

# ES / TLT 368: Teaching and Learning with Geospatial Tools (Summer, 2016)

**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 format:** This class is a short-form course, meeting face-to-face for 8 days over a 9-day stretch (Tues, 5 July through Wed, 13 July; no class on Sat, 9 July). Class begins at 8:30 am and ends at 1:00 pm.

## Recommended equipment, software & web services

- GPS unit or GPS-enabled smartphone. I have GPS units for students to borrow during the course. (They are far more accurate than any smartphone app that I have seen to date.)
- Google Earth: <http://www.google.com/earth/> – I believe the "Pro" version is currently free!
- My World GIS: No longer sold or available as a trial download. PC version available from the instructor...but it looks like the Mac version can't work as a local install in our classroom.
- ArcGIS.com: <https://www.arcgis.com/home/signin.html>– free web-based GIS from Esri. Can also use Lehigh account, accessible from [lu.maps.arcgis.com](http://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/>

**Class sessions & topics** – Each topic links to supporting pages. I will be posting as much material as possible on this publicly-available wiki and will make minimal use of CourseSite. Unless otherwise noted, assignments are due on the day in which they're listed.

- **Tuesday, July 5:** 8:30 am - 1:00 pm
  - Review of syllabus ([pdf](#))
  - **Significance of geospatial tools:** ConnectED initiative, geospatially-related careers / workforce, resources for geospatial education
  - Relative vs. absolute location (i.e., lat-lon) – I'm going to defer to Wikipedia's entry on [Location \(geography\)](#) for this.
  - **GPS activity** to apply & extend understanding of lat-lon, geospatial awareness.
  - A limited discussion of [geocaching](#).
  - Connecting GPS activity & Google Earth
  - **Introduction to Google Earth:** Interface & navigation; basic markup; editing, organizing, saving, & sharing markup
- **Wednesday, July 6:** 8:30 am - 1:00 pm
  - Google Earth re-set: How did we do with the 'Happy Place' assignment?
  - ...and two Key Thoughts for this course: 10% is good enough for our purposes, and everything is in beta always. I like to explore this through a markup layer about the SS *Savannah* (1819-1821): [Savannah\\_1819.kmz](#).
  - [Brainstorming Google Earth project topics](#).
  - For those who need it: How to deal with that "other" operating system
    - PC users grappling with Macs: <https://delicious.com/tchammond/MacHelp>
    - Mac users wishing they weren't on a PC: <https://delicious.com/tchammond/PChelp> (sorry, there's just not as much stuff here...)
  - [Google Earth vs. Google Maps](#) (i.e., client-side software vs. web services)
  - [Google Earth, second pass:](#) Advanced features
  - [Map projections](#) (i.e., why doesn't my map overlay work???)
  - [assignment due...sometime today or tomorrow:](#) Google Earth proof-of-concept: KMZ or KML file, plus text file describing how you hope to use the finished product and what you need to do to complete it.
- **Thursday, July 7:** 8:30 am - 1:00 pm
  - Where/how to [find Google Earth datasets](#).
  - [Google Earth, last pass:](#) Any project de-bugging we need to do?
  - Say hello to our new friend: [First look at ArcGIS.com](#).
    - Sharing ArcGIS.com work: [Editable Google Doc](#).
  - An introduction to GIS: [software options...](#)and [what is GIS?](#)
    - Client side: Using My World and pre-built data – watch my demo of [Why bother with GIS?](#) Follow-up:[Getting your hands on GIS](#), using my LINIQES acronym.
    - Web service: Re-tracing those same steps in [ArcGIS.com](#)
  - GIS work, step 1.5: Adding new data to an existing map. However, I've pre-processed the data for you. (You're welcome.)
    - Working with point data, which is the easiest possible data (it's in lat-lon, so it's universal)
      - A small dataset: [Iacocca Hall geocache locations.csv](#)
      - A larger dataset: [CSV\\_Main\\_Eastern\\_theater\\_ver01.csv](#)
    - Working with polygon data, that you will then merge into an existing polygon layer
      - [Jewish demographics circa Holocaust -sheet 2.csv](#)
- **Friday, July 8:** 8:30 am - 1:00 pm
  - Affinity groups to discuss Google Earth projects (and feel free to discuss GIS work as well!)
  - [Spatial thinking overview](#). Note that this is a four-page discussion – the bottom of each page links to the next one.
  - GIS review: What is it? What does it do? What are your options? Can you load some data, browse it, analyze it?
  - How to import [point](#) data into GIS
  - GIS, second pass: [Finding data, finding maps; building data...](#)and you never want to build your own map
  - [And now the training wheels are off! GIS under your own power](#).
  - GIS example: Here's what you might end up with after working with that school district data: [Lehigh Valley school districts](#).
  - An altogether insufficient look at mobile environments: Google Earth on a computer vs. Google Earth on an iPad; [ArcGIS.com](#) mobile services

- Time to brainstorm again: [What will you do for your GIS project?](#)
- *assignments due*: Google Earth final product
- **Saturday, July 9**: No class
- **Sunday, July 10**: 8:30 am - 1:00 pm
  - [Augmented reality](#), using ARIS
    - As a true geospatial tool: Outdoor game triggered by lat-lon
    - As a human-space tool: Indoor activity using QR codes
    - For those interested: Readings on AR are in CourseSite
  - GIS work time / intro to building in ARIS
  - A necessary but entirely wholesome evil: Spreadsheet kung-fu
  - *assignment due*: GIS proof-of-concept: GIS files (or web URL, if you are using [ArcGIS.com](#)), plus text file describing how you hope to use the finished product and what you need to do to complete it.
- **Monday, July 11**: 8:30 am - 1:00 pm
  - Augmented reality coda
  - A necessary topic: [Map design](#)
  - Affinity groups: Discuss GIS work, final project
  - Geospatial tools and pedagogy: Direct instruction v. inquiry, emerging area of game-based learning
  - Working time
- **Tuesday, July 12**: 8:30 am - 1:00 pm
  - Brief re-visit to pedagogy: teacher- vs. student-centered; flipped classrooms; game-based learning
  - Final project, project 'presentation' discussion
  - Technical support time!
    - In case anyone needs to know: A couple of [work-arounds for issues in My World](#)
    - ArcGIS.com: Please be sure to hit the "Share" button! I can't get to everyone's maps!
  - A relevant topic: [Diffusion of innovations, and specifically the innovation of geospatial tools](#)
  - [Other geospatial tools](#).
  - *assignments due*: GIS final product
- **Wednesday, July 13**: 8:30 am - 1:00 pm
  - Checking in on project work, presentation work
  - The history and the frontier of geospatial tools: From early examples of spatial reasoning to the current extraction industry
  - Illustration of value-added from geospatial tools
    - [Trees, cars, & carbon activity](#).
    - Weaving the Globe activity
  - Working time
  - Closing ceremonies
  - *assignment due*: Final project files **and** presentation files of final project. These can be turned in no later than Sunday, July 17.