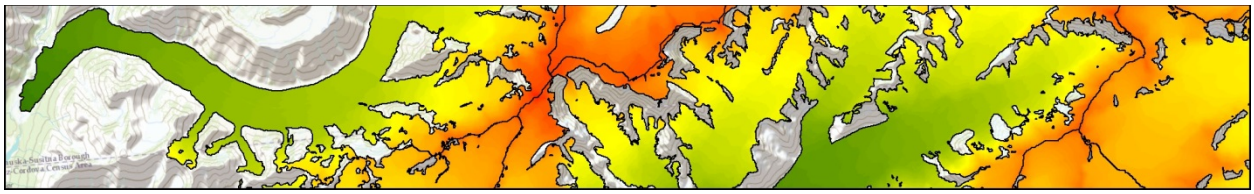

Syllabus for GEOS 458 / 658
Geoscience applications of GPS and GIS

1. Course Information:

Title:	Geoscience Applications of GPS and GIS
Number:	GEOS 458 / GEOS 658
CRN:	35309 / 35323
Prerequisites:	GEOS 222 or permission of instructor; Recommended: MATH F107X; MATH F200X
Location:	Lectures in Reichardt 233 Labs in WRRB 004
Term:	Each Spring semester
Meeting Times:	Lectures: Wednesday and Friday, 1:00 to 2:00 PM Labs: Wednesday, 2:15 to 5:15 PM

2. Instructor Information:

Instructor:	Anthony Arendt
Office:	Room 401E, Elvey Building (Geophysical Institute)
Telephone:	907-474-7427
E-mail:	arendta@gi.alaska.edu
Office hours:	Thursday 1:00 to 3:00 PM, or by appointment

Teaching Assistant:	Jennifer Davis
Office:	Room 410L, Elvey Building (Geophysical Institute)
E-mail:	jldavis@gi.alaska.edu
Office hours:	Wednesday 10 AM to 12 PM, or by appointment

3. Course readings/materials:

No specific text book is required for this course. The instructors will be providing reading material and detailed lab instructions that will be posted on the class web site.

Recommended supplementary readings:

Books

- *Geographical Information Systems – Principles, Techniques, Applications and Management* by Longley et al. (UAF Rasmussen Library: G70.2.G46 1999 v.2)
- *Getting to Know ArcGIS Desktop* by Ormsby T. et al. ESRI Press. (available for reference in the lab)
- *Getting Started with Geographic Information Systems* by Keith C. Clarke (available for reference in the lab)
- *Concepts and Techniques of Geographic Information Systems* by Lo and Yeung (available for reference in the lab)
- *Python Scripting for ArcGIS* by Zandbergen. ESRI Press (2013) (Available for reference in the lab)

Journals and Magazines

- International Journal of GIS; Geoinformatics; Geospatial Solutions; GIS Development; GPS World

Online Courses

- See: http://training.esri.com/gateway/index.cfm?fa=search.results&CourseTypeID=1 for list of courses. Contact instructor for free access to any module (offered through UAF Office of Information Technology)

4. Course description:

This course is a practical survey of Geographic Information Systems (GIS), techniques and software as applied to Geology and Geophysics. It is aimed at providing students with the background needed to use these tools in their professional and academic careers. Working with real-world data and software

tools such as ArcGIS, students will learn to organize and integrate multisource data, analyze spatial relationships and generate maps for digital and print media. An introduction to Global Positioning Systems (GPS) is also including with particular focus on mapping and survey grade GPS units and their use in a professional setting. Topics of GPS data collection include hands-on experience with recreational, mapping and survey grade GPS units as well as post processing and differential correction of raw data. This portion of the class will also focus on real world processing chains from concept through to data collection in the field and finally GIS integration. Basic principles of workflow automation and scripting using Python will be explored. The course is project-based and focuses on application of geospatial data rather than theory.

5. Course Goals and Student Learning Outcomes

Goal: The goal of this course is to take the students beyond what they have learned in a basic course in field and computer methods in geology (GEOS 222), with special focus on the principles, techniques, and real-world applications of GPS and GIS.

Student Learning Outcomes:

By the end of the course, students will be able to:

- *Use* simple and advanced GPS receivers
- *Process* differential GPS data
- *Integrate* GPS data into a GIS
- *Search, download and integrate* data available from many sources into a GIS database.
- *Reproject* and *rectify* spatial data collected from different map projections and datums
- *Perform* spatial and statistical analysis operations on tabular, vector and raster data sets.
- *Build* simple models and Python scripts to automate repetitive GIS processing tasks
- *Integrate* raster data with vector data to generate final map products.
- *Generate* readable maps with appropriate annotation and labeling
- *Apply* the acquired theoretical and practical knowledge to complete an independent term project on a topic of their choice.

6. Instructional methods:

- 1 hour lecture meeting twice a week. Lectures will be interactive and will involve use of power point presentations, blackboard, and group discussions. Material will be posted on the web.
- 3 hour laboratory component once a week will include hands-on experience with a variety of digital data, GPS equipment, and geospatial software packages.
- Reading assignments from materials provided and recommended readings on selected topics will be an integral part of the course.
- Independent project work.

7. Course calendar: See attached schedule

8. Course policies:

Attendance in lectures and labs is essential. If for some reason the course participant can not be present for a lecture or lab, they should inform the instructor in advance and make arrangements to make up time. Each student is expected to abide by the UAF Student Code of Conduct (visit: http://www.uaf.edu/catalog/current/academics/regs3.html). Plagarism of any kind will not be tolerated.

9. Grading Distribution:

Two graded homework assignments: 15%
Independent Project (including final presentation): 40%
Labs: 40% (labs are due on Wednesday at 5:15 PM, one week after they are issued)
Attendance and participation in lectures and labs: 5%

Letter grades will be used in this course:

A (>90%)

B (80 - 90 %)

C (70 - 80%)

D (60 - 70 %)

F (< 60 %)

10. Policy on Stacked Class

This is a combined 400 / 600 level course, with a mix of undergraduate and graduate students. Graduate students enrolled at the 600 level will be required to perform additional tasks to earn credit. These tasks will include: performing additional steps in labs; answering advanced questions in labs and homework; conducting a more in-depth and lengthy research project.

10. Independent Project:

Each student is required to carry out an independent term project. Students are encouraged to work on a topic that helps extend their ongoing thesis research or professional work in industry. They are required to discuss their project early on with the instructor and turn in a 1-2 page project proposal for approval by the indicated day. The project proposal will be graded as part of the overall project. Students should be aware that the independent term project is time-consuming. Though some time will be available during the scheduled lab hours, these hours will be insufficient to complete the project, and students should be prepared to put in extra work hours.

11. Disabilities Services:

The instructor will work with the Office of Disabilities Services to provide reasonable accommodation to students with disabilities.