: A Foundation for Computer Science (2nd Edition). Additional textbooks: 3. D. E. Knuth, The Art of Computer Programming, Volume 1, 3rd. Edition, Addison-Wesley, 1998. 4. N.J.A. Sloan's On-Line Encyclopedia of Integer Sequences. Open Online Resources 1. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-042j-mathematics-for-computer-science-fall-2010/ 2. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-042j-mathematics-for-computer-science-spring-2015/index.htm

5th term

Module name:	Kazakh language, Advanced (C1)
Code	K(R)Ya 1104 K(R) Ya 2105
Trimester	5
Person responsible for the module	Assoc. Prof. G.Kamiyeva, PhD Assoc. Prof. B. Dinayeva, PhD Assoc. Prof. S. Sapina, PhD
Lecturer(s)	G.Kamiyeva, B.Dinayeva, S.Sapina
Language	Kazakh language
Relation to curriculum	Bachelor programmes: Computer Science, Software Engineering, Big Data Analysis, Industrial Automation, Media Technologies, Cyber Security, Telecommunication Systems, IT Management, Digital Journalism.

	Compulsory course.																																																					
Type of teaching	Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																																					
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Recommended prerequisites	B1 level of the Kazakh language																																																					
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: ● learning the main genres of scientific, official-business and journalistic styles ● expressing his thoughts accurately and skillfully, using all the richness of the language ● using language patterns in social, cultural and educational conversations																																																					

	Students will have the skill to ● interpret the text and follow it by determining the purpose of the text, the main game, the problem considered in the text, additional information, evaluating it; ● give critical opinion, support, suggestions, solutions to problems on the read text/article; ● use the information in the text while writing essays, making project works and presentations, speaking his opinion during interviews and round tables. In terms of Competences, students will be able to ● participate in various situations in the field of communication in the lexical-grammatical and pragmatic sense ● express personal opinions in planning, solving problems, making decisions due to different social, cultural and academic contexts ● critically evaluate, analyze and summarize information
Content	The subject "Kazakh language" is intended for students at the C1 level. Practical Kazakh language is intended for teaching the Kazakh language to students of Russian departments. The curriculum of the Kazakh language is based on the latest linguistic and methodological achievements of the teaching of the Kazakh language in the lecture halls of other languages. The educational-methodological complex is based on a modular training system. The proposed program takes into account the educational levels of students, the purpose, value and positions of the lesson, skills and dexterity, types of speaking activities; It consists of content that meets the requirements of listening, speaking, writing (reading, writing, listening, pronunciation, etc.)
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature: 1. Karabaeva K.A. Kazakh language: educational tool. - Almaty: Kazakh University, 2014. 2. Linear C. Kazakh language guide (spelling, punctuation marks, vocabulary). Astana: Elorda, 2000. - 532 p. 3. "Digital educational resources" related to the subject "Kazakh language-I" and "Kazakh language-II" for students studying in the Russian department. - Astana, 2014. 4. Dinaeva B.B., Kamieva G.K. Kazakh language. Educational tool for IT students. - Astana, 2023. - 200 p. 5. Dinaeva B.B. The language of business correspondence: a study guide for students of all professions. - Nur-Sultan, 2022. -296 p. 6. Kamieva G.K. Keeping documents in the state language. Educational tool. - Nur-Sultan, 2021. -147 p. Supplementary literature: 1. Akanova D.H., Aldasheva A.M., Akhmetzhanova Z.K., Kadasheva K., Suleymenova E.D. Official business Kazakh language. Textbook complex. First level. Second level. Third level. -Almaty, "Arman-PV", 2002. 2. Bizakov S. Dictionary of synonyms - Almaty: "Arys" publishing house, 2007. - 640 p. 3. Chesenbaev I. Phraseological dictionary - Almaty: "Arys" publishing house, 2007. - 800 p. 4. Kazakh language and national values. A comprehensive study tool. Book 1,2,3,4. - Almaty: Evero, 2018. 5. Explanatory dictionary of the Kazakh language: about 50 thousand words and phrases / general editor. T. Zhanuzakov. - Almaty: Dyke-Press, 2008. - 968 p.

	6. Spelling dictionary / Sixth edition. Compiled by: N. Vali, K. Kuderinova, A. Fazylzhanova, Zh. Isaeva, N. Amirzhanova, A. Amirbekova. - Almaty: Davir publishing house, 2013. - 720 p.
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Module name:	Kazakh Language (for foreigners). Elementary (A2)																																																				
Code	K(R)Ya 1104 K(R) Ya 2105																																																				
Trimester	5																																																				
Person responsible for the module	Assoc. Prof. B. Dinayeva, PhD																																																				
Lecturer(s)	B. Dinayeva,																																																				
Language	Kazakh language																																																				
Relation to curriculum	Bachelor programmes: Software Engineering, IT Management. Compulsory course.																																																				
Type of teaching Тип преподавания	Practice sessions bring students' reading, listening, writing and speaking skills to a level where they can understand. Student's independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																																				
Workload of course components and credits per trimester	<table border="1"> <tr> <th rowspan="2">ECTS credits</th><th>Contact hours</th><th rowspan="2">ISIS</th><th rowspan="2">SIS</th><th rowspan="2">Total hours</th></tr> <tr> <th>Practice sessions</th></tr> <tr> <td>5</td><td>50</td><td>10</td><td>90</td><td>150</td></tr> </table>				ECTS credits	Contact hours	ISIS	SIS	Total hours	Practice sessions	5	50	10	90	150																																						
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5	50	10	90	150																																																	
Course assessment and forms of examination Оценка курса и формы экзамена	<table border="1"> <tr> <th>Period</th><th>Assessment type</th><th>Number of points</th><th>Exam Form</th><th>Schedule (Week #)</th></tr> <tr> <td rowspan="4">1st attestation</td><td>Problem Sets</td><td>30</td><td>Submission of written reports</td><td>Weekly</td></tr> <tr> <td>Quiz</td><td>30</td><td>Written</td><td>3rd week</td></tr> <tr> <td>Mid-term Exam</td><td>40</td><td>Written</td><td>4th week</td></tr> <tr> <td>1st attestation total</td><td>100</td><td></td><td></td></tr> <tr> <td rowspan="4">2nd attestation</td><td>Problem Sets</td><td>30</td><td>Submission of written reports</td><td>Weekly</td></tr> <tr> <td>Quiz</td><td>30</td><td>Written</td><td>7th week</td></tr> <tr> <td>End-term Exam</td><td>40</td><td>Written</td><td>9th week</td></tr> <tr> <td>2nd attestation total</td><td>100</td><td></td><td></td></tr> <tr> <td colspan="2">Final Exam</td><td>100</td><td>Written</td><td>During final exam session</td></tr> <tr> <td colspan="5">Cumulative total for the course = 0,3 * 1st Att + 0,3 * 2nd Att + 0,4*Final = 100.</td></tr> </table>				Period	Assessment type	Number of points	Exam Form	Schedule (Week #)	1 st attestation	Problem Sets	30	Submission of written reports	Weekly	Quiz	30	Written	3 rd week	Mid-term Exam	40	Written	4 th week	1st attestation total	100			2 nd attestation	Problem Sets	30	Submission of written reports	Weekly	Quiz	30	Written	7 th week	End-term Exam	40	Written	9 th week	2nd attestation total	100			Final Exam		100	Written	During final exam session	Cumulative total for the course = 0,3 * 1 st Att + 0,3 * 2 nd Att + 0,4*Final = 100.				
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Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib																																																				

	Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.
Recommended prerequisites	A1 level of the Kazakh language
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: • developing communication skills through speaking, reading, listening and writing tasks; • learning simple words and phrases, • learning to use words and phrases appropriately and to create a dialogue according to the situations encountered in everyday life. Students will have the skill to • from the information heard, they determine the specific vocabulary related to the topic and use it in everyday life; • use words, phrases and grammatical structures appropriately; • read the text fluently. • write information about about him/herself, family, address, place of birth, etc. In terms of Competences, students will be able to • study, work, free time, etc. understands the content of simple text in topics; • ask and answer questions in various situations; • write simple dictation according to KAZTEST requirements.
Content	The subject "Kazakh language" is intended for students at the A2 level. Students from abroad study the A2 level as a continuation of the initial level, at the end of the course students should learn 1400-1500 words. A2 level focuses on the formation of the ability to exchange simple information within the presented lexical topics, to understand common words and individual sentences, to describe events and activities in everyday life, to talk about oneself, relatives and acquaintances. The "Kazakh language" A2 level course teaches the student to use the Kazakh language at a basic level through reading, writing, listening, and pronunciation skills.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list Список для чтения	Basic Literature: 1. L. Beysenbaeva, A. Balabekov, A. Zhakypzhanova "Kazakh language" textbook for relatives abroad (A1 - basic level). - Nur-Sultan, 2021. 2. N. Dauletkereeva, N. Nurmagambetova, A. Smykova "Kazakh language" textbook for relatives abroad (A2 - basic level). - Nur-Sultan, 2021. 3. G.K. Dosmambetova, A.K. Balabekov, A.T. Bozbaeva-Hung, A.D. Seisenova. Kazakh language. Simple level A1. Textbook. - Astana: National Testing Center, 2016. -268 p. Supplementary literature: 1. Tileshev E., Turlybekova J., Kayupova N. Let's learn Kazakh. - Astana: "Rukhaniyat", 2010. 2. Bekturova A.Sh., Bekturov Sh.K. Kazakh language for all. - Almaty: Atamura, 2004. -720 p.

Module name:	Russian Language
Code	K(R)Ya 1104

Trimester	5																																																					
Person responsible for the module	Assoc. Prof. L.Orazgalieva, candidate of philological sciences																																																					
Lecturer(s)	Zhusupov A.E. –a.zhussupov@astanait.edu.kz, Assoc. Prof., candidate of philological sciences Orazgalieva L.M. – Laura.Orazgaliyeva@astanait.edu.kz, Assoc. Prof., candidate of philological sciences, Assoc. Prof., candidate of philological sciences Moldachmetova Z.N. –z.moldakhmetova@astanait.edu.kz, Assoc. Prof., candidate of philological sciences Shaheen A.A. –a.shaheen@astanait.edu.kz, Assoc. Prof., candidate of philological sciences Malikova Zh.D. zhanar.malikava@astanait.edu.kz, Assoc. Prof., candidate of philological sciences																																																					
Language	Russian																																																					
Relation to curriculum	6B06101 – Computer Science, 6B06102 – Software Engineering, 6B06103 – Big Data Analysis, 6B06104 – Industrial Automation, 6B06105 – Media Technologies, 6B06301 – Cyber Security, 6B06201 – Telecommunication Systems, 6B04101 – IT Management , 6B06202- Smart Technologies, 6B03201 – Digital Journalism, 6B06106 –Mathematical and Computational science. Compulsory course.																																																					
Type of teaching	Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																																					
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Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.
Recommended prerequisites	Cultural studies
Module objectives/intended learning outcomes	<i>By the end of this course students will attain the following learning outcomes.</i> <i>The student will show a working knowledge in:</i> • increasing the level of academic literacy or grammatical competence in the language (spelling, punctuation); • developing the skills of creating texts through critical (analytical) reading of fiction, educational and scientific literature; • creating different types of essays according to the content and structure requirements. <i>Students will have the skill to:</i> • identify specific vocabulary related to the topic and use it in everyday life and academic settings; • knowing the qualities of professional speech: richness, purity, logic, expressiveness, accuracy, correctness, clarity and intelligibility. • expressing your attitude in accordance with the requirements of the professional culture of speech: use terminology, discuss professional topics with a colleague and a layman, define the goal, be correct. • giving an assessment of the fact, object, and event. <i>In terms of competencies, students will be able to:</i> • compose scientific texts (annotations, reviews, etc.) • use speech aspects of business communication; • perform in front of an audience using the techniques of public speaking.
Content	The course of the Russian language as a discipline of the general education cycle is designed for students of groups with the Kazakh language of instruction at universities, is studied in accordance with the requirements of the State Standard. The course is aimed at developing the language personality of the student, who is able to carry out cognitive and communicative activities in Russian in the areas of interpersonal, social, professional, intercultural communication in the context of the implementation of state trilingual programs and the spiritual modernization of national consciousness.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature: 1. Русский язык для IT специалистов. Составители: Молдахметова З.Н, Маликова Ж.Д., Оразгалиева Л.М., Жусупов А.Е. – Астана, 2022. - 133 с. 2. Ахметжанова А.И. Русский язык: культура речи. – Алматы, «Қазақ университеті», 2018. - 120 с. 3. Русский язык для академических целей: учебное пособие для студентов факультетов естественных наук (коллектив составителей). – Алматы, 2018. – 134 с. Supplementary literature: http://www.gramota.ru/

	http://insight.glos.ac.uk/researchmainpage/ResearchCentres/WAM/PGWAM/Documents/portsmouth_harvard_guide.pdf https://scholar.google.com/scholar?q=+Galimzhan+seilov&btnG=&hl=ru&as_sdt=0%2 http://festival.1september.ru http://www.antonchehov.ru/ http://www.ajtmatov.ru/ http://www.lihachev.ru/ https://uwaterloo.ca/centre-for-teaching-excellence/teaching-resources/teaching-tips/developing-assignments/cross-discipline-skills/promoting-assessing-critical-thinking
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Module name:	Political Science																										
Code																											
Trimester	5																										
Person responsible for the module	Maral Zhanarstanova, PhD in Political Science, assistant professor Yenglik Dossymkhan, PhD in Political Science, senior lecturer Aidana Kaldybekova, MA, lecturer																										
Lecturer(s)	Maral Zhanarstanova, PhD Yenglik Dossymkhan, PhD Aidana Kaldybekova MA																										
Language	English																										
Relation to curriculum	Bachelor programmes: all majors Compulsory course.																										
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the political problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																										
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Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.																																				
Recommended prerequisites	<i>History of Kazakhstan, Cultural studies, Sociology</i>																																				
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: - get acquainted with basic elements of political theory and political concepts; - explore the various topics covered in Political Science, its history, its impact on society and individuals, and its limitations in real world applications; - gain a working understanding of the field of Political Science and all it encompasses; - acquire the capacity to interpret and assess political ideas and political behaviours in an independent manner; - develop argumentative skills on conflicting topics; - formation of critical thinking and functional literacy skills. Students will have the skills: - ability to understand political theories and concepts in order to understand different viewpoints; - ability of think critically and enhance problem-solving skills; - ability of carrying out individual works on researching, drafting, writing and editing; - ability to select and use reference materials; - ability of discussing and interpreting different political thoughts and trends. In terms of Competences, students will be able to - understand political behaviour in connection with social change and challenge; - understand the role and function of the politics in everyday life; - have a basic comprehension on characteristics of political trends; - understand the development and significance of political thoughts and theories; - interpret and apply concepts, ideas and notions on political processes and developments;																																				
Content	This course is an introduction to the basic theories and concepts in the Political Science, including: connection between everyday life with the political system; historical development of the area; political systems, ideologies & philosophies;																																				

	international relations; and Kazakhstan's profile in the framework of the studied discourses. Related topics include interdisciplinary areas, such as sociology, economy, culturology, public policy and security studies. This course will offer an overview of current research in the field of political science, with an emphasis on theoretical studies in this field and on studies that focus on political situation in the Republic of Kazakhstan.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature: W. Philips Shively. Power and Choice: An Introduction to Political Science. Rowman & Littlefield Publishers. 2018. Michael Marder. Political Categories. Thinking beyond Concepts. New York. Columbia University Press. 2019. William N. Dunn. Public Policy Analysis An Integrated Approach Sixth Edition. Routledge and Taylor & Francis Group, 2018. David Williams. Progress, Pluralism, and Politics: Liberalism and Colonialism, Past and Present. Montreal: McGill-Queen's University Press. 2020. Supplementary literature: Simon, D. W., Romance, J., & Riemer, N. (2018). The challenge of politics: an introduction to political science. CQ press. Pinker, S. (2018). Enlightenment now: The case for reason, science, humanism, and progress. Chicago (Author-Date, 15th ed.). Gates, M. (2019). The Moment of Lift: How Empowering Women Changes the World (Unabridged). Hawking, S., Redmayne, E., Thorne, K. S., & Hawking, L. (2020). Brief answers to the big questions. John Murray. Gates, B. (2021). How to avoid a climate disaster: the solutions we have and the breakthroughs we need. Penguin UK.

