

Accommodations for Students with Disabilities: If you have a disability for which you are or may be requesting accommodations, please contact both your instructor and the Office of Academic Support Services, University Center C212 (610-758-4152) as early as possible in the semester. You must have documentation from the Academic Support Services office before accommodations can be granted.

The Principles of Our Equitable Community: Lehigh University endorses The Principles of Our Equitable Community (<http://www4.lehigh.edu/diversity/principles>). We expect each member of this class to acknowledge and practice these Principles. Respect for each other and for differing viewpoints is a vital component of the learning environment inside and outside the classroom.

Lehigh University

Summer, 2017

Course Title: Teaching & Learning with Geospatial Tools

Course Number: TLT 368 / ES 368 (formerly listed as TLT 394 / ES 394)

Classroom: Iacocca Hall, E106

Class meeting days: Daily from Saturday, June 24 through Sunday, July 2. No class on Wednesday, June 28

Times: 8:30 am to 1:00 pm

Instructor: Julie Oltman

Office: Taylor Gym, Room 311

Office Hours: by appointment

Office Phone: 610.758.3166

Email: [julie.oltman\[at\]lehigh.edu](mailto:julie.oltman@lehigh.edu)

Course websites:

- Lehigh site (private information): We will be using Course Site, accessed via <http://coursesite.lehigh.edu/>
- Course map (public information, including course calendar) via <https://julieoltman.com/teaching-learning-with-geospatial-tools/>
- Dr. Hammond's GIS related bookmarks at <http://delicious.com/tchammond/TLT394?setcount=100>.

Introduction

This is a web-enhanced 3 credit graduate course. Some class meetings may occur asynchronously (i.e., online and/or in small groups). It is expected that each student has the capability to author and manage simple web pages, blogs, and wikis; connect to servers such as your Lehigh server space; and upload and link files. Lehigh University's Library and Technology Services (LTS) offers a variety of short courses, tutorials, and help desk functions to assist you with using Lehigh's services and simple tasks such as creating and posting web pages for your

Lehigh server space. The course instructor will provide additional help with these tasks as needed.

Catalog description

Exploration of geospatial tools, including but not limited to global positioning systems (GPS), geographic information systems (GIS), and related visualization tools (e.g., Google Earth). Application of these tools and techniques to instructional settings, including appropriate pedagogy and assessment.

Course purpose

The major goal of this course is to prepare you to effectively integrate geospatial technology into instruction. Accordingly, you will (1) experiment with a variety of geospatial tools appropriate for educational settings, (2) identify, examine, and evaluate resources for teaching with geospatial technologies, and (3) identify and explore pedagogical issues that emerge when teaching with geospatial tools.

Course objectives

By the end of this course, students will have demonstrated:

- Ability to identify and use basic geospatial tools.
- Ability to plan instruction using basic geospatial tools.
- Ability to locate appropriate resources and evaluate them for use in geospatial teaching and learning.
- Ability to discuss pedagogical issues relevant to teaching with geospatial tools.
- Ability to communicate geospatial issues clearly to external audiences using appropriate visualizations.

Course methods

Class sessions will consist of a variety of teaching and learning activities including lecture, small group discussion and activities, computer assisted study, independent work, research, and student presentations. Outside of class, students will read and analyze, research, write formal and semi-formal pieces, and work with a variety of technologies.

Course materials

- Books
 - (none)
- Journal articles & other periodicals
 - All journal articles will be available through Course Site and/or our web pages. See the course map for which are required and which are recommended or optional.

Other items

It is strongly recommended that you have some portable memory device (e.g., USB drive) available to you throughout the course.

You are encouraged to bring a laptop to class. Be sure that it is connected to the Lehigh wireless

network. See the IT staff in room E-105 for help if needed.

