

Anth 3016 FA (2023) **Spatial & Digital Archaeology**

Class: BB2002

Instructor: Scott Hamilton

Time: Lect Tue, Thur, 8:30 to 10:00 am

BB:2001E

Lab Mon 2:30-5:30

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This course introduces methods for digital characterization of archaeological sites, landscapes and objects during the lectures, with ‘hands-on’ training during the labs. After the 1980s rapid methodological transformation occurred in archaeology closely linked to the development of desktop computing and consumer digital technologies. It affects how data is collected, processed, stored, analyzed and consumed. These trends are accelerating, forcing sharp reorientation in archaeological training and practise, but at the same time requiring continued use of traditional approaches as we learn about weaknesses associated with new methods.

Grading

Encyclopedia Entries (2 x 10%)

Reflection Piece (1 x 15%)

Midterm test (1 x 25%)

Lab assignment (1 x 30%)

Participation (1 x 10%)

You will produce two ‘**encyclopedia**’ (2 x 10%) writing assignments (ca 500 words each) valued at 10% each and submitted to me by email as attachments in WORD or PAGES format. These submissions will be edited and critiqued and returned to aid improvement through successive assignments. ‘Encyclopedia entries’ must be well-written, accessible to a non-technical reader (no jargon), and you will be evaluated on the quality of your prose, and your ability to effectively summarize complex issues. They can address a technology, a method, or an archaeological case study featuring a method. A few (2-3) key references must be included to demonstrate sources of information, and to guide the reader in search of more detailed information. An example will be offered in class to illustrate my expectations.

These assignments will be prefaced by an exploration of emerging **AI technologies**. We shall choose a topic to employ **CHATGPT** to generate ‘copy’. This raw prose will then be critically analyzed using conventionally available resources. I want to explore:

- 1) how factually correct the AI output is;
- 2) the grammatical and stylistic nature of AI output and whether AI output can be detected;
- 3) how comprehensive is AI search capability; and
- 4) does it generate correct and appropriate academic references.

We will collectively explore this emerging digital technology to discover weaknesses in aiding academic research, and to explore how/if users risk plagiarism. With their own encyclopedia entries students are encouraged to explore appropriate use of AI in addressing the topics, while in the **reflection piece** students will address the challenges and opportunities for its appropriate use in academic research and writing. This reflection piece should be ca. 750 words (15%), and

document your individual experience and evolving perspective about the academic utility of AI technology.

The **midterm test (25%)** will be a mix of definitions/short answer questions addressing issues raised in the first half of the course. This might include composition of a small essay selected from a list of topics choices.

The final third of the term offers practical exposure to 3D scanning, modelling and printing methods. This will involve class demonstrations of the process, with a **lab assignment (30%)** requiring you to apply these skills. This will be designed to be done using regular computers using freely downloadable software.

While structured as a lecture/lab demo class, students will be expected to participate through in-class discussion, questions and debate. Much of the material discussed reflects methods that are not commonly part of archaeological training at the undergraduate level. To maximize the learning experience, students are strongly encouraged to seek clarification in class as needed. This engagement will contribute to the **participation grade (10%)**.

Lakehead's Accommodation & Confidentiality Statements:

Lakehead University is committed to achieving full accessibility for persons with disabilities/medical conditions. Part of this commitment includes arranging academic accommodations for students with disabilities/medical conditions to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a disability/medical condition and think you may need accommodations, you are strongly encouraged to contact Student Accessibility Services (SAS) and register as early as possible. For more information, please email sas@lakeheadu.ca or visit <https://www.lakeheadu.ca/faculty-and-staff/departments/services/sas>

Students are strongly advised to familiarize themselves with the Student Code of Conduct (<http://policies.lakeheadu.ca/policy.php?pid=60>) with regard to both academic and non-academic misconduct. Non-compliance will NOT be tolerated in this course and the code will be adhered to in terms of disciplinary action.

Wk 1 Lect Sept 5, 7

Introduction

Conventional archaeological visualization

Archaeological interpretation is a 3D problem

Field data collection

Reading and interpreting paper and digital maps

NTS maps, global cartesian grid systems

Issues of scale, resolution, precision and accuracy

Map projections

Wk 2 Lab Sept 11

Using a theodolite or a compass to map and grid sites

Lect Sept 12, 14

Cartesian grid space and map construction at archaeological sites

Traditional mapping tools

Total Stations

Photogrammetry and LiDAR

Wk 3 Lab Sept 18

CHATGPT as a tool for academic research and writing?

Lect Sept 19, 21

Module 1 Post-1980s Transformation: shift from analogue to digital technology

Desktop and laptop computing, digital photography

Module 2. Global Positioning Systems

Issues of data precision and accuracy

Coordinate 'capture' that exceeds map accuracy.

Wk 4 Lab Sept 25

GPS demonstration: handheld gps in open and forested conditions, RTK GPS receivers

360° camera demo: modelling archaeological site localities.

Lect Sept 26, 28

Geographic Information Systems as Relational Databases

transforming information into GIS data structures

Nature of GIS data

Interrogating GIS data to answer questions

Encyclopedia #1 due (10%)

Wk 5 Lab Oct 2

Drone flight simulation

Drone flying in the wild.

Lect Oct 3, 5

Remote sensing and non-invasive Archaeology

Near-Surface Geophysical Remote Sensing

Due Reflection Piece (15%)

Wk 6 Study Week Oct 9 to 13

Wk 7 Lab Oct 16

No lab

Lect Oct 17, 19

Oct 17 **Midterm Quiz (25%)**

Oct 19 Field and Lab Photography in Archaeology

Wk 8 Lab Oct 23

Pool demonstration with underwater 'drone'

Lect Oct 24, 26

Remote sensing and non-invasive Archaeology cont'd

Aerial remote sensing, Visible light, thermal, multispectral and LiDAR sensors

Digital photogrammetry

Improved georeferencing using RTK, PPK GPS systems

Encyclopedia #2 due (10%)

Wk 9 Lab Oct 30

GIS querying of photogrammetric output

Lect Oct 31, Nov 2

Data processing and integration cont'd

Multi-iterative paleo-landscape and cultural landscape modelling

Wk10 Lab Nov 6

3D Scanning and modelling

Lect Nov 7, 9

3D scanning, modelling and printing

Wk 11 Lab Nov 13

3D Scanning and modelling

Lect Nov 14, 16

3D scanning, modelling and printing cont'd

Wk 12 Lab Nov 20

3D Scanning and modelling

Lect Nov 21, 23

3D scanning, modelling and printing cont'd

Wk 13 Lab Nov 27

3D Scanning and modelling

Lect Nov 28, 30

3D scanning, modelling and printing cont'd

Lab Assignment Due (30%)