Module name:	Computational Mathematics
Code	
Trimester	5 for Software Engineering, Big Data Analysis, Computer Science
Person responsible for the module	Senior Lecture Rakhimzhanova Anar, PhD
Lecturer(s)	Samat Kassenov
Language	English
Relation to curriculum	Bachelor programmes: Computational Mathematics. Compulsory course.
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student's confidence through new examples and discussions on the problems.

	Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																																					
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Course assessment and forms of examination	<table><tr><td>Period</td><td>Assessment type</td><td>Number of points</td><td>Exam Form</td><td>Schedule (Week #)</td></tr><tr><td rowspan="4">1st attestation</td><td>Problem Sets</td><td>20</td><td>Submission of written reports</td><td>2nd week and 4th weeks</td></tr><tr><td>Quiz</td><td>20</td><td>Written</td><td>3rd week</td></tr><tr><td>Mid-term Exam</td><td>60</td><td>Test</td><td>5th week</td></tr><tr><td>1st attestation total</td><td>100</td><td></td><td></td></tr><tr><td rowspan="4">2nd attestation</td><td>Problem Sets</td><td>20</td><td>Submission of written reports</td><td>7th week and 9th</td></tr><tr><td>Quiz</td><td>20</td><td>Written</td><td>8th week</td></tr><tr><td>End-term Exam</td><td>60</td><td>Test</td><td>10th week</td></tr><tr><td>2nd attestation total</td><td>100</td><td></td><td></td></tr><tr><td colspan="2">Final Exam</td><td>100</td><td>Written</td><td>During final exam session</td></tr><tr><td colspan="5">Cumulative total for the course = 0,3 * 1st Att + 0,3 * 2nd Att + 0,4*Final = 100.</td></tr></table>					Period	Assessment type	Number of points	Exam Form	Schedule (Week #)	1 st attestation	Problem Sets	20	Submission of written reports	2 nd week and 4 th weeks	Quiz	20	Written	3 rd week	Mid-term Exam	60	Test	5 th week	1st attestation total	100			2 nd attestation	Problem Sets	20	Submission of written reports	7 th week and 9 th	Quiz	20	Written	8 th week	End-term Exam	60	Test	10 th week	2nd attestation total	100			Final Exam		100	Written	During final exam session	Cumulative total for the course = 0,3 * 1 st Att + 0,3 * 2 nd Att + 0,4*Final = 100.				
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Final Exam		100	Written	During final exam session																																																		
Cumulative total for the course = 0,3 * 1 st Att + 0,3 * 2 nd Att + 0,4*Final = 100.																																																						
Requirements according to the examination regulations	In case if the student did not attend more than 30% of the classes without any reasonable excuses, the teacher has a right to mark him as “not graded”, and the student wouldn’t be admitted to the exam. In other words, students must participate in at least 70% of all online/offline class time, otherwise he/she fails the course.																																																					
Recommended prerequisites	“Calculus 1”, “Calculus 2”, “Linear algebra”																																																					
Module objectives/intended learning outcomes	Course goal(s): This course is an advanced introduction to numerical linear algebra and related numerical methods. Topics include direct and iterative methods for linear systems, eigenvalue decompositions and LU factorizations, stability and accuracy of numerical algorithms. Numerical differentiation and integration. Interpolation. Least squares and regression analysis. Numerical solution of ordinary differential equations. Introduction to error analysis. By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: - To demonstrate knowledge of mathematical knowledge; - To apply basic techniques involving computational mathematics; - To develop mathematical abilities in writing programs by computers. Students will have the skill to																																																					

	- To enhance the problem-solving skills of students using an extremely powerful problem-solving tool namely numerical method; - To able to work with handling large system of equations, non-linearities and complicated geometries that are not uncommon in engineering practice and that are often impossible to solve analytically. In terms of Competences, students will be able to: - Understand numerical techniques to find the roots of non-linear equations and solution of system of linear equations. - Use Taylor Series to approximate functions and evaluate the approximations error. - Program algorithms to locate the roots of nonlinear equations. - Program algorithms to solve linear system of equations. - Smooth engineering collected data using least square method. - Understand the difference operators and the use of interpolation. - Understand numerical differentiation and integration and numerical solutions of ordinary differential equations.
Content	The course includes logics, set theory, functions, and fundamental principles of counting, number theory, inclusion-exclusion principle, recurrence relations, graph theory.
Media employed	Goodnotes; Microsoft Teams; LMS Moodle.
Reading list	1. Lecture notes (available at moodle.astanait.edu.kz); 2. B.S. Grewal, "Numerical Methods in Engineering & Science", Khanna Publication, Ed. 9th. 3. E. Kreyszing "Advanced Engineering Mathematics" John Wiley & Sons, Inc, Ed 10th.

Module name:	Operating systems
Code	
Trimester	5
Person responsible for the module	Gulsim Tulepova, M.Sc.
Lecturer(s)	Gulsim Tulepova, M.Sc., Senior-lecturer Department of Intelligent Systems & Cyber Security, g.tulepova@astanait.edu.kz Astana IT University, Expo, C1 block, 3 rd floor, office C1.1.329
Language	English
Relation to curriculum	Bachelor programmes: Software Engineering, Compulsory course.
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student's confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student's independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.
Workload of	

course components and credits per trimester	ECTS credits	Contact hours		ISI S	SIS	Total hours
		Lectures	Practice sessions			
	5	20	30	10	90	150
Course assessment and forms of examination	Period	Assessment type	Number of points	Exam Form	Schedule (Week #)	
	1 st attestation	Problem Sets	30	Submission of written reports	Weekly	
		Quiz	30	Written	3 rd week	
		Mid-term Exam	40	Written	5 th week	
		1st attestation total	100			
	2nd attestation	Problem Sets	30	Submission of written reports	Weekly	
		Quiz	30	Written	8 th week	
		End-term Exam	40	Written	10 th week	
		2nd attestation total	100			
	Final Exam		100	Written	During final exam session	
	Cumulative total for the course = 0,3 * 1 st Att + 0,3 * 2 nd Att + 0,4*Final = 100.					
	Requirements according to the examination regulations	Course and university policies include:				
Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school).						
Late submissions are not accepted.						
No cheating, duplication, falsification of data, plagiarism, and crib						
Recommended prerequisites	Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.					
	Prerequisite for this course is an intermediate level of understanding of personal computers and operating systems equivalent to the A + / IT Fundamentals levels.					
	• Basic computer literacy					
	• Basic PC operating system navigation skills					
Module objectives/inte	• Basic internet usage skills					
	The objectives of the course is to:					
	• explore functions of operating systems;					
	• Study of Basic commands of Linux.					

nded learning outcomes	● Study of Advance commands of Linux. ● Study of current directory according to the following arguments: a. Suffix to be replaced b. Replacement suffix By the end of this course students will attain the following learning outcomes. Students successfully completing the course will be able to: ● shell programming using filters (including grep, egrep, fgrep) ● write a shell script to validate the entered date. (eg. Date format is : dd-mm-yyyy) ● write a shell script to check entered string is palindrome or not. ● write the awk program uncomment awk which removes any comment from a C program. ● write an awk program using function, which capitalizes each word in a given string. ● write a program for process creation using C. (Use of gcc compiler) ● use of g++ compiler.
Content	This course introduces operating system act as an intermediary between the user of a computer and computer hardware. The purpose of an operating system is to provide an environment in which a user can execute programs in a convenient and efficient manner. An operating system is a software that manages the computer hardware. The hardware must provide appropriate mechanisms to ensure the correct operation of the computer system and to prevent user programs from interfering with the proper operation of the system. By the end of the course, students, you will be able to: Describe Basic Organization of Computer Systems Define Operating system, functions, history and Evolution Define assembler, linker, loader, compiler
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	<u>Basic Literature:</u> 1. Operating Systems Achyut S. Godbole Tata McGraw Hill 2nd edition. 2. Operating Systems D.M. Dhamdhare Tata McGraw Hill 2nd edition. 3. Understanding Operating System: Flynn & Mctloes 4th edition, thomson. 4. Operating Systems Design & implementation Andrew S. Tanenbam, Albert S. Woodhull Pearson. <u>Supplementary literature:</u> 5. Operating System Concepts (7th Ed) by silberschatz and Galvin, Wiley, 2000. 6. Operating Systems (5th Ed) – Internals and Design Principles by William Stallings, Prentice Hall, 2000. 7. Operating System Concepts (2nd Ed) by James L. Peterson, Abraham Silberschatz, Addison – Wesley. 8. Computer Organisation and Architecture (4th Ed) by William Stallings, Prentice Hall India, 1996. 9. Modern Operating Systems by Andrew S Tanenbaum, Prentice hall Inida, 1992. 10. UNIX – Sumitabha Das 11. Unix Shell Programming – Yashwant Kanetkar, BPB publications.

Module name:	Computer Networks																																														
Code																																															
Trimester	5																																														
Person responsible for the module	Kuat Beisekeyev Aigerim Kalikova Balzhan Azibek																																														
Lecturer(s)	Kuat Beisekeyev, MSc Aigerim Kalikova, MSc Laura Aldasheva, Candidate Technical Sciences Balzhan Azibek, M.Sc.																																														
Language	English																																														
Relation to curriculum	Bachelor programs: Software Engineering, Computer Science Compulsory course.																																														
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																														
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	Cumulative total for the course = $0,3 * 1^{st} \text{ Att} + 0,3 * 2^{nd} \text{ Att} + 0,4 * \text{Final} = 100$.
Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.
Recommended prerequisites	Prerequisite for this course is an intermediate level of understanding of personal computers and operating systems equivalent to the A + / IT Fundamentals levels. • Basic computer literacy • Basic PC operating system navigation skills • Basic internet usage skills • Introduction to Programming (Java, Python, C++)
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: • Common network components, architectures, and designs • IPv4 and IPv6 structure, basic and advanced subnetting • Ethernet switching technologies, Virtual LANs, STP • OSI and TCP/IP layers in detail to understand their functions and services Students will have the skills to • understand both the practical and conceptual skills to design and analyze computer communication networks. • build small and medium scale network topologies • perform configurations for routers and switches • examine IPv4 and IPv6 structure, basic and advanced subnetting and implement IP addressing schemes • cover Ethernet switching technologies, Virtual LANs, STP • understand Network automation tools and latest Cisco products In terms of Competences, students will be able to • Critical Thinking: In the assignments, students are asked to evaluate the data and information critically; solve complex technical problems and challenging tasks and manage the issues. • Problem-solving: Students demonstrate proficiency in managing network essentials requirements on Packet Tracer. • Result-Orientation: Students improve the performance of networking devices and their security on virtual machines or using packet tracer tools. • Documentation: Students learn how to understand different documents as well as standards.

	• Teamwork, collaboration, and communication: Students improve creative research and teamwork skills by performing individual/group assignments. • Career hard skills: Students learn relevant popular tools used in practice. • Research skills: The course uses elements of ROS for students to advance their interpretation and research skills.
Content	This course covers the fundamental building blocks that form a modern network, such as protocols, topologies, hardware, and network operating systems. Moreover, to provide in-depth coverage of the most important concepts in contemporary networking, such as TCP/IP, Ethernet, wireless transmission, and security. Topics include: Week 1 – Networking today; Week 2 – Cisco IOS; Week 3 – Network Protocols and models; Week 4 – Physical Layer Protocols and Data Link Layer Protocols; Week 5 – Ethernet Protocols and ARP; Week 6 – Network Layer Protocol; Week 7 – IPv4, Ipv6 Network Addresses; Week 8 – Subnetting an IPv4 Network; Week 9 – Transport Layer; Week 10 – Application Layer Protocols and QOS.
Media employed	Multimedia classrooms equipped with computer, projection, and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature: 1. Computer Networks, Global Edition 6th Edition 2021- Andrew Tanenbaum, David Wetherall. 2. Computer Networks: A Systems Approach (The Morgan Kaufmann Series in Networking) 6th Edition 2021- Larry L. Peterson, Bruce S. Davie. Supplementary literature: 1. Computer Networking: A Top-Down Approach, 6Th Edn, 2021 2. Mayers Mike. CompTIA A+ Certification : All-in-One Exam Guide / M. Mayers, S. Jernigan. - 10 ed. - San Francisco : McGraw-Hill Education, 2019. - 1524 p. - ISBN 978-1-260-45403-1 : 25500.00. 004 - K64 3. Gary A. Donabue – Network Warrior, Second Edition 4. Cisco Networking Academy Program CCNA 1 and 2 Companion Guide 5. CCNA 200-301 Official Cert Guide Volume 1 6. James F. Kurose , Keith W. Ross- Computer Networking: A Top-Down Approach, 6Th Edn, 2021 7. Online journals, article, papers, books, and internet resources

Module name:	Statistics and Data Science 1
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Code																																														
Trimester	5																																													
Person responsible for the module	Assistant Professor Beibit Abdikenov, PhD																																													
Lecturer(s)	Assistant Professor Beibit Abdikenov, PhD																																													
Language	English																																													
Relation to curriculum	Bachelor programme: Big Data Analysis. Compulsory course.																																													
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems.																																													
Workload of course components and credits per trimester	<table><tr><td rowspan="2">ECTS credits</td><td colspan="2">Contact hours</td><td rowspan="2">Total hours</td></tr><tr><td>Lectures</td><td>Practice sessions</td></tr><tr><td>5</td><td>20</td><td>30</td><td>50</td></tr></table>					ECTS credits	Contact hours		Total hours	Lectures	Practice sessions	5	20	30	50																															
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Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.																																													
Recommended prerequisites	Calculus 1, Calculus 2, Linear Algebra, Introduction to Programming.																																													
Module objectives/inten	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in:																																													

ded learning outcomes	- main summary statistics, measures of location, measures of spread, percentiles, outliers. - Normal distribution, z-score, approximation of Normal distribution. - statistical inference, confidence intervals (estimation), hypothesis testing. - multiple regression, dummy variables, logistic regression. Students will have the skills to: - perform above statistical analysis using built-in statistics library, and other packages SciPy, Statmodels and NumPy. - learn basics of Machine Learning models. - perform scatter plot, linear correlation, linear regression, - identify coefficient of determination, significance of coefficients. In terms of Competences, students will be able to - Perform statistical analysis on given subject area - Perform regression analysis, classifications and clustering of data by generic features - Apply data science tools to solve given problems
Content	This is a 10-week course, which focuses on improving understanding of statistics and enhancing python skills. These two aspects are necessary to develop before moving to Data Science. Statistics is a fundamental knowledge and contains basic models such as regression, which will be a starting point for most of the ML algorithms. While python is the most used language of Data Scientist, because it has substantive number of helpful libraries, huge number of contributors, and it is user friendly language. To develop statistical thinking on python, the following packages will be covered for statistical analysis: Statmodels, SciPy, NumPy and built-in statistics library.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Assigned reading materials and presentations should be read prior to class. Class lectures and discussions will proceed with supplemental and advanced topics, which could be difficult to understand unless students have read the assigned material. Readings are listed in the schedule section. All necessary updates and / or changes to the course will be reflected in the Learning Management System (moodle.astanait.edu.kz). Basic Literature: 1. Lecture presentations. Supplementary literature: 1. Python for Data Analysis, Wes McKinney. 2. Data Science from Scratch, Joel Grus. 3. Python Data Science Handbook, Jake VanderPlas. 4. Think Stats, Allen D. Downey. 5. Introduction to Statistics, David M. Lane. 6. Probability and Statistics for Data Science, Carlos Fernandez-Granda..

