| ID and name of course | Independent work of the student (IWS) | Number of credits | | | General number of credits | Independent work of the student under the guidance of a teacher (IWST) |
		Lectures (L)	Practical classes (PC)	Lab. classes (LC)		
101817 Programming on Python language	5	1,5	1,5	6,0	9	10

ACADEMIC INFORMATION ABOUT THE COURSE

Learning Format	Cycle, component	Lecture types	Types of practical classes	Form and platform final control
Offline	MD, UC	Problem-oriented	Learn Python programming language concepts and implement programs to strengthen practical skills	Oral offline

Lecturer - (s)	Vladislav Karyukin
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ACADEMIC COURSE PRESENTATION

Purpose of the course	Expected Learning Outcomes (LO) *	Indicators of LO achievement (ID)
This course focuses on learning the concepts of the Python and C# programming languages and understanding their practical implementation by solving real-world problems of varying complexity.	1. (cognitive) Know the theoretical and methodological concepts of Python languages	1.1 Creates basic and advanced programs Python
		1.2 Understands the features of classes and objects, as well as OOP paradigms: inheritance, encapsulation, polymorphism and abstraction
		1.3 Understands application development techniques in Python
	2. (functional) Application knowledge on working with Python's NumPy, Pandas and Matplotlib libraries	2.1 Develops programs to create and visualize data sets in an integrated Python workbench
		2.2 Uses libraries for working with data in Python
		2.3 Develops applications that are understandable to both developers and users
	3. (functional) Development of programs of various levels of complexity: from a simple console to a product of academic and industrial significance	3.1 Able to connect to databases and files to input and output information
		3.2 Able to configure application configurations
		3.3 Can create applications in Python
	4. (system) Creation of complex multifunctional applications	4.1 Creates application diagrams with methods for processing and storing information
		4.2 Creates interactions between various structural elements
	5. (system) Creating web applications in Python	5.1 Creates a new web application
		5.2 Connects the database to the web application
		5.3 Changes the design of a web application using a style sheet
Prerequisites	IT-infrastructure; Object-oriented programming; Foundations of Information Systems	

Postrequisites	Models and Methods of Intellectual Information Systems; IS innovations and new technologies
Learning Resources	**Literature: main, additional.** 1. Python for Everybody: Exploring Data in Python 3 by Dr. Charles Russell Severance, Sue Blumenberg, Elliott Hauser, Aimee Andrion , 2016. 2. Python Cookbook: Recipes for Mastering Python 3 3rd Edition, Kindle Edition by David Beazley, Brian K. Jones, 2013. 3. Programming in C# for beginners. Basic information. Alexey Vasiliev, 2018. 4. C# 7 programming language and .NET and .NET Core platforms. Andrew Troelsen, Philip Jepix, 2022. 5. Learning Python 5ed: Powerful Object-Oriented Programming, Mark Lutz, 2013. 6. Fluent Python: Clear, Concise, and Effective Programming, Luciano Ramalho, 2015. 7. Natural Language Processing with Python and Spacy: A Practical Introduction, Yuli Vasiliev , 2021 8. Learning Scientific Programming with Python, Christian Hill, 2021 **Research infrastructure** 1. Business incubator № 12 2. Laboratory room 517 3. Laboratory room 323 4. Laboratory room 514 **Internet resources** 1. Python Exercises, Practice, Solution – https://www.w3resource.com/python-exercises/ 2. Programming site – https://metanit.com/python/tutorial/1.1.php 3. Free Python course for beginners – https://code-basics.com/ru/languages/python 4. Python. Introduction to Programming – https://younglinux.info/python/course 5. Python tutorial – https :// pythonworld . ru / samouchitel - python **Software** 1. Python IDE 2. Anaconda Navigator Python 3. Microsoft Visual Studio 4. SQL Lite 5. Microsoft SQL Server 6. Microsoft Office Word 7. WinRAR 8. WordPad 9. Power Point 10. Adobe Reader

Academic course policy	The academic policy of the course is determined by the Academic Policy and the Policy of Academic Integrity of Al-Farabi Kazakh National University . Documents are available on the main page of IS Univer . **Integration of science and education.** The research work of students, undergraduates and doctoral students is a deepening of the educational process. It is organized directly at the departments, laboratories, scientific and design departments of the university, in student scientific and technical associations. Independent work of students at all levels of education is aimed at developing research skills and competencies based on obtaining new knowledge using modern research and information technologies. A research university teacher integrates the results of scientific activities into the topics of lectures and seminars (practical) classes, laboratory classes and into the tasks of the IWST, IWS, which are reflected in the syllabus and are responsible for the relevance of the topics of training sessions and assignments. **Attendance.** The deadline for each task is indicated in the calendar (schedule) for the implementation of the content of the course. Failure to meet deadlines results in loss of points. **Academic honesty.** Practical/laboratory classes, IWS develop the student's independence, critical thinking, and creativity. Plagiarism, forgery, the use of cheat sheets, cheating at all stages of completing tasks are unacceptable. Compliance with academic honesty during the period of theoretical training and at exams, in addition to the main policies, is regulated by the "Rules for the final control" , "Instructions for the final control of the autumn / spring semester of the current academic year" , "Regulations on checking students' text documents for borrowings". Documents are available on the main page of IS Univer. **Basic principles of inclusive education.** The educational environment of the university is conceived as a safe place where there is always support and equal attitude from the teacher to all students and students to each other, regardless of gender, race / ethnicity, religious beliefs, socio-economic status, physical health of the student, etc. All people need the support and friendship of peers and fellow students. For all students, progress is more about what they can do than what they can't. Diversity enhances all aspects of life.

