

1. Description and aims

Nowadays programming language proficiency is no longer an advantage – it’s a must for success in work. Excel and Python are in constant use among financial employees (consultants, auditors, traders), HR professionals, designers, architects and people from all walks of life. In contrast to analytical and mathematical thinking, programming is an easy-to-learn skill. Learned at least the basics of Python and Excel, the scope of tasks that you’ll be capable to manage with will expand overwhelmingly as well as the number of headhunters interested in your resume.

The course is designed for those interested in acquaintance with the possibilities of modern computer tools. The lessons will suit the purposes of both experienced and amateurs (unless you possess a degree in computer science). Not only will you learn how to code or use complex formulas, but also will it become clear what extensions might prove useful, what software to learn in addition and what kind of robots to expect in the nearest future. During this course hardly is it possible to become a professional programmer. However, one can easily disclose the magic of working with big data, apply modelling and hypothesis testing in practice or lay the ground for further research.

Access to a computer, readiness to use Google and sparking eyes is the basic requirement.

After the course students will learn the following features in Excel:

- Basic understanding of Excel features and its functionality
- Most widely used functions
- Analyzing data with Excel
- Visualizing data with Excel
- VBA basics

Not to forget the scope of knowledge covered in Python part:

- Where to code, how to store and run it
- What peculiarities of syntaxis to bear in mind
- How to process data and extract output
- What to use additional packages for
- How to add practical meaning to a set of commands

2. Grade evaluation

The course consists of two parts with 5 lessons in each. At the end of the program students will sit an open-book exam requiring employment of both Excel and Python skills. The exam will be evaluated on a 10-point scale and take time of 1.5 lessons. Classes will consist of theory and practice (about 20 and 80 % of a lesson time respectively).

Learners are expected to complete home assignments after each lesson, that will be graded on a 10-point scale. After the deadline of sending work, examples with solutions will be posted. Homework will be handed in via e-mail, statistics with the class performance will be available in a shared Google Sheets document.

$$GRADE = 0.6 * HA + 0.4 * EXAM$$

1. Course structure

№		Topic:	Contents:	Self-study (hours)
1	<i>Excel</i>	Introduction and first steps	Entering and editing worksheet data, essential worksheet operations, working with cells and ranges, worksheet formatting, using custom number formats	2
2		Functions and formulas	Formulas that manipulate text, working with dates and times, look up functions, financial functions, array functions	3
3		Analyzing data	Cleaning data, pivot tables, what-if analysis, goal seeking and solver, analysis ToolPak, formulas that count and sum (COUNTIF, COUNTIFS, SUMIF, SUMIFS, AVERAGEIF, DSUM, DCOUNT, DAVERAGE)	2
4		Visualizing data	Learning advanced charting, conditional formatting, sparkline graphics, data validation	1
5		Visual Basic for Application	Introduction to VBA, creating custom worksheet functions, creating UserForms, VBA examples	3
6	<i>Python</i>	Introduction and first steps	Development environments (Jupyter Notebook, Pycharm), variables data types (string, integer, boolean etc.), simple mathematical operations (sum, product, power etc.), data input and output inside a program.	3
7		Iteration algorithms	Loops (for, while), conditions (if, elif, else), functions (returning data and not, their usage within loops or containing loops), error catching, classes and subclasses, overriding.	4
8		Further inputs	Opening a file and reading the data inside, writing in this file some data, extracting useful features of the stored data (statistical information, data type).	4
9		Further outputs	Drawing graphs using additional packages (matplotlib, seaborn), working with tables (pandas), creating and editing pdf-files.	5
10		Outer world connection	Receiving data from websites (parsing with the aid of requests, beautifulsoup), access to social nets (requests, vk, vk_api, python-telegram-bot)	5
11		Exam preparation and further discussion	Revision of the covered material, solving advanced problems, disputing further development and programming usage	
12		Exam	Exam on four hours.	3

3. Additional academic literature

- Excel 2016 Bible by John Walkenbach
- Excel 2016 Formulas by Michael Alexander
- Excel 2016 Power Programming with VBA by Michael Alexander and Dick Kusleika
- Think Python 2nd Edition by Allen B. Downey
- Python Cookbook 3rd edition by David Beazley and Brian K. Jones