Module name:	Advanced Programming
Code	
Trimester	5
Person responsible for the module	Senior-lecturer S. Yeleu, MSc
Lecturer(s)	Senior-lecturer S. Yeleu, MSc

Language	English																																																					
Relation to curriculum	Bachelor programmes: Big Data Analysis, Software Engineering. Elective course.																																																					
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student's confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student's independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																																					
Workload of course components and credits per trimester	<table><tr><th rowspan="2">ECTS credits</th><th colspan="2">Contact hours</th><th rowspan="2">ISIS</th><th rowspan="2">SIS</th><th rowspan="2">Total hours</th></tr><tr><th>Lectures</th><th>Practice sessions</th></tr><tr><td>5</td><td>20</td><td>30</td><td>10</td><td>90</td><td>150</td></tr></table>					ECTS credits	Contact hours		ISIS	SIS	Total hours	Lectures	Practice sessions	5	20	30	10	90	150																																			
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Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.																																																					
Recommended prerequisites	Linear Algebra, Calculus I, Calculus II, Intro to Programming.																																																					
Module objectives/inten	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in:																																																					

ded learning outcomes	- Machine learning basics including task types with examples; - Differences between supervised and unsupervised learning; - Regularization techniques for neural networks; - Concept of backpropagation; - Different activation functions and initialization methods; - Concept of Convolutional Neural Networks and transfer learning; - Recurrent neural networks; - Natural Language Processing problem and solutions; - Concepts of autoencoders and GANs. Students will have the skills to - train simple neural networks using TensorFlow; - plot accuracies and losses for neural networks during training; - visualize weights for images to interpret results of neural network trainings; - use TensorFlow.js to create image classifier using transfer learning and own data In terms of Competences, students will be able to - Identify the appropriate architecture to use for training neural networks; - Use deep learning to solve real-world problems; - Create a deep learning project from the beginning.
Content	This course covers the fundamentals of applied deep learning and is related to computer science engineering. Topics include: machine learning basics, introduction to deep neural networks, Convolutional neural networks, transfer learning, Recurrent neural networks, Autoencoders, GANs, Natural Language Processing.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature: - Ian Goodfellow, Yoshua Bengio and Aaron Courville. Deep Learning. 2016, MIT press. - Aurélien Géron. Hands-on Machine Learning with Scikit-Learn, Keras and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems. 2nd ed., O'Reilly, 2019.

Module name:	Native Mobile Development
Code	
Trimester	5
Person responsible for the module	Amanbek Yerasyl
Lecturer(s)	Amanbek Yerasyl MSc.
Language	English
Relation to curriculum	Bachelor programmes: 6B06101 Computer Science 6B06102 Software Engineering 6B06103 Big Data Analysis Elective course
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations.

	Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																																															
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Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.																																																															
Recommended prerequisites	-																																																															
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: • understanding and demonstrating the skill in development of iOS mobile applications, • implementing basic MVC architecture pattern in iOS project, • implementing Delegation of Tasks between modules of iOS project, • adding and use Cocoapods • Swift programming language at least at intermediate level																																																															

	• working with API Students will have a solid background in iOS application development principles for computer science, media technologies and software engineering students, in preparation either for a job in industry or for more advanced courses at the graduate level. In terms of Competences, students will be able to • Work with RestAPI • Install and use third party libraries • Create complex UI screens • Work with Firebase • Present a general understanding of the programming language SWIFT
	This course covers mobile application development principles and techniques using SWIFT. Topics include basics of the Swift programming language and principles of creating UI on iOS platform. This course also covers basic concepts for software design and reuse.
Media employed	Multimedia classrooms equipped with computer, projection, and audio system; Whiteboard; Microsoft Teams; LMS Moodle, RestAPI.
Reading list	Basic Literature: 14. Lecture slides (available on moodle.astanait.edu.kz); 2. Christian Keur. iOS Programming: The Big Nerd Ranch Guide / K. Christian, H. Aaron. - 7 ed. - USA : Big Nerd Ranch, 2020. - 506 p. - ISBN 9780135264027 : 28900.00. 004.42 - K 40 Supplementary literature: 5. Android Programming / M. Kristin [и др.]. - 4 ed. - USA : Big Nerd Ranch, 2019. - 657 p. - ISBN 978-0135245125 : 24700,00. 004.42 - M 34 6. Ananth Grama.Parallel Algorithms in Computational Science and Engineering / G. Ananth, H.S. Ahmed. - Houston : Springer, 2020. - 417p. - ISBN 978-3-030-43738-1 : 38600.00.004.42 - G 71

6th term

Module name:	Sociology
Code	
Trimester	6
Person responsible for the module	Senior lecturer Kusmanova Assem, M.Sc.
Lecturer(s)	E.Otar, PhD. A.Kusmanova, M.Sc. A.Nurkanat, M.Sc. A.Zhanadilova, M.Sc. K.Issayeva, M.Sc.
Language	English
Relation to curriculum	Bachelor programmes: All Compulsory course.
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student's confidence through new examples and discussions on the problems.

	Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																													
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Recommended prerequisites	Culture Studies																																													
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: - theories and approaches to the study of society and its subsystems; - formation of ideas about the basic principles of functioning of modern society and its social institutions; - understanding the relationship between society, science, and technology;																																													

	• developing skills to describe and analyze current problems of modern society, the essence of social processes and relations; • mastering by students of the main sources and methods of obtaining sociological information; • instilling the skills of using the knowledge gained in the process of assimilating sociology in professional activity; • developing critical thinking skills and the ability to apply them in practice. Students will have the skills to • read and understand a range of sociological texts and articles • listening to lectures, presentations and interviews • participating in group discussions • access and take part in informal discussions • prepare and give poster presentations • develop team-working skills to prepare presentations • recognize and use sociological terms, categories, and concepts • improve self-study and ICT skills • develop research skills and critical thinking • develop self and peer evaluation skills • present reasoned and substantiated information about different stages of development of Kazakh society, social and interpersonal relations • analyze the features of the social institution in the context of their role in the modernization of Kazakh society • analyze of different situations in different spheres of communication from the position of correlation with the system of values, social, business, cultural, legal and ethical norms of Kazakhstani society By the end of this course students will be able to: • understand main sociological theories and concepts • know basic themes in Sociology • understand relationship between society, science, and technology • read academic texts • critically read and discussion of academic articles
Content	This course is aimed to form a socio-humanitarian worldview of students in the context of solving problems of modernization of public consciousness. Additionally, the course introduces students to the present sociological studies on issues in science and technologies.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature: 1. Tonja R. Conerly, Kathleen Holmes, Asha Lal Tamang, Jennifer Hensley, Jennifer L. Trost, Pamela Alcalsey, Kate McGonigal, Heather Griffiths, Nathan Keirns, Eric Strayer, Tommy Sadler, Susan Cody-Rydzewski, Gail Scaramuzzo, Sally Vyain, Jeff Bry, Faye Jones (2021) Introduction to Sociology 3e. 2. Bruce C. Straits (2018) Approaches to social reserach Supplementary literature: 1. Giddens, A., & Sutton, P. W. (2017). Sociology (8th ed.). Polity Press. 2. Brinkerhoff, D. B., Ortega, S. T., & Weitz, Professor of Sociology Rose. (2013). Essentials of sociology (9th ed.). Wadsworth Publishing. 3. Ritzer G. Introduction to Sociology. SAGE, 2015. 4. Giddens A. Introduction to Sociology. W.W. Norton & Company, 2014. 5. Kendall D. Sociology in Our Times: The Essentials. Wadsworth Publishing, 2014. 6. Macionis, J.J., Plummer, K. Sociology: A Global Introduction. Pearson, 2014. 7. Schaefer R.T. Sociology in Modules / R.T. Schaefer. McGrawHill, 2016.

	8. Meena, Sonam (2019) Durkheim and Sociological Method 9. Social Forces (2018) Bauman and Contemporary Sociology: A Critical Analysis 10. Simoni, Valerio Voirol, Jérémie (2021) Remittances and morality: family obligations, development, and the ethical demands of migration 11. Farrugia, David Threadgold, Steven Coffey, Julia (2018) Young subjectivities and affective labour in the service economy
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Module name:	Probability and Statistics																																											
Code																																												
Trimester	6																																											
Person responsible for the module	Assoc. Prof. M. Sergaziyev, PhD																																											
Lecturer(s)	A.Zhailaubek, M.Sc. A.Amanbekkyzy, M.Sc.																																											
Language	English																																											
Relation to curriculum	Bachelor programmes: Big Data Analysis, Software Engineering, IT Management, Computer Science. Compulsory course.																																											
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																											
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Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.				
Recommended prerequisites	Linear Algebra, Calculus I, Calculus II, Discrete mathematics.				
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: • Graphical displays for simple data sets, the central measures and spread of data; • Probability of various events; concepts of mutually exclusive events; • Conditional probabilities, multiplication rule, and Bayes theorem; • Concepts of random variables, probability distributions, expected value and variance and their use in developing statistical inference tools; • Concept of a sampling distribution and its use in statistical inference for population parameters; • Intervals of confidence for population parameters; • Hypothesis testing, including a Chi-Square test of independence, and concept of P-values in hypothesis testing; • Estimating the regression line based on some data. Students will have the skill to • draw correct inferences from data sampling; • construct confidence intervals and formulate hypothesis tests involving population means, proportions and variance; • formulate appropriate statistical hypotheses, and to correctly interpret statistical statements; • Describe a type I and type II error and the role these errors play in interpreting results. • measure the strength and direction of a linear relationship with correlation. In terms of Competences, students will be able to • Critically evaluate the data and information; • Use various test statistics to assess the significance of a model; • Employ confidence interval and regression analysis to construct a predictive model; • Use statistical techniques in decision making; • Interpret the results of statistical analysis to real world problems in different areas of application.				
Content	This course covers the fundamental statistical concepts and is related to the computer science engineering. Topics include: descriptive statistics; probability and random variables; sampling; statistical distributions; confidence intervals; hypothesis testing; regression.				

Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature: 15. Walpole, Myers, Myers, Ye. Probability and Statistics for Engineers and Scientists. 9th edition. 2016, Pearson. 16. Sheldon Ross. Introduction to Probability and Statistics for Engineers and Scientists. 5th edition. 2014, Elsevier. 17. Sheldon Ross. First Course in Probability. 10th edition. 2019, Pearson Education. Supplementary literature: 7. L. Wasserman. All of Statistics. Springer, 2005 8. Lange, Applied Probability. Springer, 2015 3. Jobson: Applied Multivariate Data Analysis, Volume I: Regression and Experimental Design.

Module name:	Advanced Databases (NoSQL)																						
Code																							
Trimester	6																						
Person responsible for the module	Aivar Sakhipov, MSc in Computer Science																						
Lecturer(s)	Aivar Sakhipov, MSc in Computer Science, Eldiyar Zhantileuov, MSc in Cyber Physical and Social Systems																						
Language	English																						
Relation to curriculum	Bachelor programmes: Software Engineering, Computer Science, IT Management. Compulsory course.																						
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																						
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1 st attestation	Assignments	60	Theoretical & Practical Quiz	2,3,4 weeks																			
	Mid-term Exam	40	Written	5 th week																			
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	2 nd attestation total	Assignments	60	Theoretical & Practical Quiz	7,8,9 weeks
		End-term Exam	40	Written	10 th week
		2nd attestation total	100		
	Final Exam		100	Written	During final exam session
	Cumulative total for the course = $0,3 * 1^{st} \text{ Att} + 0,3 * 2^{nd} \text{ Att} + 0,4 * \text{Final} = 100$.				
Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.				
Recommended prerequisites	Database Management Systems				
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: • Understanding Databases, Collections and Documents, creating Databases and Collections; • Understanding Relations and Data Modelling; • Working with Shell and Server; • Querying Embedded Fields & Arrays; • Working with Indexes; • Implementation of all features MongoDB offers to work with data efficiently Students will have the skill to • install and use MongoDB locally and in the cloud (MongoDB Atlas); • perform CRUD (Create, Read, Update, Delete) operations on MongoDB databases; • filter for data efficiently; • work with both the Mongo Shell and drivers (e.g. Node.js driver); • increase performance by using indexes; • use the Aggregation Framework that's built into MongoDB; • use MongoDB Atlas - the cloud solution offered by MongoDB; • use the serverless platform (Stitch) offered by MongoDB; In terms of Competences, students will be able to • Define, compare and understand main characteristics of the four types of NoSQL Databases (Document-oriented, Key/Value Pairs, Column-oriented and Graph). • Evaluate NoSQL database development tools and programming languages • Demonstrate an understanding of the detailed architecture, define objects, load data, query data and performance tune Document-oriented NoSQL databases.				
Content	This course covers the fundamentals of MongoDB, including MongoDB's Document data model, importing data into a cluster, working with CRUD API and Aggregation Framework. In addition to these essential topics, students will learn and work with useful MongoDB tools and services as Atlas, MongoDB's database as a service,				

	MongoDB Compass, a schema visualization tool, as well as many other useful command-line utilities.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature: 18. T.Hills., NoSQL and SQL Data Modeling: Bringing Together Data, Semantics, and Software. Technics Publications, First edition, 2016, 258 p. 19. Carlos Coronel. Database systems / C. Carlos, M. Steven. - 13th. - Boston : Cengage Learning, 2019. - 781p. - ISBN 978-1-337-62790-0 : 24900.00. 20. P. Membrey, D. Hows & E. Plugge., MongoDB Basics. Apress, 1st ed. Edition, 2014, 158 p. 21. R. Copeland , MongoDB Applied Design Patterns: Practical Use Cases with the Leading NoSQL Database. O'Reilly Media, 1st edition, 2013, 244 p. 22. Vaish, Gaurav, Getting Started with NoSQL : Your Guide to the World and Technology of NoSQL, 2013 Supplementary literature: 1. Sadalage, P. & Fowler, NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence, Wiley Publications, 1st Edition ,2019. 2. Redmond, E. & Wilson, J., Seven Databases in Seven Weeks: A Guide to Modern Databases and the NoSQL Movement (1st Ed.). Raleigh, NC: The Pragmatic Programmers, LLC., 2012.

Module name:	Storage systems																		
Code																			
Trimester	6																		
Person responsible for the module	Yersultan Tulebayev, MSc in Information Systems																		
Lecturer(s)	Yersultan Tulebayev, MSc in Information Systems																		
Language	English																		
Relation to curriculum	Bachelor programmes: 6B06101 Software Engineering, 6B06103 Computer Science																		
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																		
Workload of course components and credits per trimester	<table><tr><td rowspan="2">ECTS credits</td><td colspan="2">Contact hours</td><td rowspan="2">ISIS</td><td rowspan="2">SIS</td><td rowspan="2">Total hours</td></tr><tr><td>Lectures</td><td>Practice sessions</td></tr><tr><td>5</td><td>20</td><td>30</td><td>10</td><td>90</td><td>150</td></tr></table>					ECTS credits	Contact hours		ISIS	SIS	Total hours	Lectures	Practice sessions	5	20	30	10	90	150
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	Lectures	Practice sessions																	
5	20	30	10	90	150														
Course assessment and forms of examination	<table><tr><td>Period</td><td>Assessment type</td><td>Number of points</td><td>Exam Form</td><td>Schedule (Week #)</td></tr><tr><td>1st attestation</td><td>Laboratory works</td><td>30</td><td>Submission of written reports</td><td>2nd week 4th week</td></tr></table>					Period	Assessment type	Number of points	Exam Form	Schedule (Week #)	1 st attestation	Laboratory works	30	Submission of written reports	2 nd week 4 th week				
Period	Assessment type	Number of points	Exam Form	Schedule (Week #)															
1 st attestation	Laboratory works	30	Submission of written reports	2 nd week 4 th week															

		Quizzes	40	MCQ	2 nd week 4 th week
		Mid-term Exam	30	Written	5 th week
		1st attestation total	100		
	2nd attestation	Laboratory works	30	Submission of written reports	7 th week 9 th week
		Quizzes	40	MCQ	8 th week 10 th week
		End-term Exam	30	Written	10 th week
		2nd attestation total	100		
	Final Exam		100	MCQ Quiz	During final exam session
	Cumulative total for the course = $0,3 * 1^{st} \text{ Att} + 0,3 * 2^{nd} \text{ Att} + 0,4 * \text{Final} = 100.$				
Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.				
Recommended prerequisites	ICT or basic computer knowledge, Database Management Systems				
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: • Data Storage, development of Storage Technologies, development trend of Storage Products; • Intelligent Storage Components, RAID Technologies; • Storage Protocols: SCSI, iSCSI, FC, FCoE, SAS and SATA, PCIe and NVMe, RDMA and IB; • Storage Network Architecture: DAS, NAS, SAN; • Storage Resource Tuning Technologies and Applications; • Storage Data Protection Technologies and Applications; • Backup Solution Introduction; • DR Solution Introduction; • Storage System O&M Management. Students will have the skill to • Deploy, operate, maintain, and manage storage systems; • Competent for enterprise storage engineers, IT technical support, and other positions; • Understand and master the knowledge and skills about storage technology trends, storage systems architecture, storage basic technologies, storage common advanced technologies, storage service continuity solutions, and basic O&M management of storage systems. In terms of Competences, students will be able to • Understand how storage supports the development and application of Cutting-edge new technologies (Such as AI, Big data, cloud computing);				

	• Understand the key role of storage in the entire IT development; • Master storage ecosystem knowledge and have a more in-depth and systematic understanding of storage common technical knowledge; • Master business continuity technology and application knowledge, and have a deeper understanding of the data center backup solution and disaster recovery solution; • Perform data center storage management and maintenance operations.
Content	This course covers the fundamental data storage concepts and data storage technologies. Topics include: storage technologies, RAID technologies; storage protocols; storage system architecture; storage data protection; backup solution.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature: 1. Lecture notes (available on https://moodle.astanait.edu.kz) 2. Introduction to Storage Area Networks and System Networking. Jon Tate, Pall Beck, Hector Hugo Ibarra, Shanmuganathan Kumaravel, Libor Miklas, IBM Redbooks, 2018. 3. Storage Systems. Organization, Performance, Coding, Reliability, and Their Data Processing. Alexander Thomasian. 1st Edition - October 13, 2021. Supplementary literature: 1. Security and Data Storage Aspect in Cloud Computing (Studies in Big Data, 52) 1st ed. 2019 Edition by Prachi S. Deshpande, Subhash C. Sharma, Sateesh K. Peddoju. 2. Developments in Data Storage: Materials Perspective 1st Edition, Kindle Edition by S. N. Piramanayagam, Tow C. Chong.