INFORMATION ABOUT TEACHING, LEARNING AND ASSESSMENT

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

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

Assessment Methods

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

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

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

Formative and summative assessment	Points % content
Activity at lectures	0
Work in practical classes	25
Independent work	25
Design and creative activity	10
Final control (exam)	40
TOTAL	100

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

A week	Topic name	Number of hours	Max. ball
	MODULE 1 Python Programming Basics		
1	L 1. Introduction to Python	1	0
	PC 1. Working with simple mathematical operations	1	3
	LC 1. Basic operations with numbers	4	3
2	L 2. Programming in Python	1	0
	PC 2. Working with importing various modules	1	3
	LC 2. Python Input and Output	4	3
	IWST 1. Consultations on the implementation of IWS 1 on the topic "Implementation of a project with basic operations in Python"		
3	L 3. Variables, Expressions, and Statements	1	0
	PC 3. Implementation of conditional execution with if, elif, else operators	1	3
	LC 3. for and while loops	4	3
	IWST 2. Passing IWS1	1	0
4	L 4. Conditional Expressions	1	3
	PC 4. Implementation of random number generation operations	4	3
	LC 4. Implementation of functions		25
5	L 5. Functions	1	0
	PC 5. Creating multiple functions that return values	1	3
	LC 5. Strings	4	3
	IWST 3. Consultation on the implementation of IWS2 on the topic "Creating an application for working with data"		
	MODULE 2 Working with Data Structures in Python		
6	L 6. Loops and iterations	1	0
	PC 6. Performing operations with lists: getting values by index, selecting by range of values, merging lists	1	3
	LC 6. Lists	4	4
7	L 7. Strings	1	0
	PC 7. Implementation of various string operations: concatenation, substring extraction, obtaining the length of a string	1	4
	LC 7. Lines	4	4

	IWST 4. Passing IWS2		30
Midterm control 1			**100**
8	L 8. Reading files	1	0
	PC 8. Getting data from files, writing new texts to a file	1	3
	LC 8. Sets	4	3
	IWST 5. Consultation on the implementation of IWS3 on the topic "Creating an application with objects and classes"		
9	L 9. Lists	1	0
	PC 9. Implementing a Counter Using a DateTime Object	1	3
	LC 9. DateTime objects	4	3
10	L 10. Dictionaries	1	0
	PC 10. Implementation of a program using multiple classes and objects	1	3
	LC 10. Classes and objects in Python	4	3
	IWST 6. Passing IWS 3		15
MODULE 3 Working with Python Libraries			
11	L 11. Tuples	1	0
	PC 11.	1	3
	LC 11. Operations with NumPy	4	3
	IWST 7. Consultation on implementation of IWS4 on the topic "Creating an application with the NumPy and Matplotlib libraries"		
12	L12. Regular Expressions	1	0
	PC 12. Implementing Mathematical Calculations Using the NumPy Library	1	3
	LC 12. Operations with Pandas	4	3
13	L 13. Python objects	1	0
	PC 13. Plotting Visuals in Python Using Matplotlib	1	3
	LC 13. Maplotlib	4	2
	IWST 8. Passing IWST 4		20
14	L 14. Relational Databases and PostgreSQL	1	0
	PC 14. Performing database creation, reading, and writing operations using Python	1	3
	LC 14. Python Applications with PostgreSQL	4	3
	IWST 9. Consultations on the implementation of IWS 5 on the topic "Development of a multifunctional application on Django"		
15	L 15. Receiving and visualizing data	1	0
	PC 15. Development of an application for creating a visual display of data	1	2
	LC 15. Django Framework	4	2
	IWST 10. Passing IWST 5		20
Midterm control 2			**100**
Final control (exam)			**100**
TOTAL for course			**100**

RUBRICATOR OF THE SUMMATIVE ASSESSMENT

CRITERIA FOR ASSESSING LEARNING RESULTS

IWS1. Implementation of a project with basic operations in Python (25% of 100% MC1)

Criterion	"Great" 21-30%	"Fine" 11-20%	"Satisfactory" 6-10%	"Unsatisfactory" 0-5%
Knowledge and understanding of the basic elements of the Python languages	Understanding the degree of relevance, relevance and reliability of the data found. Knowledge and understanding of all basic elements and operations of the Python languages	Understanding the degree of relevance, relevance and reliability of the data found. Knowledge of most Python operations	Limited understanding of the appropriateness, relevance, and validity of Python language elements and operations	Superficial understanding/lack of understanding of the degree of relevance, relevance and reliability of the data found. Lack of knowledge of Python elements and operations
Coding skills	Clear and clear presentation of the program code, absence of syntax errors in the code	There are small logical errors in the program code	A large number of logical and syntax errors in the program code, which make it practically unworkable	No code or just a few lines of code
Writing a report	The writing demonstrates clarity, conciseness, accuracy.	The writing demonstrates clarity, conciseness, and correctness. Mostly no errors.	There are some key errors in the writing and the clarity needs improvement.	The writing is unclear, and it is difficult to follow the content. Lots of errors in the text

