Applied LaTeX and Markdown for Social Science Research

Laboratorio de Investigación para el Desarrollo del Ecuador

Syllabus

Instructor: Daniel Sánchez, M.A.
Module length: 4 hours
Level: Introductory
GitHub repository: `https://github.com/laboratoriolide/applied-latex`

1 Course Description

This short module will introduce the use of the typographic system LaTeX, focusing on its applied use for social science research. Further, the short module introduces Markdown and its use in conjunction with data analysis software.

2 Contents

The following is a planned outline of the course. This may change depending on the pace of the class. Lecture materials will be uploaded to the module's GitHub repository.

2.1 Lecture 1: Introduction to LaTeX and document editing

- Introduction to LaTeX, what is it and what is it for?
- Brief history of LaTeX
- Preliminary issues
  - Hardware requirements
  - Installation of TeX distributions
  - Development environments (IDEs: VS Code, TeXMaker, etc.)
  - Overleaf: using LaTeX online
  - Identification of keyboard shortcuts and important keycaps
- LaTeX file structure
- Simple commands
- Packages
- Document classes
- Basic document formatting
- Text handling
  - Alignment

  - Lists
  - Titles, covers and abstracts
  - Indexes
  - Headers and footnotes

2.2 Lecture 2: Math mode, tables and figures

- Introduction to math mode
- Basic symbols and greek letters
- Equations
- Matrices
- Basic tables
- Automated table-making: Excel2LaTeX / Overleaf addins
- Including figures and subfigures

2.3 Lecture 3: Bibliography management with LaTeX, complex documents

- BibTeX and BibLaTeX
- Zotero integration
- Brief review of Mendeley, Citavi and other integrations
- Citation and bibliography formatting, styling
- Multi-file projects
- Cross-referencing
- Tips for error debugging
- Time-permitting: basic plotting with tikz and pgfplots

2.4 Lecture 4: Integration with statistical packages

- RMarkdown/Quarto
  - Basic Markdown syntax
  - R code chunks
  - Output formats
  - Use of LaTeX
- Presenting data analysis results with R
  - *stargazer*
  - *kableExtra*
  - *modelsummary*
  - *gt* and *flextable*
- Stata
  - *estout*
  - *outreg2*

2.5 Advanced topics (if time allows)

- Presentations with beamer and Quarto
- Advanced document formatting with classes
- Using LaTeX from Word
- *knitr/sweave*
- Codecogs
- Working with Python/Jupyter

3 Evaluation

Please consult the program's regulation manual for short module evaluation criteria. All communication will be done through the program's Slack channel.

4 Software

We will mostly rely on Overleaf. However, you must install a TeX distribution on your computer for local demonstrations. I recommend using TeXLive for Windows, Linux and macOS. An alternative is MiKTeX for Windows.

For editing, an integrated development environment (IDE) is recommended. TeX Maker is a good option for Windows, macOS and Linux.

5 Communication

All communication will be done through the program's Slack channel. I do not monitor email regularly, so please use Slack for any questions or concerns.

Bibliography

Frain, John C. Applied LATEX for Economists, Social Scientists and Others: TEP Working Paper No. 0214.

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Greenber, Harvey J. A Simplified Introduction to LaTeX.

Griffiths, David F., and Desmond J. Higham. *Learning Latex: Second Edition*. 2nd ed. Philadelphia: Society for Industrial and Applied Mathematics, 2016.

Kottwitz, Stefan. *LaTeX Beginner's Guide*. 1st ed. Birminghan: Pack Publishing, 2011.

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