Module name:	Statistics and Data Science 2																		
Code																			
Trimester	6																		
Person responsible for the module	Assistant Professor Beibit Abdikenov, PhD																		
Lecturer(s)	Assistant Professor Beibit Abdikenov, PhD																		
Language	English																		
Relation to curriculum	Bachelor programme: Big Data Analysis. Compulsory course.																		
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student's confidence through new examples and discussions on the problems.																		
Workload of course components and credits per trimester	<table border="1"> <tr> <th rowspan="2">ECTS credits</th><th colspan="2">Contact hours</th><th rowspan="2">ISIS</th><th rowspan="2">SIS</th><th rowspan="2">Total hours</th></tr> <tr> <th>Lectures</th><th>Practice sessions</th></tr> <tr> <td>5</td><td>20</td><td>30</td><td>10</td><td>90</td><td>150</td></tr> </table>					ECTS credits	Contact hours		ISIS	SIS	Total hours	Lectures	Practice sessions	5	20	30	10	90	150
ECTS credits	Contact hours		ISIS	SIS	Total hours														
	Lectures	Practice sessions																	
5	20	30	10	90	150														

Course assessment and forms of examination	Period	Assessment type	Number of points	Exam Form	Schedule (Week #)
	1 st attestation	Assignment 1	40	Submission of written reports with codes	5 th week
		Midterm Exam	60	Written	5 th week
		1st attestation total	100		
	2 nd attestation	Assignment 2	40	Submission of written reports with codes	10 th week
		Endterm Exam	60	Written	10 th week
		2nd attestation total	100		
	Final Exam		100	Written	During final exam session
	Cumulative total for the course = $0,3 * 1^{st} \text{ Att} + 0,3 * 2^{nd} \text{ Att} + 0,4 * \text{Final} = 100$.				
Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.				
Recommended prerequisites	Calculus 1, Calculus 2, Linear Algebra, Introduction to Programming, Statistics and Data Science 1				
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: - machine learning algorithms such as linear regression, - logistic regression, - KNNs, - SVMs, - Tree based methods, - ANNs, - PCA. - classification and clustering. Students will have the skill to: - To perform supervised learning, unsupervised learning, and semi-supervised learning. - To understand and implement bias-variance tradeoff, feature selection and regularization. - To use SMOTE oversampling, cross validations, greed search, and other methods of ML model tuning and modification In terms of Competences, students will be able to: - Professional use basic models to solve classification, clustering and regression problems - Be able to modify and implement modified methods of machine learning				
Content	This is a 10-week course, which focuses on improving deeper understanding of system-focused aspects of machine learning, covering guiding principles and commonly used techniques for scaling up learning to large data sets. Informally, it will cover the techniques that lie between a standard machine learning				

	course and an efficient systems implementation: both statistical/optimization techniques based on improving the convergence rate of learning algorithms and techniques that improve performance by leveraging the capabilities of the underlying hardware.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Assigned reading materials and presentations should be read prior to class. Class lectures and discussions will proceed with supplemental and advanced topics, which could be difficult to understand unless students have read the assigned material. Readings are listed in the schedule section. All necessary updates and / or changes to the course will be reflected in the Learning Management System (moodle.astanait.edu.kz). Basic Literature: 2. Lecture presentations. Supplementary literature: 7. An introduction to Statistical Learning, G. James, D. Witten, T. Hastie, R. Tibshirani. 8. The Elements of Statistical Learning, T. Hastie, R. Tibshirani, J. Friedman. 9. Python Machine Learning, S. Raschka. 10. Data Science from Scratch, Joel Grus. 11. Python Data Science Handbook, Jake VanderPlas.

Module name:	Capstone project																		
Code																			
Trimester	6																		
Person responsible for the module	Elvira Aitmukhanbetova, senior lecturer Gulnur Shuteyeva, senior lecturer																		
Lecturer(s)	G.Shuteyeva, senior lecturer																		
Language	English																		
Relation to curriculum	Bachelor programmes: Big Data Analysis, Software Engineering, IT Management. (<i>Programmes under accreditation are listed</i>) Compulsory course.																		
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student's confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student's independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																		
Workload of course components and credits per trimester	<table border="1"> <tr> <th rowspan="2">ECTS credits</th><th colspan="2">Contact hours</th><th rowspan="2">ISIS</th><th rowspan="2">SIS</th><th rowspan="2">Total hours</th></tr> <tr> <th>Lectures</th><th>Practice sessions</th></tr> <tr> <td>5</td><td>30</td><td>20</td><td>10</td><td>90</td><td>150</td></tr> </table>					ECTS credits	Contact hours		ISIS	SIS	Total hours	Lectures	Practice sessions	5	30	20	10	90	150
ECTS credits	Contact hours		ISIS	SIS	Total hours														
	Lectures	Practice sessions																	
5	30	20	10	90	150														
Course assessment and																			

forms of examination	Period	Assessment type	Number of points	Exam Form	Schedule (Week #)
	1 st attestation	Topic (plan)	20	Submission of written reports	Weekly
		Project proposal	20		3 rd week
		Weekly progress (week 1- 4)	20		4 th week
		Progress report	40		5 th week
		1st attestation total	100		
	2 nd attestation	Weekly progress (week 6- 9)	20	Submission of written reports	Weekly
		Progress report	40		8 th week
		Final presentation	20		9 th week
		Team evaluation	20		
		2nd attestation total	100		10 th week
	Final paper		100		During final exam session
	Cumulative total for the course = 0,3 * 1st Att + 0,3 * 2nd Att + 0,4*Final				
Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.				
Recommended prerequisites	Research Method and tools				
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: - design a solution to a significant open-ended problem in telecommunication. - design, implement, debug, and test created system that address the selected problem using the skills learned in previous courses. - choose appropriate theories and techniques to address the problem. - select an appropriate evaluation methodology to confirm that the solution meets the design goals. - document and present (using written, oral and visual means) the design process and the results of a proposed solution to the selected problem. - function effectively in teams. Students will have the skill to . • Critically reason and analyze a reasonably complex problem; • Use research methodologies in solving complex problems; • Use appropriate research tools, resources and technologies; • Differentiate between qualitative and quantitative methods in research;				

	• Prepare project paper, presentation. In terms of Competences, students will be able to Students will be able to: - address a theoretical, practical, real-world challenge. - implement the plan activity individually as a team. - select, collect and use required information/knowledge to solve the identified problem. - design a solution to a significant open-ended problem in telecommunication. - design, implement, debug, and test created system that address the selected problem using the skills learned in previous courses. - take appropriate decisions based on collected and analyzed information. - prepare project report after performing due plagiarism check using appropriate tools.
Content	This course covers the fundamental statistical concepts and is related to the computer science engineering. Topics include: introduction to the course and policies; listing projects; project topics; project proposal; scope of the project; details of designs, working and processes; results and applications; conclusions and future scope; references and Bibliography; final presentation and final paper
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature: 1. The Capstone Guidebook: A Step-by-Step Guide to Capstone Design and Writing – by Douglas L. Blakemore, Ph.D., 2012 2. Model-Based Processing - James V. Candy, 2019 Supplementary literature: 3. Elizabeth DePoy. Introduction to Research Understanding and Applying Multiple Strategies / D. Elizabeth, N. G. Laura. - 6 ed. - USA : Elsevier Inc., 2020. - 402 p. - ISBN 978-0-323-61247-0 : 68200.00. 303 - D35

Module name:	Research project
Code	
Trimester	6
Person responsible for the module	Elvira Aitmukhanbetova, senior lecturer Gulnur Shuteyeva, senior lecturer
Lecturer(s)	G.Shuteyeva, senior lecturer
Language	English
Relation to curriculum	Bachelor programmes: Big Data Analysis, Software Engineering, IT Management. (<i>Programmes under accreditation are listed</i>) Compulsory course.
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student's confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student's independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.

Workload of course components and credits per trimester	<table><tr><td rowspan="2">ECTS credits</td><td colspan="2">Contact hours</td><td rowspan="2">ISIS</td><td rowspan="2">SIS</td><td rowspan="2">Total hours</td></tr><tr><td>Lectures</td><td>Practice sessions</td></tr><tr><td>5</td><td>30</td><td>20</td><td>10</td><td>90</td><td>150</td></tr></table>	ECTS credits	Contact hours		ISIS	SIS	Total hours	Lectures	Practice sessions	5	30	20	10	90	150																											
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Course assessment and forms of examination	<table><tr><td>Period</td><td>Assessment type</td><td>Number of points</td><td>Exam Form</td><td>Schedule (Week #)</td></tr><tr><td rowspan="3">1st attestation</td><td>Assignments</td><td>60</td><td>Submission of written reports</td><td>Weekly</td></tr><tr><td>Mid-term</td><td>40</td><td>Written</td><td>5th week</td></tr><tr><td>1st attestation total</td><td>100</td><td></td><td></td></tr><tr><td rowspan="3">2nd attestation</td><td>Assignments</td><td>60</td><td>Submission of written reports</td><td>Weekly</td></tr><tr><td>End-term</td><td>40</td><td>Written</td><td>10th week</td></tr><tr><td>2nd attestation total</td><td>100</td><td></td><td></td></tr><tr><td colspan="2">Final Exam Project</td><td>100</td><td>Manuscript and oral presentation</td><td>During final exam session</td></tr><tr><td colspan="5">Cumulative total for the course = 0,3 * 1st Att + 0,3 * 2nd Att + 0,4*Final = 100.</td></tr></table>	Period	Assessment type	Number of points	Exam Form	Schedule (Week #)	1 st attestation	Assignments	60	Submission of written reports	Weekly	Mid-term	40	Written	5 th week	1st attestation total	100			2nd attestation	Assignments	60	Submission of written reports	Weekly	End-term	40	Written	10 th week	2nd attestation total	100			Final Exam Project		100	Manuscript and oral presentation	During final exam session	Cumulative total for the course = 0,3 * 1 st Att + 0,3 * 2 nd Att + 0,4*Final = 100.				
Period	Assessment type	Number of points	Exam Form	Schedule (Week #)																																						
1 st attestation	Assignments	60	Submission of written reports	Weekly																																						
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	2nd attestation total	100																																								
Final Exam Project		100	Manuscript and oral presentation	During final exam session																																						
Cumulative total for the course = 0,3 * 1 st Att + 0,3 * 2 nd Att + 0,4*Final = 100.																																										
Recommended prerequisites	Academic Writing, Research methods and Tools																																									
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: • paradigms that research development; • Navigate in research processes and conduct valuable research projects • Explore different ways to do research, and gain an understanding of qualitative, quantitative, and mixed-methods research • Bring the gained knowledge and skills into action for diploma works Students will have the skill to • Analyze a big number of Literature Resources; • Define narrow research field; • Generate Research Question(s); • Writing Research Proposal for Chosen Research Field. • Identify Differences between qualitative and quantitative methodologies. • Use different tools for citation, for analyzing survey and future statistics. In terms of Competences, students will be able to • Critically evaluate the data and information; • Have a good communication among group members. • Have a problem-solving competence for solving different kind of problems; • Interpret the results of surveys (questionnaires) to some meaningful report and conclusion.																																									

Content	This course covers various concepts crucial to scientific research methodology, from the initial formulation of the problem through all the steps designing and conducting the research to the final stage of writing a report.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature: 1. The Essential Guide to Doing Your Research Project, 3rd edition, Zina O'Leary, SAGE Publications Ltd, 2017, ISBN-13: 978-1473952089 2. The Capstone Guidebook: A Step-by-Step Guide to Capstone Design and Writing – by Douglas L. Blakemore, Ph.D., 2012 3. Model-Based Processing - James V. Candy, 2019 Supplementary literature: 1. Elizabeth DePoy. Introduction to Research Understanding and Applying Multiple Strategies / D. Elizabeth, N. G. Laura. - 6 ed. - USA : Elsevier Inc., 2020. - 402 p. - ISBN 978-0-323-61247-0 : 68200.00.303 - D35 2. Research Methodology: Tools and Techniques, 1st edition, Dr. Prabhat Pandey, Bridge Center, 2015, ISBN-13: 976-6069350270

Module name:	Industrial Practice
Code	
Trimester	6 for the educational program Applied Data Analytics (Master)
Person responsible for the module	Turar Olzhas, PhD, Head of department
Lecturer(s)	-
Language	English, Russian
Relation to curriculum	Educational Program: Big Data Analysis Compulsory course
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student's confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student's independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.
Workload of course components and credits per trimester	
Course assessment and	

forms of examination	Period	Assessment type	Number of points	Exam Form	Schedule (Week #)
	1 st attestation	laboratory work 1-4	60	Submission of written reports	Weekly
		Mid-term Exam	40	Written	5 th week
		1st attestation total	100		
	2 nd attestation	laboratory work 5-8	60	Submission of written reports	Weekly
		End-term Exam	40	Written	10 th week
		2nd attestation total	100		
	Final exam		100		During final exam session
	Cumulative total for the course = $0,3 * 1^{st} \text{ Att} + 0,3 * 2^{nd} \text{ Att} + 0,4 * \text{Final} = 100$.				
Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.				
Recommended prerequisites	Introduction to Programming, Statistics & Data Science 1, 2				
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: - practical applications of big data analytics in different industrial domains. - requirements and constraints of real-world big data analytics projects. Students will have the skill to - Develop teamwork and communication skills by collaborating with other students and industry professionals. - Analyze the requirements and constraints of real-world big data analytics projects. - Develop project management skills, including planning, executing, and monitoring big data analytics projects. In terms of competences students will be able to: - Gain practical experience with big data analytics tools and technologies used in industry. - Identify and analyze ethical and legal considerations related to big data analytics projects. - Develop skills related to technical documentation and report writing.				
Content	Industrial practice organized in IT companies, namely the jobs related to Data Analytics, Data Engineering, Data Science or Machine Learning usage is necessary. There will be a supervisor in the university and the supervisor from the company, contacting with each other. Final grade of the Industrial practice is defined by university supervisor based on student's report				

	Introduction to big data analytics in industry Hands-on experience with big data analytics projects Requirements analysis and project planning Big data analytics tools and technologies Technical documentation and report writing
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	1. O'Reilly Media, "Hadoop: The Definitive Guide", 4th Edition, 2015. 2. Michael Armbrust, Reynold Xin, Cheng Lian, Yin Huai, Davies Liu, Joseph K. Bradley, Xiangrui Meng, Tomer Kaftan, and Matei Zaharia, "Spark SQL: Relational Data Processing in Spark", ACM, 2015. 3. George Kesidis, "An Introduction to NoSQL Databases", 1st Edition, CreateSpace Independent Publishing Platform, 2016. 4. Anne-Laure Fayard and John Weeks, "Working in Groups and Teams", SAGE Publications, 2015. 5. Philip Jan Rothstein and Scott R. Harris, "Ethical and Social Issues in the Information Age", Springer, 2014.