Recommended software & hardware includes

- *GPS unit or GPS-enabled smartphone.* I have GPS units for students to borrow during the course. A relatively good iOS app is [Spyglass](#) but it costs a few dollars. The GPS units I have are free and very accurate. If you have a GPS unit or a GPS-enabled cell phone, please bring it! We will be using GPS at several points throughout the course.
- *Google Earth:* <http://www.google.com/earth/> – I believe the "Pro" version is currently free!
- *ArcGIS:* [ArcGIS.com: https://www.arcgis.com/home/signin.html](https://www.arcgis.com/home/signin.html) – free web-based GIS from Esri. Can also use Lehigh account, accessible from lu.maps.arcgis.com
- A spreadsheet program; Microsoft Excel or Google Spreadsheets or an equivalent
- For those interested in augmented reality: ARIS (Augmented Reality Interactive Storytelling): <http://arisgames.org/>
- You may find that a digital camera of some sort (preferably better than a cell phone camera) comes in handy.
- If you end up doing any work with digital video or audio, you will find that a headset + mic combo is handy. These can be checked out from the TLT program secretary.

Course requirements (with category and percentage of final mark)

- Original Google Earth markups and instructional plans (30%, split over 2 iterations--so 2 grades of 15% each)
- Customized GIS dataset and instructional plan (30%, split over 2 iterations--so 2 grades of 15% each)
- Final project presentation (5%)
- Final project write-up (35%)

All assignments must be completed to pass the course. Submissions are due by the start of class on the date posted on the syllabus.

Note: In general, I am open to students taking a grade of 'Incomplete' to finish work later. However, know that students entering intern teaching MUST resolve any Incompletes before they are able to begin their field placement. If you do need to go this route, please complete the work in a timely manner. At the end of a year, the Incomplete converts to whatever provisional grade is assigned (typically an 'F').

Attendance

Regular attendance is expected of students in a graduate course. Accordingly, you are required to attend all synchronous class sessions and actively participate in all synchronous and asynchronous activities.

If you cannot attend due to medical emergency, family crisis, or other event, it is your responsibility to let the instructor know as soon as possible. Please also propose a solution to remedy the problem by working ahead, visiting during office hours, or putting in additional work. Absent students are responsible for learning about what they missed from their "course

buddy.”

Students who miss more than 1 class meeting in a semester will be strongly advised to drop the course.

Evaluation criteria

All assignments will be graded according to a rubric, checklist, or other criterion list, made available to the students ahead of time.

Each assignment will be evaluated out of 20 points and then weighted in the calculation of the course grade.

Nota Bene:

- Your mark will be lowered by a full letter grade for each 24-hour period in which an assignment is late (with the first decrement occurring at the end of class on the day it's due).
- ON FINAL PROJECTS, NO LATE SUBMISSIONS WILL BE ACCEPTED. Final projects received after the beginning of class on the due date will receive a failing mark.
- Assignments that have been submitted for other courses at Lehigh or elsewhere will not be accepted. If you are uncertain about this policy and your work, please talk to the instructor.
- Assignments can be turned in on paper or electronically (e.g., via an email attachment or by posting to Course Site or another website), or in a combination of both.
- Assignments submitted electronically will be returned with typed comments; assignments submitted on paper will be returned with hand-written comments.

At the end of the course, the points across all assignments will be averaged to create the student's final letter grade.

The points will be translated to a letter grade via the following table:

A	94-100 points	C+	77-79 points
A-	90-93 points	C	74-76 points
B+	87-89 points	C-	70-73 points
B	84-86 points	D	60-69 points
B-	80-83 points	F	below 60

Note that grades round up or down at the discretion of the instructor; an 89.5 does not automatically become an A-. Rounding decisions will be made according to the demonstrated level of accomplishment in the graded assignments and in the course overall:

