1. **Course Description and Objectives**

The digital, connected, sensor rich world is generating extraordinary amounts and variety of data (“Big Data”). Computational Social Science (CSS) is a research perspective that incorporates new methods and models for harnessing data to study human behavior from the level of neurons to collective behavior. This change in approach has already made breakthroughs possible in understanding human creativity, scientific performance, the sharing economy, human conflict, and online behavior, as well as the impacts of policy on the complex socioeconomic web that composes our world.

The goal of the course is to teach you these new methods and their applications so that you can apply them to your own research. The primary focus of this course is on unstructured data—text and networks. We will cover how to acquire and process data from the web and documents, as well as foundational and advanced methods in text processing and network analytics to mine and analyze data. After taking this course students will be able to use these methods to conduct qualitative and quantitative research with greater breadth and depth.

1. **Course materials**

There is no required textbook for the course. Academic papers are available at the links or, if behind a paywall, other sites \*\*cough\*\*.

1. **Requirements and Evaluation**

***Attendance***

Students need to attend lecture. If you are sick, please schedule office hours with Professor Pah or catch up with notes from a classmate.

***Grading***

The primary evaluation for this course is based on an independent research project that leverages course methods and concepts. The project is evaluated based on the quality of the writing, the clarity of presentation, and the appropriateness of the research methods and analysis.

In the first half of the semester there will be a handful of homework assignments to help you practice the basic coding mechanics. These assignments are all equally weighted. Grading of these assignments is the same as in “Coding in R” – homeworks are graded pass/fail based upon an assessment of whether you sincerely attempted the homework and answered over half of the questions correctly. This is designed to hold you accountable for the material but not create anxiety about perfection.

You will present an academic paper of your choice during the semester. You will graded based upon the quality of your presentation and your command of the material.

|  |  |
| --- | --- |
| ***Assignment Category*** | ***Percentage*** |
| *Homeworks* | 40 |
| *Presentation* | 10 |
| *Project Write-up*  *(Split between proposal and final paper)* | 50 |

***Academic Integrity***High standards of intellectual and academic integrity will be enforced. GSU guidelines are posted at https://deanofstudents.gsu.edu/files/2017/09/Academic-Honesty-Policy.pdf and <https://codeofconduct.gsu.edu/>.

Students **are** allowed to use ChatGPT for their project but **are not** allowed to submit unedited ChatGPT responses as a part of their final manuscript.

Students **are not** **allowed to copy** ChatGPT or Stackoverflow code for their homework assignments. Students **are** **allowed** to use ChatGPT and StackOverflow for homework assignments. Students **are** **allowed and encouraged to help each other** understand programming concepts, errors, and how to approach problems.

Roadmap

|  |  |  |
| --- | --- | --- |
| **Week** | **Section** | **Topics** |
| 1 | Fundamentals | Introduction, Data Types |
| 2 | Fundamentals | Handling and processing data with dictionaries |
| 3 | Fundamentals | Tabular data management |
| 4 | Data Acquisition | APIs and Web Scraping |
| 5 | Data Acquisition | Web Processing |
| 6 | Data Acquisition | PDF processing & Reproducibility |
| 7 | Text | Text Processing Fundamentals & Information Theory |
| 8 | Text | Sentiment Analysis, Machine Learning, NER & Disambiguation |
| 9 | Text | LDA |
| 10 | Text | Word Embeddings & LLMs |
| 11 | Text | OpenAlex API Project |
| 12 | Networks | Network Fundamentals & Social Networks |
| 13 | Networks | Network Extensions |
| 14 | Networks | Community Detection |