7th term

Module name:	Philosophy																		
Code																			
Trimester	7																		
Person responsible for the module	Assoc. Prof. Ainur Abdina Assoc. Prof. Gulmira Sheriyazdanova Assoc. Prof. Mariyash Bozzigitova																		
Lecturer(s)	Assoc. Prof. Ainur Abdina Assoc. Prof. Gulmira Sheriyazdanova Assoc. Prof. Mariyash Bozzigitova																		
Language	English																		
Relation to curriculum	Compulsory course for all specialties.																		
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																		
Workload of course components and credits per trimester	<table><tr><td rowspan="2">ECTS credits</td><td colspan="2">Contact hours</td><td rowspan="2">ISIS</td><td rowspan="2">SIS</td><td rowspan="2">Total hours</td></tr><tr><td>Lectures</td><td>Practice sessions</td></tr><tr><td>5</td><td>30</td><td>20</td><td>10</td><td>90</td><td>150</td></tr></table>					ECTS credits	Contact hours		ISIS	SIS	Total hours	Lectures	Practice sessions	5	30	20	10	90	150
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5	30	20	10	90	150														
Course assessment and forms of examination	<table><tr><td>Period</td><td>Assessment type</td><td>Number of points</td><td>Exam Form</td><td>Schedule (Week #)</td></tr><tr><td rowspan="2">1st attestation</td><td>Individual assignment</td><td>30</td><td>Submission of glossary</td><td>3rd week</td></tr><tr><td>Group project</td><td>30</td><td>Presentation</td><td>4th week</td></tr></table>					Period	Assessment type	Number of points	Exam Form	Schedule (Week #)	1 st attestation	Individual assignment	30	Submission of glossary	3 rd week	Group project	30	Presentation	4 th week
Period	Assessment type	Number of points	Exam Form	Schedule (Week #)															
1 st attestation	Individual assignment	30	Submission of glossary	3 rd week															
	Group project	30	Presentation	4 th week															

		Mid-term Exam	40	Quiz	5 th week
		1st attestation total	100		
	2nd attestation	Individual assignment	30	Submission of glossary	8 th week
		Group project	30	Video	9 th week
		End-term Exam	40	Quiz	10 th week
		2nd attestation total	100		
	Final Exam		100	Quiz	During final exam session
Cumulative total for the course = 0,3 * 1 st Att + 0,3 * 2 nd Att + 0,4*Final = 100.					
Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.				
Recommended prerequisites	History, Logic, Ethics, Social science, Self-knowledge				
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: 1) Formation of students' philosophical reflection, 2) Development of research abilities 3) Formation of intellectual and creative potential of students 4) Increase basic philosophical analysis skills 5) Develop argumentative skills on conflicting topics; 6) Formation of critical thinking and functional literacy skills. Students will have the skill to - ability to understand philosophical theories and concepts; - ability of think critically and enhance problem-solving skills; - ability of carrying out individual works on researching, drafting, writing and editing; - ability to select and use reference materials; - ability of discussing and interpreting different philosophical ideas In terms of Competences, students will be able to - have a basic comprehension on characteristics of periods of Eastern and Western Philosophy; - understand the meaning of philosophical terms and categories - express and reasonably argue different opinions on significant philosophical topics.				
Content	This course is an introduction to the basic theories and concepts in Philosophy including knowledge of history of Philosophy and the theory of Philosophy, basic philosophical doctrines, terms and categories, and Philosophy of Science.				

Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature: 1. W. Russ Payne, An Introduction to Philosophy, Bellevue College Press 2015. 2. Johnston D. A. Brief History of Philosophy: from Socrates to Derrida, Bloomsbury Academic, 2011. 3. Russell B. History of Western Philosophy, Touchstone Edition, 1986. 4. Kenny A. A Brief History of Western Philosophy. Oxford University Press, USA, 2010. 5. Masalimova A. R., Altaev Zh.A., Kasabek A. K. Kazakh philosophy. Textbook. - Almaty, 2018. Supplementary literature: 1. "Love, Order, and Progress : The Science, Philosophy, and Politics of Auguste Comte", 2018 2. Augustinus, Confessiones, trans. By Henry Chadwick (Oxford World's Classics) 3. Gilles Deleuze & Félix Guattari: 'What is Philosophy?' 4. Immanuel Kant: 'What is enlightenment?' 5. Martin Heidegger: 'What is Philosophy?' trans. by William Kluback 6. Martin Heidegger, The Question Concerning Technology, Garland Publishing, New York, 1977. Jean T Wilde (New Haven, Conn.: College University Press, 1956). 7. Abai Kunanbayev 'Book of Words' 8. Sh. Kudaiberdiulu 'Ush Anyk' 9. Michel Bourdeau, Mary Pickering, arren Schmaus "Love, Order, and Progress: The Science, Philosophy, and Politics of Auguste Comte", 2018 10. Mariusz Tabaczek. Emergence: Towards A New Metaphysics and Philosophy of Science, 2019 Mariusz Tabaczek 11. Michele Merritt. Minding Dogs: Humans, Canine Companions, and a New Philosophy of Cognitive Science, 2021

Module name:	Technological Entrepreneurship					
Trimester	7					
Person responsible for the module	Assel Nurguzhina; Aigerim Zuyeva					
Language	English					
Relation to curriculum	Project management position for 3 years at the international project including a long-term budget management and team lead, course completion at Start up Academy of Astana Hub					
Teaching methods	- Class discussions - Individual additional literature assessment - Presentations - Research analysis presentation - Gamified tasks during practice sessions					
Workload (incl. contact hours, self-study hours)	ECTS credits	Contact hours		ISIS	SIS	Total hours
		Lectures	Practice sessions			
	5	20	30	10	90	150
Credit points	5 credits					
Required and recommended prerequisites for joining the module	Project Management (task decomposition, assignment), Financial management (cost-benefit analysis)					

Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: • science-based research and technological breakthroughs can be transformed into new business; • the frontier of current knowledge when it comes to creating value from technological inventions and managing early-stage commercialization processes; • technical expertise with business, finance and leadership skills to become a technology leader or entrepreneur. • recognizing technology trends, align business needs and technology strategy, make business cases that justify investments. Students will have the skill to • have the requisite competencies such as attitudinal, intellectual, behavioural and managerial to be able to create business value in today's economy; • have specific knowledge of the business, play social roles and remain skilful, creative, passionate, motivative, optimistic, persuasive, flexible, resourceful, assume risk, excellent planner and problem solver. In terms of competences, students will be able to • Understand all stages of technology entrepreneurship; • Interpret the peculiarities of the global project development in accordance with national approaches; • consistently pass all steps from the identification of entrepreneurial perspectives, the building of innovative processes in the organization, the development of an innovative organization, creating strategies for the technology business, evaluation of technological innovations, leadership development and constructive communication to planning finance and business models of technology entrepreneurship.
Content	identification of entrepreneurial perspectives, the building of innovative processes in the organization, the development of an innovative organization, creating strategies for the technology business, evaluation of technological innovations, leadership development and constructive communication to planning finance and business models of technology entrepreneurship.
Exams and assessment formats	Classroom discussions, presentations, final project demo
Study and examination requirements	Requirements for successfully passing the module e.g. the final grade in the module is composed of 60% performance on exams, 40% take-home assignments, bonuses of in-class participation. Students must have a final grade of 60% or higher to pass

Reading list	Assigned reading materials and presentations should be read prior to class. Class lectures and discussions will proceed with supplemental and advanced topics, which could be difficult to understand unless students have read the assigned material. Readings are listed in the schedule section. All necessary updates and / or changes to the course will be reflected in the Learning Management System (moodle.astanait.edu.kz). Basic Literature: 1. Eric Ries. The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses Crown Business, 2011, ISBN-13: 978-0307887894 2. Alexander Osterwalder & Yves Pigneur Business Model Generation/ An amazing crowd of 470 practitioners from 45 countries\Copyright © 2010 by Alexander Osterwalder. All rights reserved. Published by John Wiley & Sons, Inc., Hoboken, New Jersey. Published simultaneously in Canada. ISBN: 978-0470-87641-1 Printed in the United States of America 2018 Supplementary literature: 3. Ash Maurya. Running Lean: Iterate from Plan A to a Plan That Works (Lean (O'Reilly)) 2nd O'Reilly Media; 2nd edition (March 20, 2012) ISBN-13: 978-1449305178. 4. Rob Fitzpatrick. The Mom Test: How to talk to customers & learn if your business is a good idea when everyone is lying to you. CreateSpace Independent Publishing Platform; 1st edition (September 10, 2013), ISBN-13: 978-1492180746. 5. Ian Chaston (2017). Technology Entrepreneurship. Technology- driven vs market-driven entrepreneurship; 6. Tony Bailetti (2012). Technology Entrepreneurship: Overview, Definition and distinctive aspects; Ian Chaston (2017). Technology Entrepreneurship. Technology-driven vs market-driven entrepreneurship; 7. Richard Florida and Martin Kenney (1988) Venture capital and high technology entrepreneurship. Journal of Business Venturing; 8. Ross Brown and Collin Mason (2014) Inside the high-tech black box: A critique of technology entrepreneurship policy;
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Module name:	Academic Writing																																																						
Code																																																							
Trimester	7																																																						
Person responsible for the module	Fariza Tolesh Aigerim Urazbekova Aliya Ayazbayeva Elmira Gerfanova																																																						
Lecturer(s)	Fariza Tolesh Aigerim Urazbekova Aliya Ayazbayeva Elmira Gerfanova																																																						
Language	English																																																						
Relation to curriculum	compulsory																																																						
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																																						
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Course assessment and forms of examination	<table><tr><th>Period</th><th>Assignments</th><th>Weight (%)</th><th></th></tr><tr><td rowspan="6">Midterm assessment</td><td>Assignments:</td><td>30</td><td></td></tr><tr><td>Syllabus quiz</td><td>2</td><td></td></tr><tr><td>Quotations task</td><td>4</td><td></td></tr><tr><td>Paraphrasing task</td><td>4</td><td></td></tr><tr><td>Research problem and question/s</td><td>10</td><td></td></tr><tr><td>Midterm presentation RP & RQ</td><td>10</td><td></td></tr><tr><td rowspan="6">End term Assessment</td><td>Assignments:</td><td>30</td><td></td></tr><tr><td>Describing relevant concepts/theories</td><td>5</td><td></td></tr><tr><td>Research methods quiz</td><td>5</td><td></td></tr><tr><td>Research significance</td><td>5</td><td></td></tr><tr><td>Research overview</td><td>5</td><td></td></tr><tr><td>End- term presentation concepts, methodology and research significance with the overview</td><td>10</td><td></td></tr><tr><td>Final exam*</td><td>Final TEST</td><td>40</td><td></td></tr><tr><td>Total</td><td>0,3 * 1st Att + 0,3 * 2nd Att + 0,4*Final</td><td></td><td></td></tr></table>					Period	Assignments	Weight (%)		Midterm assessment	Assignments:	30		Syllabus quiz	2		Quotations task	4		Paraphrasing task	4		Research problem and question/s	10		Midterm presentation RP & RQ	10		End term Assessment	Assignments:	30		Describing relevant concepts/theories	5		Research methods quiz	5		Research significance	5		Research overview	5		End- term presentation concepts, methodology and research significance with the overview	10		Final exam*	Final TEST	40		Total	0,3 * 1st Att + 0,3 * 2nd Att + 0,4*Final		
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Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib																																																						

	Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.
Recommended prerequisites	C1 level English
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: - identifying the relevant sources for the diploma thesis research - describing the context of the research based on the sources - defining the main concepts of the diploma thesis research - critically evaluating various contexts Students will have the skills to: - effectively summarize and analyse academic texts while identifying and highlight their main ideas and messages - develop independent perspectives and arguments via successful incorporation of research sources - paraphrase information from sources effectively and accurately - explain the diploma thesis problem and significance - formulate the research question of the thesis - compare the ideas from the sources - determine the research gap in the chosen field - examine databases to find appropriate academic sources - develop abilities as critical thinkers, readers and writers - develop an understanding of the demands of academic research at AITU - strengthen the ability to write texts using academic language using the process approach - integrate different academic sources - summarize information from academic sources, distinguishing between main ideas and details In terms of Competences, students will be able to - developing their own voice and creating a balance between their own voice and source summaries - apply the conventions of APA referencing style 7th edition and be aware of how to avoid plagiarism - discover scientific databases to locate appropriate academic sources, evaluate those sources and integrate them thoughtfully, responsibly, and ethically in their own thesis writing - connect the ideas from academic sources to build the background of the diploma research - assess peers' papers following the assessment criteria rubric - evaluate the relevant theories and methods - convince the reader of the significance of the diploma research - justify the choice of theories and methods of the diploma research
Content	Academic Writing is designed to help students focus on skills in academic writing for thesis research, reading and speaking with an emphasis on the rules of academic English style, research and academic vocabulary and academic language use. This syllabus is developed in accordance with the Education program of the BA degree in Computer Science, Telecommunication Systems, Cybersecurity, IT Management, Digital Journalism, Media Technology, Big Data, Software Engineering and Industrial Automation. At the end of the course students will be able to successfully apply their knowledge and skills in academic English, demonstrate their academic

	English language competence, and meet the Astana IT University coursework assignments.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	<u>Basic Literature:</u> • Методические указания к выполнению дипломных работ в ТОО “ASTANA IT UNIVERSITY” https://moodle.astanait.edu.kz • Paterson, K., & Wedge, R. (2018). Oxford Grammar for EAP: English grammar and practice for Academic Purposes. Oxford university press. <u>Supplementary literature:</u> • Lazar, J., Feng, J. H., & Hochheiser, H. (2017). Research methods in human-computer interaction. Morgan Kaufmann. • Pickard, A. J. (2013). Research methods in information. Facet publishing. • Taylor & Francis Journals Standard Reference Style Guide: American Psychological Association, Seventh Edition (APA-7) • Bottomley, J. (2021). Academic writing for international students of science. Routledge.

Module name:	High Performance Computing																						
Code																							
Trimester	7																						
Person responsible for the module	Shchukin Georgy																						
Lecturer(s)	Shchukin Georgy																						
Language	English																						
Relation to curriculum	Educational Program: Big Data Analysis Elective course																						
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																						
Workload of course components and credits per trimester	<table><tr><td rowspan="2">ECTS credits</td><td colspan="2">Contact hours</td><td rowspan="2">ISIS</td><td rowspan="2">SIS</td><td rowspan="2">Total hours</td></tr><tr><td>Lectures</td><td>Practice sessions</td></tr><tr><td>5</td><td>30</td><td>20</td><td>50</td><td>50</td><td>150</td></tr></table>					ECTS credits	Contact hours		ISIS	SIS	Total hours	Lectures	Practice sessions	5	30	20	50	50	150				
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	Lectures	Practice sessions																					
5	30	20	50	50	150																		
Course assessment and forms of examination	<table><tr><td>Period</td><td>Assessment type</td><td>Number of points</td><td>Exam Form</td><td>Schedule (Week #)</td></tr><tr><td rowspan="3">1st attestation</td><td>laboratory work 1-4</td><td>60</td><td>Submission of written reports</td><td>Weekly</td></tr><tr><td>Mid-term Exam</td><td>40</td><td>Written</td><td>5th week</td></tr><tr><td>1st attestation total</td><td>100</td><td></td><td></td></tr></table>					Period	Assessment type	Number of points	Exam Form	Schedule (Week #)	1 st attestation	laboratory work 1-4	60	Submission of written reports	Weekly	Mid-term Exam	40	Written	5 th week	1st attestation total	100		
Period	Assessment type	Number of points	Exam Form	Schedule (Week #)																			
1 st attestation	laboratory work 1-4	60	Submission of written reports	Weekly																			
	Mid-term Exam	40	Written	5 th week																			
	1st attestation total	100																					

	2nd attestation	laboratory work 5-8	60	Submission of written reports	Weekly
		End-term Exam	40	Written	10 th week
		2nd attestation total	100		
	Final exam		100		During final exam session
	Cumulative total for the course = $0,3 * 1^{st} \text{ Att} + 0,3 * 2^{nd} \text{ Att} + 0,4 * \text{Final} = 100$.				
Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.				
Recommended prerequisites	Introduction to Programming,				
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: principles and concepts of high-performance computing (HPC) and their applications in big data analytics. parallel and distributed programming techniques used in HPC. role of HPC in big data analytics and its applications in industry. Students will have the skills to: Gain hands-on experience working with HPC frameworks and libraries. Understand the performance metrics and benchmarks used to evaluate HPC systems. Analyze and optimize HPC applications to achieve better performance. In terms of Competences, students will be able to: Develop skills in using HPC for solving real-world big data analytics problems.				
Content	Parallel and distributed programming techniques Introduction to parallel and distributed computing models Understanding the challenges of parallel and distributed programming Developing skills in parallel and distributed programming techniques HPC frameworks and libraries Overview of HPC frameworks and libraries, including MPI, OpenMP, and CUDA Hands-on experience with HPC frameworks and libraries Developing HPC applications using frameworks and libraries Performance evaluation and optimization				
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.				
Reading list	1. David E. Culler, Jaswinder Pal Singh, and Anoop Gupta, "Parallel Computer Architecture: A Hardware/Software Approach", Morgan Kaufmann Publishers, 1999. 2. Peter Pacheco, "Parallel Programming with MPI", 1st Edition, Morgan Kaufmann Publishers, 1997. 3. Barbara Chapman, Gabriele Jost, and Ruud van der Pas, "Using OpenMP: Portable Shared Memory Parallel Programming", 2nd Edition, The MIT Press, 2017.				