Letter grade	What it indicates
A	Excellent work that demonstrates a clear understanding of the material under study and a superior ability to utilize that material in the assignment submitted. Contains no errors in information or execution. When options for marks are involved, indicates successful completion of the highest-level option.
B	A solid piece of work that demonstrates an understanding of the material under study and utilizes that material well in the assignment submitted. Usually fails to include some pertinent material or utilizes that material less well than would warrant assignment of an A. May contain minor errors in information or execution (e.g., typos). When options for marks are involved, indicates successful completion of more than the minimal level option.
C	Adequate work, that demonstrates a basic understanding of the material under study and which utilizes that material to some extent in the assignment submitted. Usually contains errors or omissions involving relevant material. May contain significant errors in execution or formatting (e.g., poor layout). When options for grades are involved, indicates successful completion of minimal level option.
D	Work that fails to demonstrate understanding of the material under study and fails to utilize relevant material in the assignment submitted. When options for marks are involved, indicates failure to complete successfully the minimal level option.
F	Work that is incomplete, inappropriate, completely incorrect, and/or was submitted late. This mark indicates severe problems that lead to questions about whether the student should be involved in graduate study.

Student expectations

Preparation for class

You are to come to class with all requested materials and prepared to discuss them. This is not a lecture course but a mix of discussion, activities, and labs. If you come to class prepared, this should be stimulating, engaging, and prepare you to teach with technology. If you come to class unprepared, your learning and that of your classmates will suffer.

Readings

Readings should be completed outside of class time. Give yourself time to read carefully,

take notes or marginalia on the readings. The Writing-to-Learn component of the Writing-to-Learn & Professionalism grade is designed to encourage careful reading and reflection. Please bring a copy of readings (on paper or electronic) to class for reference during discussions.

Attendance

You are required to attend all synchronous class sessions and actively participate in all synchronous and asynchronous activities.

If you cannot attend due to medical emergency, family crisis, or other event, it is your responsibility to let the instructor know as soon as possible. Please also propose a solution to remedy the problem by working ahead, visiting during office hours, or putting in additional work.

Attention & participation during class

As noted in Dewey's *Democracy and Education* (1916), education is a form of communication. If you're not attending to the discussion and participating, you're not part of the communication. During class, please turn off or silence cell phones and do not read or respond to text messages. You are encouraged to bring a laptop, but obviously, you need to remain on-task. Off-task or inappropriate behavior on computers or other devices will not be tolerated.

Homework / assignments

Unless otherwise noted, all assignments are to be original (i.e., not something that was assigned in whole or in part for another class) and completed without any assistance from others or their work. If you do wish to use material from another course, please consult the instructor first. If you do need help from others or their work in completing your assignment, please make a note of it, in the spirit of intellectual honesty.

While I am happy to offer help and guidance with your work, I respectfully decline to offer assistance or respond to requests for assistance in the 24 hours before an assignment is due. Please work ahead and manage your time accordingly.

Absences / weather policy

It is difficult to make up absences when a majority of class time will be spent examining, manipulating, and negotiating ideas. Also, class time will be used for the development of graded assignments. Please consider absences very carefully. The instructor reserves the right to lower the final attendance, participation, and professionalism one full letter grade per absence.

Weather: Be advised that I will not cancel class unless the university does so. Canceled classes due to acts of God or war will be rescheduled.

Instructor expectations

I will provide clear explanations of assignments and provide support for your execution of them. I will comment on and return your assignments promptly. I will be available for discussion outside of class time as needed to clarify concepts, assignments, or evaluation.

TLT 368 / ES 368: Detailed specification of assignments and assessments

Original Google Earth Markups and supporting materials (instructional plan or presentation files and commentary)

Rationale: Google Earth is a powerful, free visualization tool for geographically-referenced data. One of Google Earth's most powerful features is its extensibility: content from other sources (e.g., YouTube videos, Flickr images, travel guides) can be layered into the existing framework of geospatial images. Casual users can create their own, customized overlays of data using either a text editor or the built-in markup features. Google Earth is an essential tool for anyone seeking to communicate with a broad audience about geo-referenced data.

