

Course Syllabus for GEOG 479: Advanced Topics in GIS – CyberGIS, Spring, 2016

Instructor

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Course Schedules and Locations

12:30 pm - 1:50 pm, Tuesday, Lecture, Room 338, Davenport Hall

12:30 pm - 1:50 pm, Thursday, Laboratory, Room 338, Davenport Hall

Office Hours

2:00 pm – 3:00 pm, Friday, Room 137A, Davenport Hall

Course Goals

The goal of this course is to first get students familiar with the high-performance computing components in CyberGIS, and leverage the CyberGIS architecture and resources to facilitate spatial thinking and knowledge discovery from geospatial Big Data. Students will receive hands-on trainings by accessing the computing resources provided by the world's first GIS supercomputer, ROGER (Resourcing Open Geo-spatial Education and Research). Students will interact with geospatial Big Data in various forms (e.g., geo-located Twitter data, Taxi trajectory data and national DEM, etc.); and learn to solve geospatial problems with high-performance computing approaches (e.g., Apache Hadoop and Spark) and data visual-analytics toolkits (parallel MapAlgebra, Python, R, and D3.js, etc.) for geospatial Big Data processing, analysis and visualizations.

Course Information

This course is organized in the form of lectures and labs. All the course materials, including lecture slides and lab tutorials, are available online via Bitbucket repository:

<https://bitbucket.org/geog479/>

Evaluation

The final score is based on 4 parts: lab participation (**10%**), assignments (**30%**), mid-term exam (**20%**), and final project (**40%**). If the mean final percentage for the class is under 75%, I will adjust the final grade such that the mean score is 75%. The curve will be calculated separately for undergraduates and graduates.

Course Outline (Subject to Change)

- Week 1 (01/19-01/21):
Introduction to CyberGIS, Geospatial Big Data and ROGER
- Week 2 (01/26-01/28):
High performance computing, cyberinfrastructure and GIS
- Week 3 (02/02-02/04) :
Getting started with ROGER
- Week 4 (02/09-02/11):
Distributed Spatial Databases
- Week 5 (02/16-02/18):
Taming Big Geospatial Data with Hadoop (1)
- Week 6 (02/23-02/25):
Taming Big Geospatial Data with Hadoop (2)
- Week 7 (03/01-03/03):
Advanced Geospatial Data Analytics: Pig and Python on Hadoop
- Week 8 (03/08-03/10):
Advanced Geospatial Data Analytics: Parallel R
- Week 9 (03/15-03/17):
Advanced Geospatial Data Analytics: Geo visual-analytics
- Week 10 (03/29-03/31):
Mid-term project

- Week 11 (04/05-04/07):
Terrain analysis: Parallel MapAlgebra for Spatial Analysis
- Week 12 (04/12-04/14):
Interactive Geo-visualization of Large-scale Movement Data with Spark
(1): Data processing
- Week 13 (04/19-04/21):
Interactive Geo-visualization of Large-scale Movement Data with Spark
(2): Visualization
- Week 14 (04/26-04/28): Final project