	4. John Cheng, Max Grossman, and Ty McKercher, "Professional CUDA C Programming", 1st Edition, John Wiley & Sons, 2014. 5. Robert Grossman, "Big Data and High Performance Computing: Frameworks and Applications", Chapman and Hall/CRC, 2017.
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Module designation	Business Intelligence					
Semester(s) in which the module is taught	7 th trimester					
Person responsible for the module	Nurkhat Ibadildin Assel Nurguzhina					
Language	English					
Relation to curriculum	Workflow and Groupware Systems; IT operation Management BDA - Elective					
Teaching methods	- Class discussions - Individual additional literature assessment - Presentations - Research analysis presentation - Gamified tasks during practice sessions - team presentations; written exams; attendance					
Workload (incl. contact hours, self-study hours)	ECTS credits	Contact hours		ISIS	SIS	Total hours
		Lectures	Practice sessions			
	5	20	30	10	90	150
Credit points						
Required and recommended prerequisites for joining the module	Period	Assignments		Number of points	Total	
	1st attestation	Mid Term team presentations; written exams; attendance		30	100	
	2nd attestation	End Term team presentations; written exams; attendance		30	100	
	Final exam*	Final		40	100	
	Total	0,3 * 1st Att + 0,3 * 2nd Att + 0,4*Final		100	100	

Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: - theoretical concepts of the course materials (e.g., textbook, journal articles, etc.) to the decision-making and BI processes and technologies for making appropriate managerial decisions in future real-life situations. Students will have the skill to - understand how “text book theory” works “in today’s business practices”. Ultimately, it will be up to student to relate the theory and associated readings to the practical business applications. In terms of Competences, students will be able to - Undertake systematic investigation/research related to the decision support and BI systems and technologies for today’s dynamic business environment. - Develop professional attitudes in students in relation to the team work, interpersonal communication, and business ethics.
Content	This course will examine Business Intelligence (BI) technologies that help a company to improve its business. It discusses BI topics from managerial perspectives. Managerial perspectives discuss how BI affects the organization's decision-making process. This course will cover data science, data visualization dashboard design, performance dashboard and future of BI. Exponential increase in size and availability of data makes Business Intelligence (BI) a valuable course.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Main literature: Textbook: - Sharda, R., Delen, D., Efraim, T. (2018). Business intelligence, analytics, and data science: a managerial perspective (4th ed.). Pearson Education, Inc. - Sherman, R. (2015). Business Intelligence Guidebook: From Data Integration to Analytics. Elsevier Inc. - Hurley, R. (2020). Business Intelligence: An Essential Beginner’s Guide to BI, Big Data, Artificial Intelligence, Cybersecurity, Machine Learning, Data Science, Data Analytics, Social Media and Internet Marketing. Ationa Publications. - Howson, C. (2014) Successful Business Intelligence, Second Edition: Unlock the Value of BI & Big Data. McGraw-Hill Education. - Kaldero N. (2018). Data Science for Executives: Leveraging Machine Intelligence to Drive Business ROI. Lioncrest Publishing. - Covington, D. (2016). Analytics: Data Science, Data Analysis and Predictive Analytics for Business (5th ed.). - Marko, R., & Alberto, F. (2020) Definitive Guide to DAX, The: Business intelligence for Microsoft Power BI, SQL Server Analysis Services, and Excel (Business Skills) (2nd ed.). Pearson Education, Inc

Module name:	Big Data and Distributed Algorithms																																																					
Code																																																						
Trimester	7																																																					
Person responsible for the module	Yermek Alimzhanov, M.Sc.																																																					
Lecturer(s)	Yermek Alimzhanov, M.Sc.																																																					
Language	English																																																					
Relation to curriculum	Bachelor programmes: Big Data Analysis Compulsory course.																																																					
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																																					
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Course assessment and forms of examination	<table><tr><td>Period</td><td>Assessment type</td><td>Number of points</td><td>Exam Form</td><td>Schedule (Week #)</td></tr><tr><td rowspan="4">1st attestation</td><td>Self-Study in AWS Academy</td><td>30</td><td>Knowledge Check Quizzes</td><td>Weekly</td></tr><tr><td>Lab Assignments</td><td>40</td><td>Written or Lab reports</td><td>2nd, 3rd, 4th weeks</td></tr><tr><td>Mid-term Exam</td><td>30</td><td>Computer test</td><td>5th week</td></tr><tr><td>1st attestation total</td><td>100</td><td></td><td></td></tr><tr><td rowspan="4">2nd attestation</td><td>Self-Study in AWS Academy</td><td>30</td><td>Knowledge Check Quizzes</td><td>Weekly</td></tr><tr><td>Lab Assignments</td><td>40</td><td>Written or Lab reports</td><td>6th, 8th, 9th weeks</td></tr><tr><td>End-term Exam</td><td>30</td><td>Computer test</td><td>10th week</td></tr><tr><td>2nd attestation total</td><td>100</td><td></td><td></td></tr><tr><td colspan="2">Final Exam</td><td>100</td><td>Computer test</td><td>During final exam session</td></tr><tr><td colspan="5">Cumulative total for the course = 0,3 * 1st Att + 0,3 * 2nd Att + 0,4*Final = 100.</td></tr></table>					Period	Assessment type	Number of points	Exam Form	Schedule (Week #)	1 st attestation	Self-Study in AWS Academy	30	Knowledge Check Quizzes	Weekly	Lab Assignments	40	Written or Lab reports	2 nd , 3 rd , 4 th weeks	Mid-term Exam	30	Computer test	5 th week	1st attestation total	100			2 nd attestation	Self-Study in AWS Academy	30	Knowledge Check Quizzes	Weekly	Lab Assignments	40	Written or Lab reports	6 th , 8 th , 9 th weeks	End-term Exam	30	Computer test	10 th week	2nd attestation total	100			Final Exam		100	Computer test	During final exam session	Cumulative total for the course = 0,3 * 1 st Att + 0,3 * 2 nd Att + 0,4*Final = 100.				
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Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.
Recommended prerequisites	Information and Communication Technologies, Database Management Systems, Computer Organisation and Architecture, Machine Learning, Algorithms and Data Structures, and Operating Systems and Computer Networks.
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: - data science in a data-driven organization. - data pipeline - Hadoop - Spark Students will have the skills to: • Use of Big Data oriented systems Hadoop & Spark • Summarize the role and value of data science in a data-driven organization. • Recognize how the elements of data influence decisions about the infrastructure of a data pipeline. • Illustrate a data pipeline by using cloud services to meet a generalized use case. In terms of Competences, students will be able to: • Identify scaling considerations and best practices for building pipelines that handle large-scale datasets. • Design and build a data collection process while considering constraints such as scalability, cost, fault tolerance, and latency. • Implement the steps to process structured, semistructured, and unstructured data formats in a data pipeline. • Explain the concept of MapReduce and how Apache Hadoop is used in big data analytics. • Analyze data by using open-source tools that are appropriate to a given use case.
Content	This course introduces you to the core concepts of big data processing and analytics. The course helps learners develop skills with cloud services that are critical for conducting analysis of big data problems. This course is intended for students who seek expertise on the tasks, tools, and strategies that are used to collect, store, prepare, analyze, and visualize data for use in analytics and ML applications. This course is most aligned to a data engineer role but would also be appropriate for data analysts; data scientists; extract, transform, and load (ETL) developers; or ML practitioners who want to understand how the data that they use in their analyses and predictions is prepared for analysis. The course will also familiarize you with some distributed algorithms and their application areas. You will learn about important big data storage and processing frameworks like Apache Hadoop, Apache Spark, and other software packages of Hadoop ecosystem.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; LMS Moodle. Lab assignments in the AWS Academy Sandbox environments. AWS Academy Data Engineering courses.
Reading list	Basic Literature: 23. “EMC Education Services, (2015) "Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data," Wiley; 1st edition. 432

	pages. 24. Jules Damji, et al. (2020) "Learning Spark: Lightning-Fast Data Analytics," O'Reilly Media, 2nd edition. 397 pages. 25. Ajay D. Kshemkalyani, Mukesh Singhal. (2008) "Distributed Computing: Principles, Algorithms, and Systems." Cambridge University Press, 1st edition. 754 pages. Supplementary literature: 26. Jeffrey Dean, Sanjay Ghemawat (2004) MapReduce: Simplified Data Processing on Large Clusters, Google. 27. Sakti Mishra, (2022) "Simplify Big Data Analytics with Amazon EMR: A beginner's guide," Packt Publishing, 430 pages. 28. Mohammed J. Zaki, Wagner Meira Jr. "Data mining and analysis: fundamental concepts and algorithms" / Cambridge University Press, 2014.
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Module name:	Applied Machine Learning																															
Code																																
Trimester	7																															
Person responsible for the module	Aidarov Kanat, PhD,																															
Lecturer(s)	Aidarov Kanat, PhD,																															
Language	English, Russian																															
Relation to curriculum	Educational Program: Big Data Analysis Compulsory course																															
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																															
Workload of course components and credits per trimester	<table><tr><td rowspan="2">ECTS credits</td><td colspan="2">Contact hours</td><td rowspan="2">ISIS</td><td rowspan="2">SIS</td><td rowspan="2">Total hours</td></tr><tr><td>Lectures</td><td>Practice sessions</td></tr><tr><td>5</td><td>30</td><td>20</td><td>50</td><td>50</td><td>150</td></tr></table>					ECTS credits	Contact hours		ISIS	SIS	Total hours	Lectures	Practice sessions	5	30	20	50	50	150													
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	Lectures	Practice sessions																														
5	30	20	50	50	150																											
Course assessment and forms of examination	<table><tr><td>Period</td><td>Assessment type</td><td>Number of points</td><td>Exam Form</td><td>Schedule (Week #)</td></tr><tr><td rowspan="3">1st attestation</td><td>laboratory work 1-4</td><td>60</td><td>Submission of written reports</td><td>Weekly</td></tr><tr><td>Mid-term Exam</td><td>40</td><td>Written</td><td>5th week</td></tr><tr><td>1st attestation total</td><td>100</td><td></td><td></td></tr><tr><td rowspan="2">2nd attestation</td><td>laboratory work 5-8</td><td>60</td><td>Submission of written reports</td><td>Weekly</td></tr><tr><td>End-term Exam</td><td>40</td><td>Written</td><td>10th week</td></tr></table>					Period	Assessment type	Number of points	Exam Form	Schedule (Week #)	1 st attestation	laboratory work 1-4	60	Submission of written reports	Weekly	Mid-term Exam	40	Written	5 th week	1st attestation total	100			2nd attestation	laboratory work 5-8	60	Submission of written reports	Weekly	End-term Exam	40	Written	10 th week
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2nd attestation	laboratory work 5-8	60	Submission of written reports	Weekly																												
	End-term Exam	40	Written	10 th week																												

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Final exam		100		During final exam session												
Cumulative total for the course = 0,3 * 1 st Att + 0,3 * 2 nd Att +0,4*Final=100.																
Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.															
Recommended prerequisites	Introduction to Programming, Statistics & Data Science 1,2															
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: • basic principles of machine learning, including supervised and unsupervised learning, and their applications in big data analytics. Students will have the skills to: • Develop skills in using machine learning tools and libraries, such as Scikit-learn, TensorFlow, and Keras. • Gain experience with feature selection, feature engineering, and data preprocessing techniques used in machine learning. • Understand the evaluation metrics used to assess the performance of machine learning models. In terms of Competences, students will be able to: • Analyze data by using open-source tools that are appropriate to a given use case. • Develop skills in building and training different types of machine learning models, such as linear regression, decision trees, random forests, support vector machines, and neural networks. • Analyze and interpret machine learning models to derive meaningful insights and recommendations. • Develop skills in using machine learning for solving real-world big data analytics problems.															
Content	Machine learning tools and libraries Introduction to machine learning tools and libraries, including Scikit-learn, TensorFlow, and Keras Hands-on experience with machine learning tools and libraries Developing machine learning models using tools and libraries Feature selection and engineering Performance evaluation and optimization Building and training machine learning models															
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.															
Reading list	1. Aurélien Géron, "Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow", 2nd Edition, O'Reilly Media, 2019. 2. Ian Goodfellow, Yoshua Bengio, and Aaron Courville, "Deep Learning", MIT Press, 2016.															

	3. Sebastian Raschka and Vahid Mirjalili, "Python Machine Learning", 3rd Edition, Packt Publishing, 2019.
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8th term

Module name:	Psychology																																													
Code																																														
Trimester	8																																													
Person responsible for the module	Assoc. Prof. A.Issakhanova, PhD																																													
Lecturer(s)	Issakhanova Assel Alimakhanovna PhD in Pedagogy and psychology Belessova Nursulu MA in Pedagogy and psychology																																													
Language	English																																													
Relation to curriculum	Bachelor programmes: all educational programmes																																													
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																													
Workload of course components and credits per trimester	<table><tr><td rowspan="2">ECTS credits</td><td colspan="2">Contact hours</td><td rowspan="2">ISIS</td><td rowspan="2">SIS</td><td rowspan="2">Total hours</td></tr><tr><td>Lectures</td><td>Practice sessions</td></tr><tr><td>2</td><td>10</td><td>10</td><td>10</td><td>30</td><td>60</td></tr></table>					ECTS credits	Contact hours		ISIS	SIS	Total hours	Lectures	Practice sessions	2	10	10	10	30	60																											
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Period	Assessment type	Number of points	Exam Form	Schedule (Week #)																																										
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Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.
Recommended prerequisites	Self-knowledge; Cultural Studies.
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: • applying psychological principles to everyday life. • drawing appropriate, logical, and objective conclusions about behavior and mental processes from empirical evidence. • evaluating misconceptions or erroneous behavioral claims based on evidence from psychological science. • describing ethical principles that guide psychologists in research and therapy. Students will have the skill to • read and understanding a range of psychological text; • use psychological skills in communication; • understand personal characteristics and needs; • develop emotional intelligence; • find the features of communication and use them in the relationship. In terms of Competences, students will be able to • apply self-regulation methods; • select and use reference materials in psychology; • work with psychological person's health and stress resistance.
Content	This course provides an introduction to psychology for majors in IT related majors. Topics given major consideration include maturation and development, motivation, emotion, personality, mental health, intelligence, aptitude, social influence, attitudes, beliefs, and vocational adjustments.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature: 1. Douglas A. Kleiber. Series: Social Psychology Research Progress. Hauppauge : Nova. 2020. 2. Educational Psychology. By: Zeryl Joy M. Fiscal. Oakville, ON : Society Publishing. 2019. 3. Pedro F. Bendassolli. Series: Advances in Cultural Psychology: Constructing Human Development. Charlotte, NC : Information Age Publishing. 2019. 4. Looij, August van. Series: Psychology of Emotions, Motivations and Actions. New York : Nova. 2019. 5. Industrial Organisational Psychologists Engaging with the New World of Work. SIOPSA; Theo H Veldsman; et al. [S.l.] : KR Publishing. 2021. 6. Campbell. Series: Psychology of Emotions, Motivations and Actions. New York : Nova Medicine and Health. 2021. 7. Social Psychology: Handbook of Basic Principles / Van Lange A.M. Paul, H.E. Tory, W. A. Kruglanski. - New York : The Guilford Press, 2021. 8. Psychology [Текст] / G.M. David, C. Nathan DeWall. - 13 ed. - New York : Macmillan International Higher Education, 2021

