Spring 2015
ESPM 3031 & 5031
Tuesdays 1:55-2:45 (Skok 35)
Wednesday 1:55-3:50 (Skok 35)

**Applied Global Positioning Systems for Geographic Information Systems (Applied GPS for GIS)**

This course will cover the principles and fundamentals of GPS and the use of GPS units in the field. ESPM 3031 will focus on juniors and seniors, and 5031 on graduate students.

Prerequisites will be junior (3031) or graduate (5031) standing, plus familiarity with desktop computer use. An introductory course in GIS is recommended. The course will meet twice each week. Additional time may be required to complete field exercises.

Lecture topics will focus on GPS system principles, fundamentals, operations and techniques to improve accuracy. Datums, Projections and Coordinate Systems will be covered. Differential correction and accuracy assessments will be discussed and applied in laboratory exercises. Both code phase and carrier phase GPS will be used in the class and field exercises. Several different types of GPS equipment will be studied in the classroom and used in the field. In addition to traditional GPS handheld units, students will work with Android tablets and Juno SB based ArcPad/GPS equipment. Students will transferring field data to and from desktop systems and develop skills integrating GPS data with GIS.

Students will complete three GPS data collection/location homework assignments
A final project integrating concepts from the entire course will also be required.

*Students registered in ESPM 5031 will also complete/create: a full data dictionary with Pathfinder Office and a data collection application using ArcPad Application Builder.*

Grading will be A-F; 60% labs/homework, 15% Final Project, 25% Section Tests

3 Credits – 3 hours per week (lecture and field/laboratory)

Instructor:

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Field and Laboratory Sessions

**Introduction to GPS**
1. Classroom operational exercise

**GPS Hardware**
2. Field operational basics
3. Navigation Exercise

**Projections, Datum and Coordinate System Basics**
4. Exercise in collecting points, lines and areas
5. Exercise in downloading and uploading data.

**GPS Software**
6. Exercise in integrating GPS data into GIS (initial process)

**GPS Accuracy**
8. Exercise in accuracy assessment

**GPS Process Efficiencies and Usage**
9. Exercise in creating and using data dictionaries

**Basics of the PDA**
10. PDA basics and Exercise to use layers already on the PDA.

**Working with ArcPad on the PDA**
11. Exercise to learn to open, close, create subdirectories, copy, move, write protect, toolbars, properties, projections, zoom, defaults, layers visible, symbols, power off, reset, and recovery.
12. Exercise in creating layers on desktop for the PDA, moving layers back and forth – troubleshooting
13. Exercise to create, modify and query data (pts, lines, poly, esp. attribute data)

**Editing Data**
14. Exercise in attributes and field editing with GPS – select, create, extend, move vertex, attributes, delete

**ArcPad Data Preparation**
15. Exercise using data formats: common file formats plus jpeg, mr. sid, prj files to load and load and use various data layers; including logistics with smart cards
16. Exercise to introduce ArcPad Tools and Application Builder

**Skills Integration**
17. Final Project – Field data collection and mapping