# RTU Course "Programming Language Python"

## 0L000 Academy of Liepaja

*General data*

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| Code | LA1465 |
| Course title | Programming Language Python |
| Course status in the programme | Compulsory/Courses of Limited Choice |
| Responsible instructor | Dzintars Tomsons |
| Volume of the course: parts and credits points | 1 part, 3.0 credits |
| Language of instruction | LV, EN |
| Annotation | During the current course, students learn the programming language Python as a second programming language. In the classes, students improve their knowledge and skills for using the basic constructions of algorithms (branches, cycles, functions, etc.) and data structures (lists, queues, stacks, binary trees, etc.) to solve various programming tasks. Separate lessons are devoted to data visualization using Python. |
| Goals and objectives of the course in terms of competences and skills | The goal of the course is to provide knowledge of the programming language Python and improve students' programming skills.<br>The objectives of the course:<br>1. to strengthen knowledge of the basic constructions of algorithms and programming languages and the simplest methods of structuring data and program code, to improve skills of programmiņg using Python.<br>2. to improve skills in creating and using dynamic data structures in Python.<br>3. to improve data processing and visualization skills using Python. |
| Structure and tasks of independent studies | Programming in Python<br>After each lesson, students must complete 1-2 tasks according to the topic of the lesson. |
| Recommended literature | Obligātā/ Obligatory:<br>1. E-studiju vidē (estudijas.rtu.lv) pieejamais nodarbību materiāls<br><br>Papildu/ Additional:<br>1. Lambert, Kenneth A. Fundamentals of Python – Course Technology, Cengage Learning, 2010. xxviii, 915 p.<br><br>Citi informācijas avoti/ Other sources of information:<br>1. Python Tutorial, [Elektroniskais resurss] – Tiešsaites raksts. – [b.v., cplusplus.com, b.g.] – Pieejas veids: tīmeklis – https://www.tutorialspoint.com/python/index.htm<br>2. Python Tutorial, [Elektroniskais resurss] – Tiešsaites raksts. – [b.v., cplusplus.com, b.g.] – Pieejas veids: tīmeklis – https://www.w3schools.com/python/<br>3. Real Python Tutorials, [Elektroniskais resurss] – Tiešsaites raksts. – [b.v., cplusplus.com, b.g.] – Pieejas veids: tīmeklis – https://realpython.com/ |
| Course prerequisites | - |

*Course contents*

| Content | Full- and part-time intramural studies | | Part time extramural studies | |
|---|---|---|---|---|
| | Contact Hours | Indep. work | Contact Hours | Indep. work |
| Specifics of the Python programming language.<br>Preparing the workplace for working with Python.<br>Data input and output commands.<br>Working with variables.<br>Branch and selection constructs, conditionals, and logical operators in Python | 2 | 2 | 0 | 0 |
| Loop constructions in the Python programming language. One-dimensional arrays and lists. Multidimensional arrays | 2 | 4 | 0 | 0 |
| Creating functions. Recursive functions | 2 | 4 | 0 | 0 |
| Data processing. Data input and output to text files. | 2 | 6 | 0 | 0 |
| Adding additional modules to the Python environment. Working with the data processing module NumPy.<br>Graphic ploting of data using Matplotlib | 4 | 8 | 0 | 0 |
| Data processing. Visualization of function graphs and time series using the Tkinter module | 2 | 6 | 0 | 0 |
| Data processing. Calculation error handling. | 2 | 6 | 0 | 0 |
| Data processing. Working with Python and Microsoft Excel files | 2 | 6 | 0 | 0 |
| Data processing. Working with JSON data structures | 2 | 6 | 0 | 0 |
| Data structures in Python | 2 | 6 | 0 | 0 |
| Retrieve and processing of geographic data using the Python | 2 | 6 | 0 | 0 |
| Total: | 24 | 60 | 0 | 0 |

*Learning outcomes and assessment*

| Learning outcomes | Assessment methods |
|---|---|
| Knowledge:<br>Knows the Python programming language at the application level;<br>Knows the basic constructions of data structures and algorithms at the application level and their implementation in the Python programming language. | After each lesson, students must complete 1-2 tasks according to the topic of the lesson. |
| Skills:<br>Able to compile and debug Python programs.<br>Able to evaluate the situation and select the most suitable basic structure of the programming language.<br>Able to create data processing algorithms, perform numerical calculations, evaluate measurement accuracy and plot data graphically.<br>Able to read data from external files and display the data obtained as a result of program operation as text, numbers, images or diagrams in an external fil.<br>Able to write Python program code, analyzing input and output data, constructing algorithms, creating a user interface, debugging programs and unit testing, analyzing the execution time of the program and optimizing it. | After each lesson, students must complete 1-2 tasks according to the topic of the lesson. |
| Competence:<br>Able to code, analyzing program execution time and optimizing it;<br>Able to code, documenting code. | After each lesson, students must complete 1-2 tasks according to the topic of the lesson. |

*Evaluation criteria of study results*

| Criterion | % |
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| The final grade ot hte current course has calculated as average rating of the solution of all independent tasks | 100 |
| Total: | 100 |

*Study subject structure*

| Part | CP | Hours | | | Tests | | |
|---|---|---|---|---|---|---|---|
| | | Lectures | Practical | Lab. | Test | Exam | Work |
| 1. | 3.0 | 12.0 | 12.0 | 0.0 | * | | |