History 3885G
Digital Research Methods with Artificial Intelligence
Winter 2026

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This is a **draft** outline. Please see the course site on OWL Brightspace for a final version.

Course Description
In this course students will learn how to use large language models (generative Artificial Intelligence) and other computational techniques to find and evaluate digital sources and use them for research purposes. No previous background in the subject area is required.

Prerequisite(s):
Registration in third year or above, any module.

Course Syllabus
This course is a hands-on introduction to using large language models (generative AI systems like ChatGPT or Gemini) to assist with the practice of writing nonfiction. Research of all kinds now crucially involves the acquisition and use of digital sources, both primary and secondary. In this course, you will learn to find, harvest, manage, excerpt, cluster and analyze digital materials throughout the research process, from initial exploratory forays through the production of a computational essay, a notebook that can include texts, images, maps, code, interactive visualizations, audiovisual sources, networks and datasets.

Popular discussions of LLM technology have focused on the unconstrained models' tendencies to hallucinate, their seeming inability to cite or return verifiable sources of information, and their potential misuse for misinformation and disinformation. When you are working with these models at a more technical level, however, you learn that their capabilities are changing every few weeks. As current problems are solved new opportunities and challenges arise.

This course teaches ways to constrain and even make use of hallucination, to draw information and make inferences from verifiable structured data, and to rigorously cite sources. The workflows that you will learn are firmly grounded in the tools and techniques of the digital humanities: text encoding, the semantic web, linked open data, bibliography, databases, web APIs, text analysis, and text mining. In the past, using such techniques typically required a bottom-up process based on writing computer programs. With the introduction and development of generative AI, we can now work from the top down. We will make extensive use of the models' ability to co-author code as well as prose.

Prior Experience

Successful use of generative AI in writing nonfiction computational essays requires a lot of careful and critical reading. LLMs can generate plausible texts in seconds. It is your job to verify claims, correct errors, improve the writing, and direct the thinking. Other than that, the only thing that you need to do well in this course is a willingness to learn new things and the perseverance to keep working when you're confused or when you realize that you could spend a lifetime learning about the topics and technologies that we will cover in class, and still not master them all. Students will come into the course with very different levels of experience and expertise. Some, probably most, will be familiar only with the rudiments of computer and internet use. A few may already be skilled programmers.

Workload

This course requires that you spend at least a bit of time each day (say 20-30 minutes) practicing your new skills. It's a lot like learning a new language, learning to play a musical instrument, or going to the gym. At first it is going to be hard but be patient with yourself and ask a lot of questions. With daily practice, you will soon find ways to do your research and coursework faster and more efficiently. If you can't commit to regular practice, however, you should probably not take this course. The techniques that you learn in this class build cumulatively week-by-week, and there are several evenly spaced assignments of equal value.

Participation and Professionalism

You are required to participate in each scheduled meeting. *Failure to participate in more than two meetings without prior approval or a note from your academic advisor may result in a failing grade*. Teamwork is an essential component of this class (and your grade). Since you will be working closely with others using teleconferencing and shared online documents as well as in person, it is important to be respectful, to share your own ideas and to listen carefully to the ideas of others.

Teamwork and Peer Evaluation

Each assignment you will be randomly assigned to a team of 4-7 people (depending on the class size). Grades for the team portion of the assignment will be shared by all members of the team. At the end of each assignment, you will submit a very brief peer evaluation for the members of your team. I will use these assessments, in conjunction with my own, to determine your individual contribution to team assignments.

Learning Outcomes

At the conclusion of this course, you will

- Be aware of a wide variety of different kinds of digital sources and strategies for making use of them computationally

- Be familiar with a range of research approaches in digital humanities, computational social science and related disciplines
- Be acquainted with methodological applications of large language models and generative artificial intelligence
- Be more familiar with using computer code as a medium of expression

Methods of Evaluation

Students must submit <u>all</u> course assignments to pass the course.

Assignment	*Worth*	*Handed Out*	*Due Date*	*Zero Date*
01	25%	Week 01	Week 02	Week 03
02	25%	Week 04	Week 05	Week 06
03	25%	Week 08	Week 09	Week 10
04	25%	Week 11	Week 12	Week 13

There will be four assignments, worth 25% each, spread uniformly throughout the term. Each assignment has an individual portion (10%), a team portion (10%), and a portion that combines my assessment of in-class work with peer assessments of the student's contribution to team performance (5%).

Each assignment has a suggested due date and, a week later, a zero date. If you hand in your assignment before the zero date, you will receive full credit for your work. After the zero date, it will be worth nothing.

If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to Academic Advising as soon as possible.

Course Materials

A Computer

To get the most out of this class, you will need a Windows, Mac or Linux laptop or desktop. A tablet or netbook will probably not be sufficient. If you have any concerns, email me.

LLM License(s)

You will need a developer account for one of the LLMs. Details will be provided in class. Total cost should be less than $50 for the semester.

Mathematical License

You will also need a **student desktop license** for Wolfram Research's *Mathematica* software. (Don't let the name scare you, you won't need any particular training in mathematics to do well in the class). In the past, this software has sometimes been available for free for Western students. Check here to see if that is the case:

https://www.wolfram.com/siteinfo/

If it is not freely available this term, you will have to purchase a license. A one semester license is about $90 CAD. You can purchase the software here

https://www.wolfram.com/mathematica/pricing/students/

If you are unable or unwilling to purchase the software, please do not take the course.

Software Provided by University

You will also be required to use software provided by the university:

- You will need access to Microsoft Office tools (especially Word, PowerPoint, and Excel). These are available through your Office 365 account https://wts.uwo.ca/office_365/index.html
- Graded assignments will also require teamwork that will be conducted through MS Teams https://wts.uwo.ca/microsoft_teams/index.html
- You may also find it convenient to install Zoom for team meetings and office hours appointments https://wts.uwo.ca/zoom/index.html

Course Schedule and Readings - DRAFT

- Wk 01. Jan 08. Large Language Models and Generative AI.
- Wk 02. Jan 15. The Computational Essay.
- Wk 03. Jan 22. Prompt 'Engineering' is Writing.
- Wk 04. Jan 29. Top-Down vs. Bottom-Up Exploration.
- Wk 05. Feb 05. Data Structures.
- Wk 06. Feb 12. Verification and Citation.
- Wk 07. Feb 19. SPRING READING WEEK

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- Wk 08. Feb 26. Computable Knowledge.
- Wk 09. Mar 05. Coding as Conversation.
- Wk 10. Mar 12. Networks.
- Wk 11. Mar 19. Embeddings and Semantic Search.
- Wk 12. Mar 26. Retrieval Augmented Generation.
- Wk 13. Apr 02. Machine Learning.

Additional Statements

Communication policies: During the term you will be able to contact me via email and/or MS Teams.

Use of generative artificial intelligence (AI): In this course you will be required to use generative AI tools and document your use of them. More information will be provided in class.

Please review the Department of History's shared policies and statements for all undergraduate courses at: https://history.uwo.ca/undergraduate/program_module_information/policies.html for important information regarding accessibility options, make-up exams, medical accommodations, health and wellness, academic integrity, plagiarism, and more.