
Introduction to Geospatial Data Visualization I

Lecturers: Viktor Lagutov, Anastasia Kvasha

Credits: 1 credit

Duration: September - November

Course level: PhD / MA

Maximum number of students: 35

Pre-requisites: none

Software: GoogleEarthPro (GEP), qGIS, online mapping tools (e.g. GoogleMaps, ArcGIS Online)

Course e-learning site: <http://ceulearning.ceu.edu>

Aims, Objectives and Learning Outcomes

Geospatial Technologies (GT) became essential tools not only in academic research but also in our daily life. Application of GT includes (but not limited to) data collection, storage, visualization and analysis. The range of these technologies as well as their potential application is wide and user's choice depends on issues concerned, goals to be achieved and level of computer literacy.

The aim of this course is to develop basic understanding of Geographic Information Systems (GIS) principles, to get acquainted with spatially referenced data and to foster some basic skills in its visualization (mapping). The online sessions provide both technologies' theoretical understanding and practical use for mapping societal and environmental phenomena.

The course gives a brief introduction to alternative technologies of data collection (satellite imagery, crowdsourcing, expert knowledge, etc), different maps design for different purposes (internet, journal publications, etc.). Several geospatial data file formats will be introduced (vector, raster). Many geospatial datasets are freely available for researchers online, yet they are greatly underutilized. Participants will learn what kind of data can be stored in these datasets, how to obtain, develop and share such datasets.

Both desktop and online GT solutions (GoogleEarthPro, Google Maps, ArcGISonline, QuantumGIS) will be reviewed in order to build up students' interest and ability to apply these tools in both academic research and further professional career. QuantumGIS (qGIS), the most popular and widespread open-source free GIS package, will be used as the main software package for illustrating the techniques of geospatial data collection, generation, and visualization. Working with qGIS on mapping exercises will help participants to learn the basics of a typical GIS package and mapping principles.

By the end of the course students will understand the processes of:

- acquiring geospatial information from different sources;
- creating simple maps using basic mapping packages (GEP, qGIS) and online mapping tools.

The course is organized as a series of short online presentations followed by practicals (detailed video instructions) and individual work on maps development.

Learning outcomes	Assessment	Activities	Estimated workload (h)
Awareness of GT types and their usage in various research areas	Class participation	Lectures and computer-based seminars	4
Knowledge of GIS and practical skills in geospatial data retrieval and visualization	Class participation and exercises	Computer-based seminars led by instructors, step-by-step exercises, consultations	12
Acquaintance with online satellite imagery / their products and applications in various areas	In-class exercises and homework	Self-study, Individual work and step-by-step exercises, consultations	12
Hands on experience with mapping software, various mapping related techniques and tools	In-class exercises and homework	Self-study, Library/ Internet search and reading, consultations	12
Ability of independent data collection and visualization	Homework	Self-study, Computer-based Individual work, consultations	20
Total			60

Sessions outline

N	Session description	Exercises
1	Module 0. Overall introduction to the course. Theory - Intro to cartography and geodata visualization, mapping basics, map design and components.	Self-introduction. Find any maps online to illustrate phenomena of interest.
2	Using GoogleEarth/Pro - GoogleEarth (GE) basics, retrieving sites location; maps development, maps overlay, etc.	Create a dataset in GE (kml) describing any phenomena
3	Online mapping tools, sharing, GoogleMaps	Create an online map/s using kml dataset
4	Data sources for mapping - Existing data sources and Internet data search; Online databases	Explore available sources, find useful datasets
5	Data sources (cont.) - using data in CSV / Excel format (coordinates, address); Earth Observations, Remote Sensing; ArcGIS Online	Visualize dataset from CSV / Excel file. Exploring Sentinel Hub, ArcGIS Online
6	Desktop mapping - practical mapping skills, map creation using qGIS	Map/s development in qGIS

Course Assessment

The evaluation (*pass/fail*) is based upon student's performance using the following categories:

- online class participation: student participation in online discussions is expected and encouraged.
- practical sessions: series of maps should be developed and submitted.