To this end, you will demonstrate the ability to use Google Earth purposefully by creating a customized mark-up layer to be displayed in Google Earth. The use of this data will be described and contextualized in supporting materials.

This assignment will be completed in two steps: A proof-of-concept (ungraded; successful completion = full credit) and a final version.

- The proof-of-concept should demonstrate that you can successfully create markup within Google Earth, organize it into a folder, save it to an external file, and send this file to another user. The content of your proof-of-concept should be an initial exploration of your topic for the final submit -- it should include at least one of the placemarks, lines, polygons, and/or image overlays that you intend to use in your completed assignment.
- The final submission will consist of one or more Google Earth files that display the fully-developed set of markups and/or a video tour of the markup.

Required Elements: You will prepare and submit

1. One or more .kml or .kmz files viewable in Google Earth. Each file should contain multiple mark-ups (placemarks, lines, polygons), and each item should contain additional contextual data (e.g., a title, caption, image, link to further information, etc.).
2. An instructional plan or presentation that puts this overlay file to use. This document can be a .doc, a .ppt, or any other file format that you are comfortable with.
3. An informal commentary that
 - a. Describes how/when you envision using the Google file and instruction/presentation (e.g., what audiences, when it would be used, what larger sequence of instruction or communication this might fall within)
 - b. Reflects upon the process of carrying out this assignment. What was easy? What was hard? If you could do it over again, what would you do differently? Where did you have to turn for help?

How to submit: At each step (the proof-of-concept and final submit), upload your complete set of files to Course Site. As a backup, you may also email your work to the instructor as attachments and/or turn in hard copies (printouts) of the documents.

Original or customized GIS dataset and supporting materials (instructional plan or presentation files and commentary)

Rationale: While Google Earth is powerful, free, and popular, it is not a true Geospatial Information System (GIS). A GIS opens possibilities for analysis and quantitative work that are impossible (or impractical) in Google Earth. Any substantive course in geospatial tools must involve hands-on, generative work with GIS.

To this end, you will demonstrate your ability to work with GIS by creating (or customizing) and documenting a dataset. The use of this data will be described and contextualized in supporting materials.

This assignment will be completed in two steps: A proof-of-concept (ungraded; successful completion = full credit) and a final version.

- The proof-of-concept should demonstrate that you can successfully package a combination of maps and data in ArcGIS. The content of your proof-of-concept should be an initial exploration of your topic for the final submit -- it should include at least some of the data that you intend to use in your completed assignment, and perform at least some of the intended final functions that you hope to include in your final submit.
- The final submission will consist of one or more GIS maps (links or apps) that display the fully-developed dataset, intended displays, etc.

Required Elements: You will prepare and submit

1. A link to your arcGIS map (you can include this as a separate word doc or as a link included in the beginning of of your instructional plan or presentation).
2. An instructional plan or presentation that puts this map to use. This document can be a .doc, a .ppt, or any other file format that you are comfortable with. This plan or presentation **MUST** include screenshots of the data displayed in the GIS to illustrate the intended use of color, symbols, etc., during the instruction or presentation.
3. An informal commentary that
 - a. Describes how/when you envision using arcGIS and the instruction / presentation (e.g., what audiences, when it would be used, what larger sequence of instruction or communication this might fall within)
 - b. Reflects upon the process of carrying out this assignment. What was easy? What was hard? If you could do it over again, what would you do differently? Where did you have to turn for help?

How to submit: Upload your complete set of files to Course Site. As a backup, you may also email your work to the instructor as attachments and/or turn in hard copies (printouts) of the

documents. BE SURE TO IDENTIFY WHICH MAP LAYERS (if any) ARE YOUR ORIGINAL WORK. Attribution whenever possible.

Presentation of final project (presentation, presentation files, and handout)

Rationale: This assignment serves two purposes, one summative and one formative.