	9. Susan W. Weinschenk. 100 Things Every Designer Needs To Know About People / W. W. Susan. - USA : Pearson, 2020 Supplementary literature: 9. Douglas A. Kleiber. Series: Social Psychology Research Progress. Hauppauge : Nova. 2020. 10. Educational Psychology. By: Zeryl Joy M. Fiscal. Oakville, ON : Society Publishing. 2019. 11. Pedro F. Bendassolli. Series: Advances in Cultural Psychology: Constructing Human Development. Charlotte, NC : Information Age Publishing. 2019. 12. Looij, August van. Series: Psychology of Emotions, Motivations and Actions. New York : Nova. 2019. 13. Industrial Organisational Psychologists Engaging with the New World of Work. SIOPSA; Theo H Veldsman; et al. [S.l.] : KR Publishing. 2021. 14. Campbell. Series: Psychology of Emotions, Motivations and Actions. New York : Nova Medicine and Health. 2021. 15. Social Psychology: Handbook of Basic Principles / Van Lange A.M. Paul, H.E. Tory, W. A. Kruglanski. - New York : The Guilford Press, 2021. 16. Psychology [Текст] / G.M. David, C. Nathan DeWall. - 13 ed. - New York : Macmillan International Higher Education, 2021 17. Susan W. Weinschenk. 100 Things Every Designer Needs To Know About People / W. W. Susan. - USA : Pearson, 2020
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Module name:	Project Management																		
Code																			
Trimester	8																		
Person responsible for the module	Associate professor N. Ibadildin, PhD																		
Lecturer(s)	Associate professor N. Ibadildin, PhD																		
Language	English																		
Relation to curriculum	Bachelor programmes: IT Management, IT Entrepreneurship Compulsory course.																		
Type of teaching	Lectures serve to present new ideas and give theoretical and methodological groundwork (case analysis, problem solving, real case applications). Practice sessions (seminars) are interactive sessions designed to develop firm understanding of its accounting and financial perspectives. Based on the use of active teaching methods like case studies, problem solving and business cases through interactive discussions, MCQ's and analytic problem-solving students are urged to properly prepare and actively participate. Instructor-supervised independent study (ISIS) is to explore and investigate course content in greater detail (discussion). Student's independent study (SIS): self-study time, including preparation and completion of all course examinations.																		
Workload of course components and credits per trimester	<table border="1"> <tr> <th rowspan="2">ECTS credits</th><th colspan="2">Contact hours</th><th rowspan="2">ISIS</th><th rowspan="2">SIS</th><th rowspan="2">Total hours</th></tr> <tr> <th>Lectures</th><th>Practice sessions</th></tr> <tr> <td>4</td><td>20</td><td>20</td><td>10</td><td>70</td><td>120</td></tr> </table>					ECTS credits	Contact hours		ISIS	SIS	Total hours	Lectures	Practice sessions	4	20	20	10	70	120
ECTS credits	Contact hours		ISIS	SIS	Total hours														
	Lectures	Practice sessions																	
4	20	20	10	70	120														

Course assessment and forms of examination	Period	Assessment type	Number of points	Exam Form	Schedule (Week #)
	1 st attestation	Individual written assignment 1	30	Written	2 ^d week
		Test assignment 2	20	MCQ	3 ^d week
		Team project assignment 3	50	Report and Presentation	4 th week
		1st attestation total	100		
	2 nd attestation	Individual written assignment 4	20		7 th week
		Test assignment 5	20		8 th week
		Team project assignment 6	30		9 th week
		Attendance	30		
		2nd attestation total	100		
	Final Exam		100	Written exam	During final exam session
	Cumulative total for the course = $0,3 * 1^{st} \text{ Att} + 0,3 * 2^{nd} \text{ Att} + 0,4 * \text{Final} = 100$.				
Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.				
Recommended prerequisites	Business Administration				
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: • Modern project management fundamentals; • Principles of project management. Students will have the skill to • Analyze projects through different methodologies based on the project's results and make decisions as a project manager. • Understand project's documents from manager's point of view • Project management literacy; • Reading and producing project's documents; • Planning; • Teamwork; • Decision making; • Communication;				

	• Leadership; • Work ethics; • Problem solving; • Organizational skills. In terms of Competences, students will be able to • Understand project management fundamentals through reading textbook and lecturing on course topics. • Communicate effectively on project management. • Apply work breakdown structures (WBS) for the project. • Employ necessary network scheduling techniques. • Create a project management plan. • Implement a developed project management plan. • Advance in concepts that will assist the student in his/her development academically, ethically, analytically, and develop as a project manager.
Content	Project management course will concentrate on the lifecycle of the project from the project manager's position. Students will understand the company's decision-making processes from the inception of the project and acquire knowledge of how to start and control new and existing projects. Main topics will include project integration, project scope management, project time and cost management, quality management, human resource considerations, communications, risk management, and procurement management. Undergraduates will learn how a company will initiate, plan, execute, monitor and close projects under certain restrictions including scope, timeline, budget and resources.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature: 1. A Systems Approach to Planning, Scheduling, and Controlling, 12th ed. Harold Kerzner, ISBN-10: 9781119165354, ISBN-13: 978-1119165354, 2017 2. Project Management Case Studies 5th Edition, Harold Kerzner, ISBN-10: 1119385970, ISBN-13: 978-1119385974, 2017 3. A Guide to the Project Management Body of Knowledge (PMBOK® Guide)—Sixth Edition, Project Management Institute, ISBN-10: 9781628251845, ISBN-13: 978-1628251845, 2017 4. Agile Practice Guide 1st Edition, Project Management Institute, Inc., ISBN: 978-1-62825-199-9, 2017 5. PMP Exam Prep, What You Really Need to Know to Pass the Exam Tenth Edition, Upgraded, Rita Mulcahy, ISBN-10: 1943704279, ISBN-13: 978-1943704279, 2022. 6. PMI-ACP Exam Prep: A Course in a Book for Passing the PMI Agile Certified Practitioner (PMI-ACP) Exam (Updated Second Edition). Mike Griffith, ISBN-10: 1932735984, ISBN-13: 978-1932735987, 2018 Supplementary literature: 1. Successful Project Management 7th Edition, Cengage Learning, ISBN-10: 1337095478, ISBN-13: 978-1337095471, 2017 2. Contemporary Project Management 4th Edition, Timothy Kloppenborg, Vittal S. Anantatmula, Kathryn Wells, Cengage Learning, ISBN-10: 9781337406451, ISBN-13: 978-1337406451, 2018 3. Information Technology Project Management 9th Edition, Kathy Schwalbe, Cengage Learning, ISBN-10: 9781337101356, ISBN-13: 978-1337101356, 2018 4. Girvan L., Paul D. Agile and Business Analysis: Practical Guidance for IT Professionals. BCS, The Chartered Institute for IT; 2017. Accessed November 24, 2022.

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Module name:	Research Methods and Tools																																											
Code																																												
Trimester	8																																											
Person responsible for the module	Maxat Kassen, PhD Professor of Digital Public Administration, Astana IT University m.kassen@astanait.edu.kz																																											
Lecturer	Maxat Kassen, PhD Professor of Digital Public Administration, Astana IT University m.kassen@astanait.edu.kz																																											
Language	English																																											
Relation to curriculum	Bachelor programmes: MT, ITM Compulsory course.																																											
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																											
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Course assessment and forms of examination	<table><tr><td>Period</td><td>Assessment type</td><td>Number of points</td><td>Exam Form</td><td>Schedule (Week #)</td></tr><tr><td rowspan="4">1st attestation</td><td>Weekly assignments</td><td>30</td><td>Submission of written reports</td><td>Weekly</td></tr><tr><td>Group project assignment</td><td>30</td><td>Written assignment</td><td>4th week</td></tr><tr><td>Mid-term Exam</td><td>40</td><td>Written assignment</td><td>5th week</td></tr><tr><td>1st attestation total</td><td>100</td><td></td><td></td></tr><tr><td rowspan="4">2nd attestation</td><td>Weekly assignments</td><td>30</td><td>Submission of written reports</td><td>Weekly</td></tr><tr><td>Group project assignment</td><td>30</td><td>Written assignment</td><td>9th week</td></tr><tr><td>End-term Exam</td><td>40</td><td>Written assignment</td><td>10th week</td></tr><tr><td>2nd attestation total</td><td>100</td><td></td><td></td></tr></table>					Period	Assessment type	Number of points	Exam Form	Schedule (Week #)	1 st attestation	Weekly assignments	30	Submission of written reports	Weekly	Group project assignment	30	Written assignment	4 th week	Mid-term Exam	40	Written assignment	5 th week	1st attestation total	100			2nd attestation	Weekly assignments	30	Submission of written reports	Weekly	Group project assignment	30	Written assignment	9 th week	End-term Exam	40	Written assignment	10 th week	2nd attestation total	100		
Period	Assessment type	Number of points	Exam Form	Schedule (Week #)																																								
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Final Exam	100	Written	During final exam session		
Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.				
Recommended prerequisites	-				
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: • key aspects of qualitative and quantitative methods of analysts from both theoretical and practical perspectives and from a wide variety of comparative cross-institutional and cross-country contexts; • key trends, challenges and opportunities in building research methodology for effective management and leadership in various areas; • skills of content, context, stakeholder, comparative and policy analysis through investigating actual projects in the area, analyzing interesting cases from different countries and comparing concrete research methods and tools, unique innovative strategies in advancing effective management of research and development processes at both national and local levels; • potential of scientific methods to solve various socioeconomic challenges and propose effective implementation strategies to address the challenges and advance management and leadership. Students will have the skill to • Know major theories and methodologies of qualitative and quantitative analysis; • Understand the benevolent effects of management strategies aimed to advance research and development at national levels from different contexts; • Identify key drivers, challenges and opportunities for the development of research methodology for effective IT and media technology management; • Master such useful methods of investigation as stakeholder, content, context analysis as well as survey research and statistic analysis; • Identify and assess key benchmarks in measuring the progress of research and development agendas in promoting more competitive and efficient management and leadership in the area. In terms of Competences, students will be able: • to understand structure and components of scientific research; • to understand and apply a wide range of qualitative and quantitative methods of analysis for effective management and leadership; • to conduct individual and group research projects, using scientific methods of analysis; • to identify, locate, select and read scientific references for research assignments.				
Content	The key goal of the course is to provide students with the knowledge that will help				

	them to understand and apply various qualitative and quantitative methods of research for effective management and leadership.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature: 1. Sofaer, S. (1999). Qualitative methods: what are they and why use them?. Health services research, 34(5 Pt 2), 1101. 2. Gerring, J. (2017). Qualitative methods. Annual review of political science, 20, 15-36. 3. Seaman, C. B. (2008). Qualitative methods. In Guide to advanced empirical software engineering (pp. 35-62). Springer, London. 4. Crang, M. (2003). Qualitative methods: touchy, feely, look-see?. Progress in human geography, 27(4), 494-504. 5. Potter, W. J. (2013). An analysis of thinking and research about qualitative methods. Routledge. 6. Taylor, G. R. (Ed.). (2005). Integrating quantitative and qualitative methods in research. University Press of America. 7. Sechrest, L., & Sidani, S. (1995). Quantitative and qualitative methods:: Is There an Alternative?. Evaluation and program planning, 18(1), 77-87. 8. Crang, M. (2002). Qualitative methods: the new orthodoxy?. Progress in human geography, 26(5), 647-655. 9. Osborne, J. W. (Ed.). (2008). Best practices in quantitative methods. Sage. 10. Cook, T. D., & Reichardt, C. S. (Eds.). (1979). Qualitative and quantitative methods in evaluation research (Vol. 1). Beverly Hills, CA: Sage publications. 11. Steckler, A., McLeroy, K. R., Goodman, R. M., Bird, S. T., & McCormick, L. (1992). Toward integrating qualitative and quantitative methods: an introduction. Health education quarterly, 19(1), 1-8. 12. Stockemer, D., Stockemer, G., & Glaeser. (2019). Quantitative methods for the social sciences (Vol. 50, p. 185). Quantitative methods for the social sciences: Springer International Publishing. 13. Lewin, C. (2005). Elementary quantitative methods. Research methods in the social sciences, 215-225. 14. Nardi, P. M. (2018). Doing survey research: A guide to quantitative methods. Routledge. Supplementary literature: 1. Adda, J., & Cooper, R. W. (2003). Dynamic economics: quantitative methods and applications. MIT press. 2. Khandker, S. R., Koolwal, G. B., & Samad, H. A. (2009). Handbook on impact evaluation: quantitative methods and practices. World Bank Publications. 3. Waters, D., & Waters, C. D. J. (2008). Quantitative methods for business. Pearson Education. 4. Gray, P. S., Williamson, J. B., Karp, D. A., & Dalphin, J. R. (2007). The research imagination: An introduction to qualitative and quantitative methods. Cambridge University Press. 5. Spicer, N. (2004). Combining qualitative and quantitative methods. Researching society and culture, 2, 293-303. 6. Kidder, L. H., & Fine, M. (1987). Qualitative and quantitative methods: When stories converge. New directions for program evaluation, 1987(35), 57-75. 7. Curvin, J., & Slater, R. (2002). Quantitative methods for business decisions. Thomson Learning. 8. Morgan, D. L. (2013). Integrating qualitative and quantitative methods: A pragmatic approach. Sage publications. 9. Gorard, S. (2003). Quantitative methods in social science research. A&C Black. 10. Teo, T. (Ed.). (2014). Handbook of quantitative methods for educational research. Springer Science & Business Media.

	11. Davies, M. B., & Hughes, N. (2014). Doing a successful research project: Using qualitative or quantitative methods. Bloomsbury Publishing. 12. Lampard, R., & Pole, C. (2015). Practical social investigation: Qualitative and quantitative methods in social research. Routledge.
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Module name:	Information Security Fundamentals																																							
Code																																								
Trimester	8																																							
Person responsible for the module	Assoc. Prof. M Sarinova Asiya Zhumabaevna PhD																																							
Lecturer(s)	Otarbay Zhenis PhD candidate in Robotics Kulbaeva Laura MSc in Information systems Aldosh Balziya MSc Kutubaeva Madina MSc																																							
Language	English																																							
Relation to curriculum	Bachelor programmes: Big Data Analysis, Software Engineering, IT Management. (<i>Programmes under accreditation are listed</i>) Compulsory course.																																							
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																							
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Course assessment and forms of examination	<table><tr><td>Period</td><td>Assessment type</td><td>Number of points</td><td>Exam Form</td><td>Schedule (Week #)</td></tr><tr><td rowspan="4">1st attestation</td><td>Problem Sets</td><td>30</td><td>Submission of written reports</td><td>Weekly</td></tr><tr><td>Quiz</td><td>30</td><td>Written</td><td>3rd week</td></tr><tr><td>Mid-term Exam</td><td>40</td><td>Written</td><td>5th week</td></tr><tr><td>1st attestation total</td><td>100</td><td></td><td></td></tr><tr><td rowspan="3">2nd attestation</td><td>Problem Sets</td><td>30</td><td>Submission of written reports</td><td>Weekly</td></tr><tr><td>Quiz</td><td>30</td><td>Written</td><td>8th week</td></tr><tr><td>End-term Exam</td><td>40</td><td>Written</td><td>10th week</td></tr></table>					Period	Assessment type	Number of points	Exam Form	Schedule (Week #)	1 st attestation	Problem Sets	30	Submission of written reports	Weekly	Quiz	30	Written	3 rd week	Mid-term Exam	40	Written	5 th week	1st attestation total	100			2nd attestation	Problem Sets	30	Submission of written reports	Weekly	Quiz	30	Written	8 th week	End-term Exam	40	Written	10 th week
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		2nd attestation total	100		
	Final Exam		100	Written	During final exam session
	Cumulative total for the course = $0,3 * 1^{st} \text{ Att} + 0,3 * 2^{nd} \text{ Att} + 0,4 * \text{Final} = 100$.				
Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.				
Recommended prerequisites	-				
Module objectives/intended learning outcomes	The purpose of Information Security Fundamentals is to provide students with a basic understanding of information security. We take a high-level overview of subjects, including risk management, security policies, fundamental networking, password cracking, cryptography, malware, mobile security, and more. The first subjects students in networking classes cover are standard network devices, TCP/UDP, firewalls, and network topology. From there, the student will be able to comprehend the value of data protection and the usual procedures and guidelines followed by information security professionals. Students will next get an overview of various offensive security subjects, including malware, password cracking, sniffer, and more! The students will be exposed to offensive and defensive themes to help them select areas of interest. This is excellent for students leaving IT roles or those looking to move careers. After completing this, students need to be able to: <i>Recognize the fundamentals of computer networking</i> <i>Recognize fundamental cryptography</i> <i>Recognize several password-cracking techniques.</i> The students will get a summary of offensive security issues, including malware, password cracking, sniffer, and more! This is excellent for students leaving an IT position or seeking an entirely changing career to assist the learner; offensive and defensive themes will be introduced. Student interests are identified. By the finish, the pupil ought to be proficient in the knowledge of the core ideas and procedures involved in information security practitioners. The class will cover essential subjects such as software security, computer security concepts, trusted systems, internet security, managerial concerns, and cryptography techniques.				
Content	Important subjects will be covered in class such as: software security, computer security concepts, and trusted systems, internet security, managerial concerns, and cryptography techniques.				
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.				

