**Syllabus**

**Fall semester 2021-2022 у.г.**

**On the educational program «6B06102 – Information systems»**

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| **Code of the discipline** | **Name of the discipline** | | **ISW** | **A number of hours in a week** | | | | | | **A number of credits** | | **ISWT** | |
| **Lecture** | | **Practice** | | **Laboratory** | |
| PYP 3221 | Introduction to Python programming | | 6 | 15 | |  | | 30 | | 3 | | 6 | |
| **Academic information about the course** | | | | | | | | | | | | | |
| Type of studying | Type of the course | | Type of the lecture | | Type of the practice | | | | A number of ISW | | Type of the final control | | |
| Offline / Online | Theoretical, practical | | Problem oriented | | Learning the concepts of Python programming language and implementing programs to strengthen practical skills | | | | 6 | | Written exam | | |
| **Lecturer** | Karyukin Vladislav Igorevich | | | | | | | | **Office hour** | | According to the schedule | | |
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| **Laboratory work** | Karyukin Vladislav Igorevich | | | | | | | |  | |  | | |
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| **Academic presentation of the course** | | | | | | | | | | | | | |
| **The purpose of the course**  This course is aimed at studying the concepts of Python programming language, as well as understanding their practical implementation by solving real-life practical problems of varying complexity. | | **Expected results of studying (RS)** | | | | | Indicators of achieving RS (for each RS at least 2 indicators) | | | | | | |
|  | | **RS1** (cognitive) Know theoretical and methodological concepts of Python | | | | | * 1. – the ability to build basic and advanced programs in Python   2. – know the features of classes and objects, as well as OOP paradigms: inheritance, encapsulation, polymorphism and abstraction | | | | | | |
| **RS2** (functional) Apply knowledge of working with NumPy, Pandas, and Matplotlib libraries | | | | | 2.1 - create programs for building and visualizing datasets in the Python integrated working environment  2.2 - develop multifunctional applications that are well understood by both developers and users | | | | | | |
| **RS3 (functional)** Development of the programs of various levels of complexity: from simple console to a product of academic and industrial importance | | | | | 3.1 - be able to connect to databases and files for input and output of information 3.2 – creating Python applications | | | | | | |
|  | |  | | | | |  | | | | | |
| **RS 4 (system)** Creation of complex multifunctional applications | | | | | 4.1 - create application diagrams with methods for processing and storing information 4.2 - building the interaction of various structural elements with each other | | | | | |
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| Prerequisites and postrequisites | | **Prerequisites:** The foundations of Information systems  **Postrequisites:** Python web applications in Django and Flask | | | | | | | | | | |
| Литература и ресурсы | | Literature:  **Main:** Python for Everybody: Exploring Data in Python 3 by Dr. Charles Russell Severance, Sue Blumenberg, Elliott Hauser, Aimee Andrion, 2016Python Cookbook: Recipes for Mastering Python 3 3rd Edition, Kindle Edition by David Beazley, Brian K. Jones, 2013Advanced Python Development: Using Powerful Language Features in Real-World Applications 1st ed. Edition by Matthew Wilkes, 2021 **Additional:**   1. Natural Language Processing with Python and spaCy: A Practical Introduction, Yuli Vasiliev, 2021 2. Learning Scientific Programming with Python, Christian Hill, 2021   **Resources**  **- Software and internet resources:**  Python IDE, Anaconda Navigator Python, Microsoft Visual Studio, SQL Lite, Microsoft SQL Server, Microsoft Office Word, WinRAR, WordPad, Power Point, Adobe Reader, Paint.  **Online availability**: additional study materials, homework assignments and projects can be found in EMCD at univer.kaznu.kz. | | | | | | | | | | |
| Academic policy of the course in the context of university moral and ethical values | | **Rules of academic conduct**: 1. For each classroom session, you should prepare in advance according to the schedule below. The preparation of the assignment should be completed before the classroom session where the topic is discussed. 2. Academic values: 1. IWS laboratory exercises should be independent, creative. 2. Plagiarism, forgery, the use of cheat sheets, cheating at all stages of knowledge control are inadmissible Students with disabilities can receive consulting assistance by email - vladislav.karyukin@gmail.com | | | | | | | | | | |
| Evaluation policy | | **Criteria evaluation**: assessment of learning outcomes in relation to descriptors (checking the formation of competencies at midterm control and exams). **Summative evaluation**: assessment of the activity of work in the classroom; assessment of the completed assignment. | | | | | | | | | | |