First, as noted in Dewey's *Democracy and Education* (1916), education is a form of communication. In addition to preparing your final project, you must be prepared to communicate about it. The final project documentation is one form of communication; this presentation will serve as another form of communication, one that allows for more dynamic presentations and dialog with the audience.

Second, in my experience with course projects, the act of preparing and presenting a project often spurs students to greater heights in their final product--deeper thinking, a higher level of polish, or just a greater appreciation of the complexity of the task or topic.

Accordingly, before submitting your final project documentation, you will prepare and present to your classmates a brief (15 minutes or less) description of your project. This presentation can be either a polished dissemination of completed work or it can be a more emergent, at-this-stage-in-the-process description. The presentation will be followed by 5-10 minutes of audience interaction, run by a discussant (either the instructor or a peer).

Required Elements: You will prepare and submit

1. A presentation file. This presentation can be in the form of a slide set (e.g., a .ppt file), a website, or any other format that you feel comfortable with and that supports your message. If your presentation involves demonstrations within a GIS or Google Earth (or other geospatial technology), you should include at least one screenshot to document the tool and key steps.
2. A handout for the audience. One rule of effective presentations is to provide a handout that engages the audience, cues the content, and provides a forum for extending participants' thinking (e.g., jotting down notes). This handout can be a .doc or .pdf file, and should be limited to a single sheet of paper. (Yes, you can use both the front and the back.) DO NOT summarize the entire presentation but instead provide a skeleton of the content (using words, images, or both) that allows us to follow along, fill in key points, and engage in our own dialog with the content.

Evaluation: You will receive *feedback* on the following

1. Preparation and materials--are they complete? Clear? Prepared on time?
2. Delivery of the presentation--did you have everything ready? Did you explain the concepts clearly? How was your body language? Projection?
3. Engagement during the follow-up Q & A. You don't have to have the answer to every question, but you need to track the conversation and address the issues.

Your *grade* will primarily hinge on #1, as the element most under your control. The presentation and Q & A will influence, but not override, the final grade.

How to submit: Upload your complete set of files to the “Presentation Forum” in Course Site. As a backup, you may also email your work to the instructor as attachments and/or turn in hard copies (printouts) of the documents. BE SURE TO POST THE FILES BEFORE THE CLASS SESSION IN WHICH YOU WILL PRESENT. You may submit revised versions of the files afterward (if you wish -not required), but you must have a complete version up by class time.

Final project (unit plan, policy paper, or research paper --includes supporting materials)

Rationale: We each enter this class with divergent goals: Some wish to put these tools and techniques into their classroom practice, others are hoping to build their skills in analysis and decision-making, still others might just be looking for food for thought. The final project is intended to allow everyone to pursue his/her individual goal to some level of depth and mastery.

There are THREE options for the final project:

1. An instructional unit that utilizes geospatial technologies. The level (elementary, middle, secondary, or higher education) and content (e.g., science, environmental education, social studies) are up to you. The length can vary from as few as 3 lessons (e.g., 3 45-minute class periods) to 10 lessons or more.
2. A policy paper on the topic of your choice. The topic and scope (local, state, national, international) are up to you. The paper should include an executive summary (of 2 pages or less), and the body of the main paper should run to 10 pages or more.
3. A research paper of 15 pages or more on a topic of geospatial tools in education.
Sample topics include:
 - a. Best practices for the use of geospatial tools in a content area (e.g., science education).
 - b. The use of geospatial tools to support a specific pedagogical style (e.g., inquiry-oriented pedagogy).
 - c. Obstacles, opportunities, and strategies for conducting professional development for in-service teachers on geospatial technologies.
 - d. Obstacles, opportunities, and strategies for introducing pre-service teachers to geospatial technologies.

Required Elements: The requirements vary by each option.