Reading list	Assigned reading materials and presentations should be read prior to class. Class lectures and discussions will proceed with supplemental and advanced topics, which could be difficult to understand unless students have read the assigned material. Readings are listed in the schedule section. All necessary updates and / or changes to the course will be reflected in the Learning Management System (moodle.astanait.edu.kz). <u>Basic Literature:</u> ○ Lecture slides (available on moodle.astanait.edu.kz); Wright, C. (2016). Fundamentals of Information Security Risk Management Auditing. IT Governance Ltd.
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Module name:	IT Risk Management					
Semester(s) in which the module is taught	8					
Person responsible for the module	Madina Tulemissova, Senior-lecturer					
Language	English					
Relation to curriculum	Big Data Analytics - Elective course.					
Teaching methods	Lecture, class discussions, group project, individual assignments, case-study, quiz					
Workload (incl. contact hours, self-study hours)	ECTS credits	Contact hours		ISIS	SIS	Total hours
		Lectures	Practice sessions			
	5	20	30	10	90	150
Credit points	5					
Required and recommended prerequisites for joining the module	Management, Project Management, IT Operations Management					

Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: • The fundamentals of risk management • Risk Identification • Risk assessment • Risk response • Risk monitoring and reviewing Students will have the skill to • define risk management • recognize why it's important to set the context and objectives for the risk management process • recognize why it's necessary to apply a risk management process in a project, and • summarize and classify each step of the risk management • identify risks in achieving objective outcomes • identify categories of risk, and • select methods to identify risks. • recognize the process of undertaking a risk assessment of identified risks • select risk controls through risk assessment • use a risk matrix to respond to identified risks • clarify risks to stakeholders • use contingencies to deal with risk • identify methods of treating risk • design a Communications Plan to include all stakeholders in the management of identified and assessed risks, and • design a Risk Management Plan. • recognize the importance of a monitor and review process • use a monitor and review process • integrate a monitor and review process that sets targets • obtain and use feedback for continuous improvement, and • select steps for continuous improvement. In terms of Competences, students will be able to • know how the risk management process works as part of a compliance framework • use frameworks to identify, assess and analyze risks in a business context • apply appropriate risk responses • design and integrate strategies for reporting and communicating risks to various stakeholders • use a monitor and review process, and apply risk management as an iterative process.
Content	The course covers the area of risk management in the context of a project. It highlights the importance of risk management and the need for project managers to think about it in advance. The course contains basic risk management theories and concepts applicable to the project environment, including planning, preparing and responding to project risks. The course covers the areas of risk identification, assessment, monitoring and control. As part of this course, students will be introduced to methods of qualitative and quantitative risk analysis.

Exams and assessment formats	Period	Assignments	Number of points	Total Weights
	Midterm	Individual assignments Midterm quiz	60 40	30%
	Endterm	Individual assignments Group project: Risk Management Plan Risk Identification (Risk Register) Qualitative Risk Analysis (Matrix) Risk Response Plan Endterm assessment (Presentation)	10 10 20 20 20	30%
	Final Exam	Case study exam	100	40%
	Total	0,3 * Midterm + 0,3 * Endterm + 0,4 * Final Exam		
Study and examination requirements	Assessment is administered continuously throughout the course. The students are rated against their performance in continuous rating administered throughout the semester (60%) and summative rating done during the examination session (40%), total 100%. Continuous rating is students' on-going performance in class and independent work. Class work is assessed for attendance, laboratory works' defense and in- class assessments.			
Reading list	• Mulcahy, Rita (2019): Risk Management, 3rd edition, Rmc Pubns Inc. • Pandian, C. Ravindranath (2006): Applied Software Risk Management: A Guide for Software Project Managers 1st Edition • International Project Management Association IPMA (2015): Individual Competence Baseline 4th version (ICB4) • ISO (2012): ISO 21500 - Guidance on project management. • Project Management Institute (2017): A guide to the project management body of knowledge (PMBOK guide) Sixth edition; Agile practice guide. Newtown Square, PA • J. Hermarij, Better Practices of Project Management (2016), 4th fully revised edition. Based on IPMA Competences - ICB Version 4			

Module name:	Cloud Computing
Code	
Trimester	8
Person responsible for the module	Aldiyar Salkenov, Senior Lecturer, Master of Engineering in Information Technology
Lecturer(s)	Elvira Aitmukhanbetova, MSc in Computer Science Meruyert Nurgazy, MSc in Software Engineering
Language	English

Relation to curriculum	Bachelor programmes: Computer Science, Software Engineering																																																																																					
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student’s confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student’s independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																																																																																					
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Course assessment and forms of examination	<table><tr><td>Period</td><td>Assessment type</td><td>Number of points</td><td>Exam Form</td><td>Schedule (Week #)</td></tr><tr><td rowspan="7">1st attestation</td><td>Quiz 1</td><td>15</td><td>Multiple Choice Questions</td><td>Week 2</td></tr><tr><td>Quiz 2</td><td>15</td><td>Multiple Choice Questions</td><td>Week 4</td></tr><tr><td>Assignment 1</td><td>10</td><td>Self-checked laboratory work</td><td>Week 2</td></tr><tr><td>Assignment 2</td><td>10</td><td>Self-checked laboratory work</td><td>Week 3</td></tr><tr><td>Assignment 3</td><td>10</td><td>Self-checked laboratory work</td><td>Week 4</td></tr><tr><td>Mid-term Exam</td><td>40</td><td>Multiple Choice Questions</td><td>Week 5</td></tr><tr><td>1st attestation total</td><td>100</td><td></td><td></td></tr><tr><td rowspan="7">2nd attestation</td><td>Quiz 3</td><td>15</td><td>Multiple Choice Questions</td><td>Week 7</td></tr><tr><td>Quiz 4</td><td>15</td><td>Multiple Choice Questions</td><td>Week 9</td></tr><tr><td>Assignment 4</td><td>10</td><td>Self-checked laboratory work</td><td>Week 6</td></tr><tr><td>Assignment 5</td><td>10</td><td>Self-checked laboratory work</td><td>Week 8</td></tr><tr><td>Assignment 6</td><td>10</td><td>Self-checked laboratory work</td><td>Week 9</td></tr><tr><td>End-term Exam</td><td>40</td><td>Multiple Choice Questions</td><td>Week 10</td></tr><tr><td>2nd attestation total</td><td>100</td><td></td><td></td></tr><tr><td rowspan="3">Final Exam</td><td>Final test</td><td>30</td><td>Multiple Choice Questions</td><td>During final exam session</td></tr><tr><td>Final project</td><td>70</td><td>A project</td><td>During final exam session</td></tr><tr><td>Final total</td><td>100</td><td></td><td></td></tr><tr><td colspan="5">Cumulative total for the course = 0,3 * 1st Att + 0,3 * 2nd Att + 0,4*Final = 100.</td></tr></table>					Period	Assessment type	Number of points	Exam Form	Schedule (Week #)	1 st attestation	Quiz 1	15	Multiple Choice Questions	Week 2	Quiz 2	15	Multiple Choice Questions	Week 4	Assignment 1	10	Self-checked laboratory work	Week 2	Assignment 2	10	Self-checked laboratory work	Week 3	Assignment 3	10	Self-checked laboratory work	Week 4	Mid-term Exam	40	Multiple Choice Questions	Week 5	1st attestation total	100			2nd attestation	Quiz 3	15	Multiple Choice Questions	Week 7	Quiz 4	15	Multiple Choice Questions	Week 9	Assignment 4	10	Self-checked laboratory work	Week 6	Assignment 5	10	Self-checked laboratory work	Week 8	Assignment 6	10	Self-checked laboratory work	Week 9	End-term Exam	40	Multiple Choice Questions	Week 10	2nd attestation total	100			Final Exam	Final test	30	Multiple Choice Questions	During final exam session	Final project	70	A project	During final exam session	Final total	100			Cumulative total for the course = 0,3 * 1 st Att + 0,3 * 2 nd Att + 0,4*Final = 100.				
Period	Assessment type	Number of points	Exam Form	Schedule (Week #)																																																																																		
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Requirements according to the examination regulations	Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.
Recommended prerequisites	Software Architecture, Advanced Programming, DBMS, Computer Organization and Architecture
Module objectives/intended learning outcomes	Students will show a working knowledge in: • different types of cloud computing models • advantages that cloud computing provides over a traditional, on-premises computing model. • the main AWS service categories and core services • cloud economics and billing including a pay-as-you-go model, total cost of ownership, AWS organizations and cost management • cloud global presence including AWS global infrastructure • cloud security and concepts such as shared responsibility model, access management, account security, data security using encryption, and compliance regulations • networking concepts such public and private networks, subnets, IPv4 and IPv6 addresses, CIDR notation, internet gateways, and endpoints • key concepts of high-level cloud computing including elastic computing, containers, virtual machines and serverless solutions • various storage types including block storage, file storage and object storage • cloud database services including managed and unmanaged services, relational, non-relational databases • cloud architecture design principles and best practices such as scalable, dynamic architectures using traffic distribution and monitoring technologies Students will have the skills to: • set up AWS accounts, work with provisioning management software and launch instances on Amazon EC2 • manage users and user permissions in AWS • set up an organizational structure that simplifies billing and account visibility to review cost data • create resizable compute capacity in the cloud using Amazon EC2 • create a virtual private network and add additional components to produce a customized network • mitigate varying loads on the server using Elastic Load Balancing and Auto Scaling at AWS • create an Amazon EBS volume, attach it to an instance, apply a file system to the volume, and then take a snapshot backup • demonstrate when to use AWS Database services including Amazon Relational Database Service (RDS), Amazon DynamoDB, Amazon Redshift, and Amazon Aurora In terms of Competences, students will be able to: • explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing • identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, et

	- demonstrate a solid understanding of what AWS is, what its many services are all about (and what each service does) and which kind of service (or service combination) may be used to implement meet IT or application requirements - build IT solutions using cloud technologies by implementing computing, storage, database, networking and management services
Content	This course provides a hands-on comprehensive study of cloud concepts and capabilities across the various cloud service models including Software as a Service (SaaS), Infrastructure as a Service (IaaS) and Platform as a Service (PaaS). Cloud computing is introduced through Amazon Web Services (AWS) and its capabilities. Through a combination of presentations, demos, and hands-on labs, students get an overview of AWS and a detailed view of the computing and storage capabilities. Additionally, this course showcases the ease, flexibility, and power of serverless solutions on AWS.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle; AWS Learning Academy
Reading list	Basic Literature: - Cloud Computing: Principles and Paradigms, Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wiley, ISBN 978-0470887998, 2011 - Amazon Web Services in Action, Andreas Wittig, Michael Wittig, Manning Publications Co., ISBN 978-1617292880, 2016 Supplementary literature: - Learn AWS Serverless Computing, Scott Patterson, Packt Publishing, ISBN 978-1789958355, 2019

Module name:	Deep learning and reinforcement learning																		
Code																			
Trimester	8																		
Person responsible for the module	Nurakhov Yedil, Master of Science																		
Lecturer(s)	Nurakhov Yedil, M.Sc.																		
Language	English																		
Relation to curriculum	Bachelor programmes: Big Data Analysis Compulsory course.																		
Type of teaching	Lectures serve to introduce new concepts and provide theoretical and methodological foundations. Practice sessions (seminars) are active sessions to develop student's confidence through new examples and discussions on the problems. Instructor-supervised independent study (ISIS) deals with review and exploration in greater depth of the course material. Student's independent study (SIS): Self-study time including the time required to prepare for and complete all course assessments.																		
Workload of course components and credits per trimester	<table border="1"> <tr> <th rowspan="2">ECTS credits</th><th colspan="2">Contact hours</th><th rowspan="2">ISIS</th><th rowspan="2">SIS</th><th rowspan="2">Total hours</th></tr> <tr> <th>Lectures</th><th>Practice sessions</th></tr> <tr> <td>5</td><td>30</td><td>20</td><td>10</td><td>90</td><td>150</td></tr> </table>					ECTS credits	Contact hours		ISIS	SIS	Total hours	Lectures	Practice sessions	5	30	20	10	90	150
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Course assessment and forms of examination	Period	Assessment type	Number of points	Exam Form	Schedule (Week #)
	1 st attestation	Problem Sets	30	Submission of written reports	Weekly
		Quiz	30	Written	3 rd week
		Mid-term Exam	40	Written	5 th week
		1st attestation total	100		
	2nd attestation	Problem Sets	30	Submission of written reports	Weekly
		Quiz	30	Written	8 th week
		End-term Exam	40	Written	10 th week
		2nd attestation total	100		
	Final Exam		100	Written	During final exam session
Cumulative total for the course = 0,3 * 1 st Att + 0,3 * 2 nd Att + 0,4*Final = 100.					
Requirements according to the examination regulations	The exam will take the form of a test. The test consists of 16 questions. The allocated time for the test is 30 minutes. Course and university policies include: Attendance is mandatory. Missing 30% of lessons will result in F (Fail) grade (or summer school). Late submissions are not accepted. No cheating, duplication, falsification of data, plagiarism, and crib Contacting the Lecturer: students are welcome to arrange one-to-one meetings with the teacher during office hours to discuss the class.				
Recommended prerequisites	Linear Algebra, Calculus I, Calculus II, Discrete mathematics, Machine learning algorithms, Object oriented programming, Algorithms and data structures				
Module objectives/intended learning outcomes	By the end of this course students will attain the following learning outcomes. The student will show a working knowledge in: • Data preparation: data collection, normalization, and scaling • Understanding the problems of classification, clustering, and regression • Understanding the main deep learning metrics • Understanding the types and methods of forming neural networks and analyzing the tasks that require their application • Understanding of optimization methods • Understanding data representation for training a neural network model in the context of a specific task • Understanding the main aspects of reinforcement learning • Understanding the methods of presenting information about the learning environment • Understanding policy optimization techniques and strategy selection Students will have the skills to • Transform the original input and output data to train the neural network model • Choice of network topology in the context of the task • Choosing the type of neural network • Choice of activation function in the context of the problem being solved				

	- Analyze the results of the constructed model - Draw conclusions from the analysis of the constructed model - Understanding the main parameters of reinforcement learning: environment, agent, action, reward - Understanding of the main calculated characteristics: average expected reward, average future reward - Understanding the basic methods of policy optimization: Monte Carlo method, application of the Bellman optimality equation In terms of Competences, students will be able to - Collection, preprocessing and preparation of data for building a model - Choose a solution, a method for building a neural network model to solve the problem - Analyze trained model - Select a task view model - Work with standard API for reinforcement learning, and a diverse collection of reference environments - Select Policy Optimization Method
Content	The aim of the course is to develop knowledge and skills in various research methods, tools and problems in the field of Deep and Reinforcement Learning. They range from qualitative to quantitative methods and cover perspectives from engineering and natural sciences to even the arts and humanities. The course will prepare the student to analyze and implement new methods of Deep and Reinforcement Learning.
Media employed	Multimedia classrooms equipped with computer, projection and audio system; Whiteboard; Microsoft Teams; LMS Moodle.
Reading list	Basic Literature: 29. Richard S. Sutton and Andrew G. Barto. Reinforcement Learning: An Introduction. Second edition. 2017, Cambridge, Massachusetts. 30. Sheldon Ross. Introduction to Probability and Statistics for Engineers and Scientists. 5th edition. 2014, Elsevier. 31. Aurélien Géron. Hands-On Machine Learning with Scikit Learn and TensorFlow.. 2019, O'Reilly Media, Inc. Supplementary sources: http://stevenmiller888.github.io/mind-how-to-build-a-neural-network/ https://mattmazur.com/2015/03/17/a-step-by-step-backpropagation-example/ https://habr.com/ru/company/otus/blog/429090/ https://gb.ru/blog/algoritmy-obucheniya-nejronnoj-seti/