**Academic calendar and the content of the course**

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| Week | A name of the topic | RS | ID | A number of hours | Maximum points | Knowledge evaluation form | A form of classes / platform |
| 1 | **L1.** Introduction to Python | RS1 | ID 1.1. | 1 | 0 |  | Classroom, video lecture in MS Teams |
| 1 | **LW1**. Basic operations with numbers | RS1 | ID 1.1 | 2 | 10 | A report in Word file | Classroom, webinar in MS Teams |
| 2 | **L2.** Python programming | RS1 | ID 1.1 | 1 | 0 |  | Classroom, video lecture in MS Teams |
| 2 | **LW2.** Python input and output | RS1 | ID 1.1 | 2 | 10 | A report in Word file | Classroom, webinar in MS Teams |
| 3 | **L3.** Variables, expressions and statements | RS1 | ID 1.1 | 1 | 0 |  | Classroom, video lecture in MS Teams |
| 3 | **LW3**. For and while loops | RS1 | ID 1.1 | 1 | 10 | A report in Word file | Classroom, webinar in MS Teams |
| 3 | **ISWT1.** Consultation on doing ISW1 |  |  |  | 0 |  | Classroom, webinar in MS Teams |
| 3 | **ISW1.** Implementation of project with basic operations in Python | RS1 | ID 1.1 |  | 25 |  | Classroom, webinar in MS Teams |
| 4 | **L4.** Conditional expressions | RS1 | ID 1.1 | 1 | 0 |  | Classroom, video lecture in MS Teams |
| 4 | **LW4**. Implementing functions | RS1 | ID 1.1 | 2 | 10 | A report in Word file | Classroom, webinar in MS Teams |
| 5 | **L5.** Functions | RS1 | ID 1.1 | 1 | 0 |  | Classroom, video lecture in MS Teams |
| 5 | **LW5.** Strings | RS1 | ID 1.1 | 2 | 10 | A report in Word file | Classroom, webinar in MS Teams |
| 5 | **ISWT2.** Consultation on doing ISW 2 |  |  |  | 0 |  | Webinar in MS Teams |
| 5 | **ISW 2.** Implementation of project with functions, conditions and loops in Python | RS1 | ID 1.1 |  | 25 | A report in Word file | Classroom, webinar in MS Teams |
| 5 | **BC 1** |  |  |  | 100 |  |  |
| 6 | **L6.** Loops and iterations | RS1 | ID 1.1 | 1 | 0 |  | Classroom, video lecture in MS Teams |
| 6 | **LW6.** Lists | RS1 | ID 1.1 | 2 | 10 | A report in Word file | Classroom, webinar in MS Teams |
| 7 | **L7.** Strings | RS1 | ID 1.1 | 1 | 0 |  | Classroom, video lecture in MS Teams |
| 7 | **LW7.** Strings | RS1 | ID 1.1 | 1 | 10 |  | Classroom, video lecture in MS Teams |
| 7 | **ISWT 3.** Consultation on doing ISW3 |  |  |  | 0 |  | Classroom, webinar in MS Teams |
| 7 | **ISW 3.** Implementation of project with lists and strings | RS1 | ID 1.1 |  | 25 | A report in Word file | Classroom, webinar in MS Teams |
| 8 | **L8.** Reading files | RS1 | ID 1.1 | 1 | 0 |  | Classroom, video lecture in MS Teams |