Option 1

1. A title page including your name, the name of the unit, the name of the class, and the date.
2. An overview of the unit. This document should:

- a. Describe the context of the unit: what age levels is this unit for? What curricula/standards does the unit support? What achievement-level tracks or grouping strategies was the unit designed to fit?
 - b. Provide a narrative of how the unit is supposed to progress.
 - c. Provide information about the author (who you are, what bases of experience you have) and the unit (why/when it was produced, any info you have on how this unit performs in the classroom).
3. Three or more lesson plans. The exact format of the plans is up to you, but the following information must be specified:
 - a. Standards addressed. This MUST include one or more content-area standards (e.g., PA standards for science or history) and can also include non-content-area standards (e.g., PA's standards for reading, writing, and speaking; ISTE's technology standards for students). If you are preparing a learning unit for a non-standards aligned organization - you MUST clearly outline your learning objectives (goals) for the unit and overarching purpose for the unit/seminar/course/field trip, etc...
 - b. Learning objectives to be met,
 - c. Time frame, both in terms of length of the lesson and the amount of time falling between lessons,
 - d. Materials to be used, including technology tools (software, hardware, etc.), handouts, texts, etc.,
 - e. Sequence of instructional activities,
 - f. Assessments / follow-ups / homework.
4. All supporting materials for these lesson plans. If the lesson calls for a .ppt, include it. If the lesson requires a handout, include it. These materials can be either original or re-purposed.
5. A summative assessment to be used after the final lesson to evaluate learners' mastery of the concepts, tools, and techniques used in the unit. This assessment should directly follow from the standards and objectives in the lesson plans.
6. An informal reflection, commenting on your process of assembling this unit and its materials. What surprised you? What did you learn along the way? What strengths or weaknesses do you perceive this unit to have?

Option 2

1. A title page, including your name, the name of the unit, the name of the class, and the date.
2. An executive summary of no more than 2 pages.
3. The body of the paper, written in APA format (or whatever set of rules are appropriate for your intended audience). The paper should run to 10 pages or more, and should be written to be both authoritative (i.e., the audience is convinced that you know what you are talking about) and expressive (the paper is engaging / strikes a chord / evokes the desired response). Feel free to include pull-quotes, sidebars, anecdotes or vignettes, figures / tables / graphs -- any technique that reinforces your message without compromising the facts or your credibility.

4. A reference list, formatted according to APA or whatever set of rules are consistent with your intended audience. You should include no fewer than 10 references in this list.
5. An annotated bibliography of 5 or more resources for further reading and research. These can be items already cited in the reference list or they can be new references.
6. A brief presentation (e.g., set of slides or brochure) that can be used to present the executive summary and any key points from your main paper. Approach this part of the task in this way: If you were presenting this policy paper to the target audience, what materials would you need to present it?
7. An informal reflection, commenting on your process of assembling this policy paper and its materials. What surprised you? What did you learn along the way? What strengths or weaknesses do you perceive this project to have?

Option 3

1. A title page, including your name, the name of the unit, the name of the class, and the date. Follow APA format
2. An abstract of no more than 150 words summarizing the topic and main findings of the paper.
3. The body of the paper, written in APA format. The paper should run to 15 pages or more.
4. A reference list, formatted according to APA or whatever set of rules are consistent with your intended audience. You should include no fewer than 20 references in this list, and at least 5 references must be research pieces from peer-reviewed journals. Please consult with the instructor if you need clarification on this requirement or assistance in locating peer-reviewed research.
5. A brief presentation (e.g., set of slides or brochure) that can be used to present this paper. Approach this part of the task in this way: If you were presenting this paper at a conference, what materials would you need to present it?
6. An informal reflection, commenting on your process of researching and writing the paper and assembling the presentation materials. What surprised you? What did you learn along the way? What strengths or weaknesses do you perceive this paper to have?

How to submit: Upload your complete set of files to CourseSite. As a backup, you may also email your work to the instructor as attachments and/or turn in hard copies (print outs) of the documents.

(end)