POLSCI 514 - Intro to LaTex, R and Programming Logic

Instructor: Fabricio Vasselai (Fall 2018)

Friday 10am-12pm at room 7603, Haven Hall

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Office Hours: TBD after consulting class
Class at Canvas: https://umich.instructure.com/courses/243608
Class at Piazza: https://piazza.com/umich/fall2018/polsci514

Content summary:

The class will start by quickly covering what LaTeX is, why it is relevant (and nowadays even necessary) and the basics of how to use it. After that, all classes will be entirely devoted to learning R, an interpreted programming language specialized in statistics and data analysis (including visualization). We will cover basic topics and syntax assuming no previous contact with the language. Some less basic features will also be introduced, but advanced topics will only be quickly mentioned (and as time permits). I will make my best effort, however, to always point you in the right direction if for whatever reason (including your own research ideas, papers or other classes' projects) you need a given fancier technique.

Whenever possible, R concepts will be connected to general programming so students can start developing their broader skills. In fact, the philosophy of the course will be to teach students how to keep learning by themselves. The approach of the whole course will be quite hands-on and it will always keep in mind the needs of students to solve problems in the other quantitative methods classes they are usually enrolled in. As a matter of fact, many R topics will, on purpose, be illustrated using topics being taught on Polsci 599 (perhaps also 598). Often, examples will use the Monte Carlo method, so a quick intro to that will also be offered.

Topics covered:

(non-exhaustive list, approximately in order)

- Intro do LaTeX and TexStudio
- Customizing text in LaTeX
- R syntax
- R-packages
- using R-Studio
- good coding practices
- R data types and containers
- working with randomness in R
- Monte Carlo method
- for-loops, flow-control and functions in R
- user-defined function
- vectorized operations in R
- plotting in R

References:

There are no general required textbooks. Recommended or eventually required readings/videos will be mentioned whenever it applies. A good intro to LaTeX can be found at Wikibooks. On-line resources to learn R are extremely abundant. A nice free introductory R course can be found at Datacamp; a useful set of R intro lessons can also be found at this official YouTube account from The Learn R group.

Grading:

10% of the final grade will come from attendance and participation; 20% from short (surprise) in-class quizzes, 50% from homeworks and 20% from a final problem set. Almost every week there will be individual homework assigned and they will always be due one week after. Homeworks for this class **are to be done alone, without collaboration**. the lowest homework grade will be dropped - in exchange, no late submissions will be accepted. I will do my best to plan homeworks such that they don't get heavy when students have exams in Polsci 598 and Polsci 599. The final problem set will be just that - a list of exercises

that requires you to use things that you will have learned during all months. We will talk about whether it will be in class or to take home.

In all R exercises, your grade will depend on (a) completeness (whether you did all the requested job); (b) functionality (whether your code has the functionality it should have); (c) accuracy (whether you get approximately the correct answeres from your implementations); (d) code quality (whether you wrote quality code instead of anything that simply gets the job done); (e) code clarity (how readable your code is). A really relevant part of your grade will depend on code quality and code clarity, so I strongly recommend taking a look at Google's R Style Guide. I will also be talking about good coding practices all the time.

Class Canvas:

The class entry in the university's Canvas system should be your main point of connection to this course. There you will find all the class material, there you will submit your homework, find your grades and other info. There you can also find a list of past announcements that I have sent to the group. Please do check the class' Canvas site fairly regularly.

Communication:

Strictly all regular communication will happen via Piazza (which means not via email), a very handy on-line questions-and-answers platform. In Piazza, students can ask questions anonymously, both publicly and privately (although the latter should be saved only for discussing personal matters or when the question being asked contains part of a solution for a homework). This way, we centralize our communication and it makes it so that all questions and doubts you might have end up reaching all colleagues. Another neat feature of Piazza is that students can also answer to students. If questions there become frequent (as I hope), I will include a grade bonus for those who also frequently answer colleagues' questions.

Software:

Students are required to bring their laptops every class, with the following software installed:
- a LaTeX distribution (I strongly recommend MiKTeX)
- the LaTeX integrated writing environment called TeXStudio (you can use others, but then at your own risk)
- the R language
- the widely used R integrated development environment called R-Studio

In case you have any problems related to installing the above software, you can contact the Political Science department's CAP Lab's GSIs assigned for this Fall term, Anil Ramachandran Menon and James Newburg.

Disability Accommodations:

The Office of Services for Students with Disabilities (SSD) is located in G664 Haven Hall (763-3000, http://ssd.umich.edu/). SSD typically recommends accommodations through a Verified Individualized Services and Accommodations (VISA) form. Any information you provide is private and confidential and will be treated as such. If you need specific arrangements, please contact me directly via email rather soon.

Academic Integrity:

Here you find university's standards for academic and professional conduct:
http://www.rackham.umich.edu/current-students/policies/academic-policies/section11
Any breaches of academic integrity will be immediately reported both to the Political Science department and to university's relevant offices.