**Syllabus**

**Course title ECBS 5241 – Coding for Economists**

**Instructor** Miklós Koren, Márton Fleck

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Office N13 213 (Budapest), N13 223 (Budapest) by appointment

**Credits**  2 US credits (4 ECTS credits)

**Module** Analytical Foundations Module

**Term**  Fall 2020-2021 2020-2021

**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, how to write simple programs in Python to automate tasks, and how to use Stata throughout the steps of the your research process.

**Relevance.** Quantitative research in economics and other social science requires an 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 and Stata scripts, using for loops and functions.

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

- Filter, aggregate, reshape, and combine data for analysis.

**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 and Stata.  Install and use packages in Python and Stata.  Use key programming tools in Python and Stata: 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)

Koren, Miklós, Arieda Muço and András Vereckei, 2019a. “Economics with Stata [website].” The Carpentries. https://datacarpentry.org/stata-economics/ (KMV\_Stata 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 instructors. 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

- Stata 16, free teaching licenses available upon request.

- 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 | Storing your data in lists and dictionaries | PG 4.3.3 |
| 7 | Reading and writing files in different formats | PG 4.8 |
| 8 | Data cleaning in Stata | KMV\_Stata, Episodes 1-2 |
| 9 | Transforming and combining data | KMV\_Stata, Episodes 3-4 |
| 10 | Save and Reuse your Work in .do Files | KMV\_Stata, Episode 5 |
| 11 | Repeat tasks with for loops | KMV\_Stata, Episode 6 |
| 12 | Finding and installing user-written Stata packages |  |

**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.

Márton Fleck is a PhD candidate in economics at CEU, and member of the CEU MicroData research group where he works with large administrative datasets using Python and Stata. His research interests are applied microeconomics, political economy, and industrial organization.