IWS2. Creating an application for working with data (30% of 100% MC1)

Criterion	"Great" 26 - 30%	"Fine" 16-25%	"Satisfactorily" 6-15%	"Unsatisfactory" 0-5%
Working with data in the application	Understand compliance, relevance, reliability of the data in application. Knowledge understanding of all basic database connection operations in Python	Understanding the degree of relevance, andrelevance, and reliability of the data in the reliability of the data found. Knowledge and Knowledge of most Python database operations	Limited understanding of the consistency, andrelevance, and validity of Python databaseconnection operations	Superficial understanding/lack of understanding of the degree of compliance, relevance, and reliability of working with databases. Lack of knowledge of database connection operations in Python

	"Great" 11 – 15%	"Fine" 6 – 10%	"Satisfactory" 3 - 5%	"Unsatisfactory" 0-2%
Coding skills	Clear and clear presentation of program code, absence of syntax errors in the code	There are small logical errors in the program code	A large number of logical and syntax errors in the program code , which make it practically unworkable	No code or just a few lines of code
Writing a report	The writing demonstrates clarity, conciseness, and accuracy.	The writing demonstrates clarity, conciseness, and correctness. Mostly no errors.	There are some key errors in the writing and the clarity needs improvement.	The writing is unclear, and it is difficult to follow the content. Lots of errors in the text

IWS3. Creating an application with objects and classes (15% of 100% MC2)

Criterion	"Great" 11 – 15%	"Fine" 6 – 10%	"Satisfactory" 3 - 5%	"Unsatisfactory" 0-2%
Knowledge of solutions to test tasks	Full understanding of all test tasks and correct answers to them	Almost complete understanding of test items and answers to them	Partial understanding of test items	Lack of understanding of test tasks and answers to questions asked
Writing program code for test tasks	Clear and clear presentation of the program code, absence of syntax errors in the code	There are small logical errors in the program code	A large number of logical and syntax errors in the program code , which make it practically unworkable	No code or just a few lines of code
Writing a report	The writing demonstrates clarity, conciseness, and accuracy.	The writing demonstrates clarity, conciseness, and correctness. Mostly no errors.	There are some key errors in the writing and the clarity needs improvement.	The writing is unclear, and it is difficult to follow the content. Lots of errors in the text

IWS4. Creating an application with the NumPy and Matplotlib libraries (20% of 100% MC2)

Criterion	"Great" 16-20%	"Fine" 11-15%	"Satisfactory" 6-10%	"Unsatisfactory" 0-5%
Knowledge and understanding of Python's NumPy and Matplotlib libraries	Understand the consistency, relevance, and reliability of working with Python libraries. Knowledge and understanding of all basic operations Python libraries	Understand the consistency, relevance, and reliability of working with Python libraries. Knowledge and understanding of most of all basic Python library operations	Limited understanding of basic Python library operations	Superficial understanding/lack of understanding basic Python library operations

Coding skills	Clear and clear presentation of the program code, absence of syntax errors in the code	There are small logical errors in the program code	A large number of logical and syntax errors in the program code, which make it practically unworkable	No code or just a few lines of code
Writing a report	The writing demonstrates clarity, conciseness, and accuracy.	The writing demonstrates clarity, conciseness and correctness. Mostly no errors.	There are some key errors in the writing and the clarity needs improvement.	The writing is unclear and it is difficult to follow the content. Lots of errors in the text

IWS 5. Development of a multifunctional application on Django (20% от 100% MC2)

Criterion	"Great" 16-20%	"Fine" 11-15%	"Satisfactory" 6-10%	"Unsatisfactory" 0-5%
Knowledge and understanding of developing a feature-rich application in Django	Understanding the compliance, relevance, and reliability of a feature-rich Django app	Understanding the compliance, relevance, and reliability of a feature-rich Django app	Limited understanding of basic operations aof a feature-rich Django application	lack of understanding of the basic operations of a feature-rich Django application
Programming coding skills	Clear and concise presentation of program code, absence of syntax errors in the code	There are minor logical errors in the program code.	A large number of logical and syntactic errors in the program code, which make it practically inoperable	No program code or few lines of code
Writing a report	Writing demonstrates clarity, conciseness and correctness.	Writing demonstrates clarity, conciseness, and correctness. There are mostly no errors.	There are some key errors in the letter and clarity, the clarity needs to be improved.	Writing is unclear, difficult to follow the content. Many errors in the text

Acting Dean _____ **Turar O.N.**

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Head of Department _____ **Shormakova A.N.**

Lecturer _____ **Karyukin V.I.**