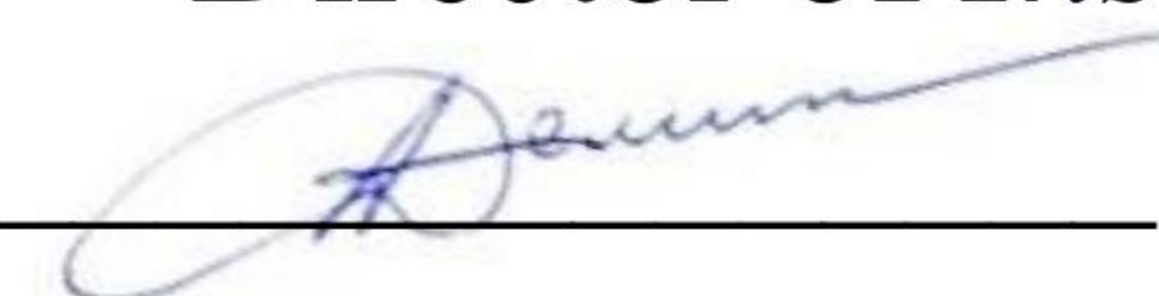


APPROVED BY

Director of *Institute of Cybernetics*

 / Dmitriy M. Sonkin

Programming languages (Python)

Field of Study: 09.04.04 Software Engineering

Programme name: Big data solutions

Level of Study: Master Degree Programme

Year of admission: 2019

Semester, year: first semester, first year

ECTS: 6

Total Hours: 216

Contact Hours: 64

- **Lectures:** 24
- **Labs:** 40
- **Practical experience:** 0

Assessment: exam, term project

Department: Software engineering

Head of Department

 / V.S. Sherstnev

Instructor(s)

 / I.A. Zaikin

Programming languages (Python)

Course Overview

Course Objectives	The objective of this course is to learn Python and its libraries that are commonly used for data analysis
Learning Outcomes	Students will be able to manipulate data, clean and visualize it in IPython/Jupyter environment
Course Outline	This course covers features of the Python language as well as processing, cleaning, and visualizing data in Python using the following libraries: NumPy, SciPy, pandas, matplotlib. Students will also get the hang of working with IPython/Jupyter interactive environment.
Prerequisites (if available)	Object-oriented programming
Course Structure	<ol style="list-style-type: none"> 1. Python basics 2. IPython/Jupyter environment 3. The NumPy library: N-dimensional array type ndarray and vectorized computation 3. The pandas library basics 4. Data loading, storage, and file formats 5. Cleaning, transforming, merging and reshaping data 6. Plotting and visualization with matplotlib 7. Data aggregation and group operations 8. Time series
Facilities and Equipment	Python 3.6 with IPython, Jupyter, NumPy, SciPy, pandas, matplotlib
Grading Policy	<p>In accordance with TPU rating system we use:</p> <ul style="list-style-type: none"> - Current assessment which is performed on a regular basis during the semester by scoring the quality of mastering of theoretical material and the results of practical activities (performance tests, tasks, problem solving). Max score for current assessment is 60 points, min – 40 points. - Course final assessment (exam) is performed at the end of the semester. Max score for course final assessment is 40 points, min – 22 points. <p>The final rating is determined by summing the points of the current assessment during the semester and exam scores at the end of the semester. Maximum overall rating corresponds to 100 points, min pass score is 55.</p> <p style="text-align: center;">Max score for current assessment of term project is 40 points. Max score for final assessment of term project is 60 points.</p>
Course Policy	Class attendance will be taken into consideration when evaluating students' participation in the course. Students are expected to actively engage in class discussions about the assigned readings.

Teaching Aids and Resources	Compulsory Readings: <ul style="list-style-type: none"> • Wes McKinney. Python for Data Analysis – 2013 Additional Readings: <ul style="list-style-type: none"> • Rick Muller. A Crash Course in Python for Scientists http://nbviewer.jupyter.org/gist/rpmuller/5920182 • Robert Johansson. Lectures on scientific computing with Python https://github.com/jrjohansson/scientific-python-lectures
Instructor (-s)	Ivan Zaikin < zaikin@tpu.ru >