

# POLSCI 514

## The Use of Social Science Computer Programs

### Fall 2022

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The goal of this course is to acquire an applied knowledge of computational tools for political science research. This course also functions as a supplement to methods classes in the political science department that requires to use computational tools such as  $\text{\LaTeX}$  and R.

This course quickly introduces what  $\text{\LaTeX}$  and then focuses largely on learning and applying R, a programming language specialized in statistics, data analysis and visualization. Specifically, we will start with learning essential syntax in R (arithmetic, objects, loops, functions, etc), and tools to analyze data in R (import and export, subset, and summarize data). In addition, we also learn ways to random number generation, simulation, and data visualization. At the conclusion of this course, student will be able to confidently apply social science computer programs to construct, estimate, and evaluate systematically empirical representations of theoretical propositions about politics and their research.

## 1 Logistics

- Lectures: Fridays, 12:00AM – 2:00PM, Haven Hall 7603
- Office hours: Fridays, 10:00AM – 12:00PM, 5570 Haven Hall by appointment. Please sign up here [Link](#).

## 2 Software

It is highly recommended that students register and download the following systems before the classes begin. Also, **please bring your laptop to every class.**

- Overleaf: Overleaf is an online editor and compiler for  $\text{\LaTeX}$ . Please make an account before the first class starts.
- R: Download R language and R studio. R studio is an integrated development environment for R, and it is widely used among R users. Alternatively, you can use your preferred editor if you want.

### 3 Course Outline

Each class consists of a lecture and a practice session. In the lecture, I will explain the concepts and the codes about the topics we cover in the week. In the practice session, students will be learning by doing, that is, you write your own code. Students are strongly encouraged to ask questions and solve problems in class. In the practice session, you can ask questions not only about the topics we covered in the week, but also about other general issues in  $\LaTeX$  and R coding.

The following course outline is subject to change, depending on the schedules of POLSCI598 and POLSCI599.

09/02	Introduction to $\LaTeX$ and R basics
09/09	Objects and data structure
09/16	No Class
09/23	Random variables, plotting functions
09/30	Univariate analysis, logical operators and indicator functions
10/07	Bivariate analysis, loops and conditionals
10/14	Matrix operations
10/21	No Class
10/28	List, Array, Apply family
11/4	dplyr
11/11	ggplot
11/18	Estimation and hypothesis testing
12/02	Linear regression model
12/09	TBD

### 4 Grades

The final grades are based on the following items:

- **Participation** (30%): The rate of attendance and level of engagement in class and in Piazza discussions.
- **Problem sets** (70%): The performance of the problem sets. Students can complete the problem sets in class, or you can take home and submit by the deadline. Please submit the problem sets on Canvas (not emails). Collaboration is allowed, but please always try to work through a problem set first and then acknowledge the collaborators, if any. In the first two weeks, the problem sets are about  $\LaTeX$  and the rest of the week will be about R.

### 5 COVID Safety Protocols

Please follow the university's COVID-19 guidance. In particular, please stay home if you feel sick. This may change depending on the COVID situation over the semester and we will adjust protocols accordingly.

- **Class Attendance and Assignment Submission Flexibility:** Everyone should not hesitate to avoid attending a class in case there is any symptoms of COVID-19. Missing classes or submission deadlines due to infection prevention measures will not be penalized.

## 6 Other Course Policies

- **Student Sexual Misconduct Policy:** Title IX prohibits sex discrimination to include sexual misconduct: harassment, domestic and dating violence, sexual assault, and stalking. If you or someone you know has been harassed or assaulted, you can receive confidential support and academic advocacy at the Sexual Assault Prevention and Awareness Center (SAPAC). SAPAC can be contacted on their 24-hour crisis line, 734-936-3333 and online at [sapac.umich.edu](http://sapac.umich.edu). Alleged violations can be reported non-confidentially to the Office for Institutional Equity (OIE) at [institutional.equity@umich.edu](mailto:institutional.equity@umich.edu). Reports to law enforcement can be made to University of Michigan Police Department at 734-763-3434.<sup>1</sup>
- **Accommodations for Students with Disabilities:** If you think you need an accommodation for a disability, please let me know at your earliest convenience. Some aspects of this course, the assignments, the in-class activities, and the way the course is usually taught may be modified to facilitate your participation and progress. As soon as you make me aware of your needs, we can work with the Services for Students with Disabilities (SSD) office to help us determine appropriate academic accommodations. SSD (734-763-3000; <http://ssd.umich.edu>) 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.<sup>2</sup>
- **Religious-Academic Conflicts:** While the university does not observe religious holidays, it is the policy of the University of Michigan to make every reasonable effort to allow members of the university community to observe their religious holidays without academic penalty. Absence from classes or examinations for religious reasons does not relieve students from responsibility for any part of the course work required during the period of absence. Students who expect to miss classes as a consequence of their religious observance shall be provided with a reasonable alternative opportunity to make-up missed academic work. It is the obligation of students to provide faculty with reasonable notice of the dates on which they will be absent. When the absence coincides with an exam or other assignment due date, the options to make up that missed work may be limited and will be determined by the instructor within the boundaries of the respective class.<sup>3</sup>
- **Academic Misconduct:** The University of Michigan community functions best when its members treat one another with honesty, fairness, respect, and trust. The college promotes the assumption of personal responsibility and integrity, and prohibits all forms of academic dishonesty and misconduct. All cases of academic misconduct will be referred to the Office of the Assistant Dean for Undergraduate Education. Being found responsible for academic misconduct will usually result in a grade sanction, in addition to any sanction from the college. For more information, including examples of behaviors that are considered academic misconduct and potential sanctions, please see <https://lsa.umich.edu/lsa/academics/academic-integrity.html>.<sup>4</sup>
- **Student Mental Health and Wellbeing:** The University of Michigan is committed to advancing the mental health and wellbeing of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. For help, contact

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<sup>1</sup>This statement is taken from: <https://sapac.umich.edu/article/faculty-resources-sample-syllabus-language>.

<sup>2</sup>This statement is taken from: <https://ssd.umich.edu/article/syllabus-statement>.

<sup>3</sup>This statement is taken from: *Handbook for Faculty and Instructional Staff 2018*, p. 17.

<sup>4</sup>This statement is taken from: *Handbook for Faculty and Instructional Staff 2018*, p. 16.

*Counseling and Psychological Services (CAPS)* at (734) 764-8312 and <https://caps.umich.edu/> during and after hours, on weekends and holidays, or through its counselors physically located in schools on both North and Central Campus. You may also consult *University Health Service (UHS)* at (734) 764-8320 and <https://www.uhs.umich.edu/mentalhealthsvcs>, or for alcohol or drug concerns, see <https://www.uhs.umich.edu/aodresources>. For a listing of other mental health resources available on and off campus, visit: <http://umich.edu/~health>.<sup>5</sup>

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<sup>5</sup>This statement is taken from: *Handbook for Faculty and Instructional Staff 2018*, p. 16.