| 8 | **LW8**. Sets | RS1 | ID 1.1 | 2 | 10 | A report in Word file | Classroom, webinar in MS Teams |
| 9 | **L9.** Lists | RS1 | ID 1.1 | 1 | 0 |  | Classroom, video lecture in MS Teams |
| 9 | **LW9.** Datetime objects | RS1 | ID 1.2 | 2 | 10 | A report in Word file | Classroom, webinar in MS Teams |
| 9 | **ISWT 4.** Consultation on doing ISW 4 |  |  |  | 0 |  | Classroom, webinar in MS Teams |
| 9 | **ISW 4.** Implementation of project with classes | RS1  RS3  RS4 | ID 1.2  ID 3.2  ID 4.1  ID 4.2 |  | 25 | A report in Word file | Classroom, webinar in MS Teams |
| 10 | **L10.** Dictionaries | RS2 | ID 1.1 | 1 | 0 |  | Classroom, video lecture in MS Teams |
| 10 | **LW10.** Classes and objects in Python | RS1 | ID 1.2 | 2 | 10 | A report in Word file | Classroom, webinar in MS Teams |
| 10 | **МТ (Midterm Exam)** |  |  |  | 100 |  |  |
| 11 | **L11.** Tuples | RS1 | ID 1.2 | 1 | 0 |  | Classroom, video lecture in MS Teams |
| 11 | **LW11.** Operations with NumPy | RS2 | ID 2.1 | 2 | 10 | A report in Word file | Classroom, webinar in MS Teams |
| 12 | **L12.** Regular expressions | RS1  RS3  RS4 | ID 1.1  ID 3.2  ID 4.1 | 1 | 0 |  | Classroom, video lecture in MS Teams |
| 12 | **LW12.** Operations with Pandas | RS2  RS3  RS4 | ID 2.1  ID 3.2  ID 4.1 | 2 | 10 | A report in Word file | Classroom, webinar in MS Teams |
| 13 | **L13.** Python objects | RS1 | ID 3.1  ID 3.2 | 1 | 0 |  | Classroom, video lecture in MS Teams |
| 13 | **LW13.** Matplotlib 1 | RS2 | ID 2.1  ID 2.2 | 2 | 10 | A report in Word file | Classroom, webinar in MS Teams |
| 13 | **ISWT 5.** Consultation on doing ISW 5 |  |  |  | 0 |  | Webinar in MS Teams |
| 13 | **ISW5.** Creating an application with NumPy and Matplotlib libraries | RS 2  RS 3  RS 4 | ID 2.1  ID 3.2  ID 4.1 |  | 25 | A report in Word file | Classroom, webinar in MS Teams |
| 14 | **L14.** Relational databases and SQL Lite | RS3 | ID 3.1  ID 3.2 | 1 | 0 |  | Classroom, video lecture in MS Teams |
| 14 | **LW14.** Matplotlib 2 | RS2 | ID 2.1  ID 2.2 | 1 | 10 | A report in Word file | Classroom, webinar in MS Teams |
| 15 | **L15.** Retrieving and visualizing data | RS2 | ID 2.1  ID 2.2 | 1 | 0 |  | Classroom, video lecture in MS Teams |
| 15 | **LW15.** Python applications with SQL Lite | RS3  RS4 | ID 3.1  ID 4.1  ID 4.2 | 1 | 10 | A report in Word file | Classroom, webinar in MS Teams |
| 15 | **ISWT 6.** Consultation on ISW 6 |  |  |  | 0 |  | Webinar in MS Teams |
| 15 | **ISW 6.** Creating applications with databases | RS3  RS4 | ID 3.1  ID 4.1  ID 4.2 |  | 25 | A report in Word file | Classroom, webinar in MS Teams |
|  | **BC 2** |  |  |  | 100 |  |  |

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