EAS 501 006 FA 2019

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EAS501.006 – GPS AND GEOSPATIAL FIELD TECHNOLOGIES (Fall 1st half of semester, annually)

This half-semester course focuses on two core geospatial field methods and technologies: GPS (global positioning systems) and field data collection tools using integrated GIS and GPS (e.g. Collector for ArcGIS, possibly others). Main topics in GPS are use of different levels/grades of GPS instruments and peripherals; best practice data collection for point, line and polygon surveys; different methods of both real-time and post-collection differential correction; and assessment and improvement of accuracy/precision. Main topics in field data collection tools are how to use of Collector to acquire point, line and polygon features; development of and use of forms in Collector for field data collection and planning; and similar applications of other software, and overall spatial data collection project design. The course format emphasizes hands-on work both outdoors and in the Lab; homework will require time to complete outside of lab. Prerequisites: one prior GIS course or EAS531 concurrently, and a willingness to go outside and collect data.

Instructor: Shannon Brines (sjbrines@umich.edu)

Office Hours: by appointment - email me with GPS Class in subject line

Credits: 1.5

Dates: Fall semester A (1st half of semester)

Meets: Thursdays 10-12 in SEAS computer classroom (3325 Dana Bldg)

Grading: Attendance and participation in class 25%; Final project report and presentation 25%; Quizzes and assignments 50%

Learning Outcome Goals
By the end of the course students will be better prepared to be able to:
1) Practice Geospatial field research and the integration of Geospatial Technologies including:
Global Positioning Systems (GPS); Geographic Information Systems (GIS) and Remote
Sensing (RS), and field observations and hands-on field data collection using
varying techniques,
2) Understand the workflow of a Geospatial field research projects and be familiar with a
range of Geospatial field applications (and appropriate use),
3) Understand data accuracy,
4) Develop and carry out a Geospatial field-based research project: from
development of a hypothesis, to employing Geospatial field techniques, to calculating and synthesizing results.

Final Projects:

Students will design their own Geospatial field data collection mission; undertake their own data collection mission (if necessary, on a practice geography); explore their collected field data; and report on all phases of their mission (including justifying their mission design and noting adjustments for future work). Students will make a "lightning talk" (no more than 5 slides and 5 minutes) about their project on the last day of this Fall A semester class (October 17).

Equipment Used:

Subject to weather and time available, this course intends to provide hands-on experience and in-person demonstrations with field equipment and technologies including: Collector Classic (ESRI, Inc.) app for iOS and android devices (students with iOS device may also install the newer Collector app); Bad Elf GPS for iOS devices; Garmin 64st GPSMap; Garmin etrex; Trimble R1 GNSS Receiver; Trimble Total Station; and an Unmanned Aerial System (UAS aka "drone").

Course Summary:

Date	Details	
Thu Sep 5, 2019	First Day: Sep 5 Quiz (https://umich.instructure.com/courses/330249/assignments/817098)	due by 11:59pm
Thu Sep 12, 2019	Read GIS Fundamentals (Bolstad) Chapter 5 (https://umich.instructure.com/courses/330249/assignments/839844)	due by 11:59pm
Thu Sep 19, 2019	EAS GPS Collector Introduction Sep12 (https://umich.instructure.com/courses/330249/assignments/839481)	due by 11:59pm
Thu Sep 26, 2019	EAS GPS Comparison Lab Sep 19 (https://umich.instructure.com/courses/330249/assignments/854128)	due by 11:59pm
	Read GIS Fundamentals (Bolstad) Chapter 14 and GPS Comparison Co-Assignment (https://umich.instructure.com/courses/330249/assignments/856140)	due by 11:59pm
Thu Oct 10, 2019	Read "Drone" Literature (https://umich.instructure.com/courses/330249/assignments/863754)	due by 11:59pm
Wed Oct 16, 2019	Final Project Slides (https://umich.instructure.com/courses/330249/assignments/865024)	due by 11:59pm
Thu Oct 17, 2019	Final Project Paper/Write-Up (https://umich.instructure.com/courses/330249/assignments/868888)	due by 11:59pm