

History 3885G
Digital Research Methods with Artificial Intelligence
Winter 2027

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Office Hours: **Online by appointment**

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): [List any prerequisites here.]

Registration in third year or above, any module.

Course Syllabus

In this course, students learn to use cutting-edge large language models (LLMs) and other computational techniques to find, evaluate and analyze digital sources for advanced research in the humanities and social sciences. We take a top-down, project-based approach using the Google Gemini ecosystem, focusing on translating complex research methodologies into functional, AI-powered workflows. The shift from a programmatic environment to the high-level, agentic capabilities of the Gemini ecosystem allows students to focus on research questions, as 'vibe coding' handles the heavy lifting of code generation. No previous programming experience is required. The focus is on enabling ambitious research projects that were previously difficult or impossible for non-programmers.

Workload

Successful use of generative AI in writing nonfiction computational essays requires careful and critical reading. While AI can co-author both code and prose in seconds, the student's job is to verify claims, correct errors, improve the writing, and rigorously direct the thinking.

This course is hands-on and requires daily, regular engagement (20-30 minutes minimum) as the techniques build cumulatively week-by-week. Since teamwork is an essential and regular part of the course, students also must monitor the team software (Google Chat) daily.

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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 counsellor 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 team software 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

For each assignment you will be randomly assigned to a team of about 6 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.

Use of AI

In this course you will be required to use AI for all your work. For the purposes of this course, it does not matter which parts of your assignments were written by you or your teammates and which were written by AI. When you are using text from another non-AI source you must quote it properly and cite your sources, of course! Contact me if you have any questions. *You take final responsibility for what you hand in.*

In this course, I will be using AI for everything, too, including using it to study your interactions in your teams, review your assignment submissions, and so on. *I will never use AI to automatically assign grades to your work.*

Unsworth's Scholarly Primitives

John Unsworth's "Scholarly Primitives" (2000) are a set of fundamental actions common to humanities research across all eras and media. These primitives form the conceptual backbone of advanced digital research. In this course they are used to define the basic functions that our computational tools should enable. The key primitives include:

- **Discovering:** The act of locating relevant materials and information, which in a digital context moves beyond simple keyword search to advanced methods like semantic searching.
- **Representing:** The necessary step of converting sources into a computational structure (like structured data, graphs, or maps) so they can be processed and analyzed by tools.
- **Comparing:** The systematic analysis of two or more entities—texts, images, or data sets—based on defined criteria to identify similarities, differences, and patterns.

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- **Annotating:** The process of attaching descriptive, contextual, or interpretive metadata to a source, allowing human judgment to be applied consistently at scale.
- **Referring:** The foundational requirement to link every piece of knowledge back to its source, ensuring traceability and verification (or “grounding”) in research.
- **Sampling:** The methodological process of selecting and acquiring a subset of data from a larger archive based on specific, defensible criteria.
- **Illustrating:** The final step of turning research findings into a persuasive visual form, such as a chart, graph, or network map, to aid analysis and communication.

Learning Outcomes

At the conclusion of this course, you will be able to:

- **Design and Implement AI Methodologies:** Translate complex research questions into formal System Instructions and Structured Schemas, effectively constraining Generative AI agents to produce verifiable, reproducible research data.
- **Master Grounding and Traceability:** Programmatically employ source-grounding tools (NotebookLM, Gemini File Search API) to ensure all synthesized knowledge is traceable and citable to a defined corpus.
- **Perform Advanced Computational Discovery:** Apply high-level analytical primitives, including Semantic Search and Network Analysis for relational visualization, to generate research findings impossible to achieve through traditional keyword search or close reading.
- **Critically Evaluate Computational Advantage:** Analyze and articulate the methodological trade-offs and systemic limitations introduced when transforming qualitative sources into quantitative data structures, demonstrating a critical perspective on the final scholarly artifact.

Methods of Evaluation

Students must submit all course assignments to pass the course.

<i>Assignment</i>	<i>Worth</i>	<i>Handed Out</i>	<i>Due Date</i>	<i>Accepted Until</i>
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%).

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 Counseling as soon as possible.

Course Materials

A Computer

To maximize your success in this course, **you must have regular access to a laptop computer**. While our tools are cloud-based and function within a modern web browser (including Google Chromebooks), a tablet or netbook will not be sufficient. The core activities of this course require you to simultaneously view and interact with multiple high-resolution windows (e.g., Code Editor, Live App Preview, and a NotebookLM Synthesis window). A large screen (13 inches or greater is recommended) and sufficient processing power are necessary to support this complex, multi-window computational workflow.

A Gmail Account

To use the tools that we are going to be working with, including Gemini, NotebookLM, Google AI Studio, Google Drive, Google Docs, Google Chat and Google Meet, **you will need a Gmail account**. Please send your Gmail address to me at the beginning of the course.

Generative AI Platform Access

You will need a free developer account for Google AI Studio, which provides access to the Gemini family of models and tools.

- **NotebookLM:** As the primary research tool, we will use its capabilities for source management and grounded analysis.
- **Google AI Studio:** This will be the environment for rapid prototyping of custom research agents.

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- **Gemini Advanced / Deep Research:** We will leverage the advanced reasoning and deep analysis capabilities of Gemini for complex synthesis tasks.
- **Google Drive and Docs:** To create and share resources.
- **Google Chat and Meet:** For collaboration.

Total cost for API usage and subscriptions is anticipated to be minimal (if not zero), and details will be provided in class.

Zoom

You may also find it convenient to install Zoom for office hours appointments (although you can request a meeting on Google Meet instead):

<https://wts.uwo.ca/zoom/index.html>

Additional Statements

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

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.