**Syllabus**

**Course title – Introduction to Coding in Python**

**Instructor** Miklós Koren

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Office QS B510 (Vienna) by appointment

**Credits**  1 US credits (2 ECTS credits)

**Module** Analytical Foundations Module

**Term**  Fall

**Course level** Master's

**Prerequisites**

**Course drop** As required in the MA in Economics regulations

**1. Course Description**

**Content.** This course teaches how to organize data and code on your computer, and how to write simple programs in Python to automate tasks.

**Relevance.** Quantitative research in economics and other social science requires effective use of computational tools. The tools and methods used in this course will be applied throughout other courses and the students' professional career. .

**2. Learning Outcomes**

**Key outcomes.** By the end of the course, students will be able to

- Understand folder structure. Perform operations in the command line on files in different folders.

- Automate repeating tasks with Python, using for loops and functions.

- Download data from the internet.

- Read and write data in various formats. Explore data and fix common data quality errors.

**Other outcomes.** The course will also help develop skills in the following areas.

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| **Learning Area** | **Learning Outcome** |
| Critical thinking | Evaluate and compare different computing tools and methods. |
| Quantitative reasoning | Explore and analyze a large number of observations from potentially many different sources. |
| Technology skills | Write short programs in Python.  Install and use packages in Python.  Use key programming tools in Python: functions, loops. |
| Interpersonal communication skills | Convey technical concepts verbally.  Collaborate with others on technical tasks. |
| Management knowledge and skills | Create software with many components.  Organize work components effectively.  Meet deadlines. |
| Cultural sensitivity and diversity | Work together with students of different backgrounds. |
| Ethics and social responsibility | Understand ethical and legal constraints of acquiring data.  Apply good practices of data protection. |

**3. Reading List**

**Required**

Paarsch and Golyaev, 2016. A Gentle Introduction to Effective Computing in Quantitative Research: What Every Research Assistant Should Know. MIT Press. (PG henceforth)

Koren, Miklós, Arieda Muço and András Vereckei, 2019a. “Introduction to the Command Line for Economics [website].” The Carpentries. https://datacarpentry.org/shell-economics/ (KMV\_shell henceforth)

**Recommended**

Sargent, Thomas J. and John Stachurski. 2020. Python Programming for Economics and Finance [website], https://python-programming.quantecon.org/index\_toc.html

Gentzkow, Matthew and Jesse M. Shapiro. 2014. Code and Data for the Social Sciences. https://web.stanford.edu/~gentzkow/research/CodeAndData.pdf

**4. Teaching Method and Learning Activities**

Learning objectives will be achieved through

- This is a participatory, experiential course. Students participate in live coding together with the instructor. This format facilitates quick and frequent feedback and enables students to achieve mastery in their computing skills.

**5. Assessment**

Grading will be based on the total score out of 100, in line with CEU’s standard grading guidelines.

- Class participation (40 percent)

- Take-home coding assignment (60 percent)

**6. Technical requirements**

- Personal laptop computer with administrative privileges to install open source software.

- Operating system: Windows 10+ or Mac OS X 10.8+, or Linux 2.6.18+

- git bash (Windows only), https://gitforwindows.org/

- Miniconda Python 3.8 distribution (note the version), https://docs.conda.io/en/latest/miniconda.html

- Internet access.

**7. Topic Outline and Schedule**

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| **Session** | **Topics** | **Readings** |
| 1 | Introduction to the command line | PG 2.1-2.3, KMV\_shell, Episode 1. |
| 2 | Navigating files and directories | KMV\_shell, Episodes 2-3 |
| 3 | Python fundamentals | PG 4.1-4.2 |
| 4 | Breaking up code into functions | PG 4.3.7 |
| 5 | Repeating tasks with for loops | PG 4.3.9-11 |
| 6 | Reading and writing files in different formats | PG 4.8 |

**8. Short Bio of the Instructor**

Miklós Koren is professor of economics at CEU, senior research fellow at the Institute of Economics, and research fellow of the Centre for Economic Policy Research. His research focuses on how talent and technology jointly determine business success. Professor Koren has more than two decades of experience with data and coding. He is a certified Carpentries Instructor.