[PLSC 3XX - Section X]
COMPUTATIONAL SOCIAL SCIENCE:
EXPLORING BIG DATA INSIGHTS AND APPLICATIONS
[DEPARTMENT OF POLITICAL SCIENCE]
[UNIVERSITY]

Instructor: Elisa D'Amico
Term: Fall/Spring 202X
Course Dates: X
Office Hours: X

Email: edamico2@luc.edu
Days & Times: X
Course Location: X
Office: X

Course Description and Objectives

This course introduces students to the dynamic field of computational social science. Participants will acquire essential skills in collecting, cleaning, and rigorously analyzing social data utilizing diverse methods using machine learning techniques. A focal point of the course is the mastery of GIS, data scraping, and data extraction from APIs and pivotal social science sources. Ethical considerations in the realm of big data and artificial intelligence within the social sciences will be thoroughly explored and discussed. Participants will engage in hands-on learning through structured R programming assignments, enhancing their coding proficiency. Additionally, collaborative learning is fostered through a group project, wherein students will collaboratively design and develop advanced visualization from working data analyses. By delving into computational methods and responsible big data utilization, participants will learn to transform raw data into meaningful social insights, making this course a comprehensive and practical exploration of the field.

Students who complete this course will:

1. Develop Advanced Data Analysis Skills: Acquire essential skills in collecting, cleaning, and rigorously analyzing social data using diverse machine learning techniques, including geospatial (GIS) data analysis.

2. Master Data Extraction: Gain expertise in data scraping and extraction from APIs and pivotal social science sources for comprehensive data acquisition.

3. Navigate Ethical Challenges: Explore ethical dimensions of big data and artificial intelligence in social sciences, ensuring responsible and ethical data practices.

4. Excel in R Programming: Enhance coding skills through structured R programming assignments, enabling proficient data manipulation and analysis.

5. Collaborate for Advanced Visualization: Foster collaborative skills by designing and developing advanced visualizations from real-world data analyses, promoting effective teamwork and innovative data representation.

Required Texts

Wickham, Hadley, and Garrett Grolemund. 2016. *R for Data Science: Import, Tidy, Transform, Visualize, and Model Data.* (R4DS). O'Reilly Media, Inc. ISBN: 1491910399

Wang, F., & Liu, L. (2023). *Computational Methods and GIS Applications in Social Science.* CRC Press.

The primary course texts are provided in the list above, with supplementary reading materials accessible via the weekly schedule.

Grades

Final grades for the course will be based on the following scale. I reserve the right to make adjustments to individual grades based on overall performance in the course and/or extenuating circumstances.

Grade scale: *A*: 93.5 - 100 *A-*: 89.5 - 93.5 *B+*: 86.5 - 89.5 *B*: 83.5 - 86.5 *B-*: 79.5 - 83.5
C+: 76.5 - 79.5 *C*: 73.5 - 76.5 *C-*: 69.5 - 73.5 *D+*: 66.5 - 69.5 *D*: 59.5 - 66.5
F: 0 - 59.5

The proportion of each assignment as part of your overall grade is as follows:

- Participation 10%
- Lab Assignments: 20%
- Group Visualization Project: 15%
- Midterm Assessment: 20%
- Final: 35%
    - Final Presentations: 15%
    - Final Project: 20%

Participation

On most Fridays, there will be a class discussion to synthesize the materials of the week. During these sessions, students will be grouped together discuss data roadblocks and ethical concerns from the week's labs and readings. After deliberation and discussion, each group will then have a chance to present their thoughts engage in class discussion to accumulate participation points for the semester.

Lab Assignments

Unless otherwise specified, students will have weekly 'lab' assignments associated with the given readings and topic. These will contribute to their practical application of R techniques.

Group Visualization Project

During Week 8, students will spend in-class time working on and then presenting a collaborative visualization project on a social science topic of their choosing. Details on the specific conditions will be explained later in the semester.

Midterm Assessment
In week 9, there will be a virtual midterm timed assessment which attempts to gauge students' application capabilities of the material.

Final Presentations
Students will engage in short presentations of their final projects in a mode of their choosing.

Final Project
Students are tasked with conducting a comprehensive analysis of a social issue using computational methods. Students must select a relevant topic, gather diverse social data from ethical sources, clean and preprocess the data, apply appropriate computational techniques such as machine learning, natural language processing, and geospatial analysis, and present their findings through compelling visualizations. Peer feedback sessions will provide opportunities for constructive critique, enhancing the overall quality of the final submissions.

Extra Credit
Extra credit opportunities may be provided on an as-need basis. If you believe that this need applies to you, please contact me during the semester. Otherwise, extra credit opportunities may arise circumstantially. Stay tuned in class for this potential occurrence.

Communication, Office Hours, Question about Grades
Please direct all communication with me outside class or office hours via email, which can be found in the header of this syllabus. I do my best to reply to student emails as quickly as possible but students should not necessarily expect me to reply immediately, especially regarding last-minute inquiries or questions asked over a weekend. For example, I may not be able to reply to questions about exams or assignments after 7p the day before it is scheduled/due.

Regular office hours will be held every [insert here], except on university holidays (or by appointment). If you can't make those times, email me to schedule a more convenient appointment time.

My office hours exist for you to come to me with questions about this class and other academic thoughts or concerns. Email is only for brief communications; long and complicated questions should be discussed during office hours. With respect to grades, after I have graded and returned your assignments, there is a 24-hour moratorium before I will answer questions about that assignment.