

SYLLABUS: GEOLOGY 275 – Geologic Data and Analysis Fall 2009

Credits: 4.0

CRN: 168

Lecture meets MWF 12:00-12:50 p.m., Sci1 205

Lab meets: Wednesday, 1:00-2:50 p.m., Sci1 205

Prerequisites: Geol 220

Textbook: Field note book (no larger than 8½” x 11” fully open; see <http://www.mmdsales.com/store/Scripts/prodView.asp?idproduct=748> or <http://www.amazon.com/gp/product/B0011DGJSC> for suitable field books; there’s even one specifically for Geology, ISBN 978-1-932149-35-7). There will be handouts provided during the course via Angel which give background and overviews of mapping methods and techniques. If you are staying in the major, I recommend purchasing a copy of *Geology in the Field*, by Robert Compton (John Wiley and Sons, 1985; ISBN: 0-471-82902-1). This text provides a wealth of standard approaches to geologic data description and collection.

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Course Description (from the Undergraduate Catalog): “An examination of field and remote sensing techniques for gathering spatially distributed and oriented geologic data and common techniques for the preparation, analysis and presentation of these data. Brunton compasses, handheld GPS units and simple surveying tools will be utilized in collection of field data. Construction of GIS maps, using a variety of bases (e.g., topographic maps, aerial photos, satellite images, etc.) and geologic interpretation of mapped data will be a central focus of laboratory activities.”

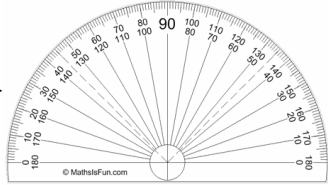
Course Overview: This course focuses on the collection of field data and how to organize, visualize, and analyze this data in a computer environment. Thus, this course will move back and forth between field data collection and the computer. Brunton compasses, handheld GPS units, digital photographs, surveying tools, and of course, *your eyes*, will be utilized to collect field data. Students will develop skills in identifying and describing geologic materials and topographic features. Students will develop good field note taking habits, and learn how to make field observations. They will construct maps in the field, and overlay field data in a GIS environment in the lab (e.g., overlaying topographic maps, aerial and ground-based photos, satellite images, GPS measurements, etc.). Students will engage in the construction and interpretation of geologic maps. Expect to spend lab time and some lecture time outdoors!

Course Goals

Students will:

- Develop mapping skills using a tape and compass
- Develop topographic profiling skills using hand sites and tapes
- Develop surveying skills using an autolevel tool
- Learn how to collect rock orientation information using a Brunton compass
- Become proficient in measuring and mapping features in field settings using a GPS receiver
- Become proficient in transferring field data to a GIS environment
- Develop skills in creating and interpreting maps of geologic data
- Learn how to collect spatial information from photographs
- Become proficient with accessing and processing online spatial data

Tools for the course Students must have the following tools to complete the lab and field exercises:

- Pencils
- Field note book (no larger than 8 ½ x 11 fully open)—should fit in a jeans pocket
- Map case or clipboard
- Ruler (standard and metric)
- Protractor 
- Compass for drawing arcs
- Sturdy shoes for field work (wear shoes you are willing to get wet—we will be hiking along and in some creeks!)
- GPS unit (check out from Lisa in the Earth Sciences main office)
- Brunton compass (check out from Lisa in the Earth Sciences main office)
 - Alternatively, you can purchase one for yourself. The minimum features for a compass include an inclinometer, an adjustment for declination, and sighting mirror. I use a Silva Ranger for most geologic mapping. It's sufficiently accurate for most reconnaissance mapping, light weight, and very easy to use. Here's a place to look for one...
<http://www.thecompassstore.com/ranger1.html>. Here's the industry standard Brunton compass: <http://www.brunton.com/product.php?id=144>. It costs a lot more, but when used with a stable platform, it's a superior instrument.
- Tape measure (optional, preferably metric)
- Hand lens (optional)

Grading

Grades will be based on **exercises** (80%), and a **final exam** (20%). The field exercises will consist of field notes (hand in copies of these), and write-ups to be completed and handed in when due (listed in each exercise). Lab exercises will involve creating maps from digital data, analyzing data and answering questions, etc.

Field notes are vitally important—whether the subject matter is environmental consulting, or more traditional geologic mapping. Field observations and notes form the basis of interpretation. Once back in the office, there is no other resource for a write-up than your notes. Believe me, memory just won't last! In addition, good note taking habits will often lead to new insight into the features you are mapping.

Field notes *must always have the following*: the date and time; location; purpose of exercise; a note on weather conditions; and a list of co-workers. The notes should then include measurements, maps, observations, and sketches as appropriate to the exercise. Prior to leaving a field location, make sure you look over your notes for any omissions—and certainly keep your hands on your field notebook. A lost field notebook can mean the loss of a field season of observations!

Lab Exercises will be graded based on a rubric which will detail necessary features that the student must complete and provide a scale for the quality of the student's effort. A rubric is a standard and a mirror which provides feedback to the student. Some of the exercises in the class will be repeated, so that the student learns from the rubric and is able to improve and develop skill and mastery of the technique. Most lab write-ups will be due on the Monday following a lab exercise (labs occur on Wednesday).

The final exam will consist of short answer and sketching. The test will draw from all of the exercises, and help you bring together the various components of the course.

Final grade assignments will be based on the weighted sum of the average of scores received on the exercises (80%), and final exam (20%).

Grade assignments will be *guided* by the standard University curve given below.

<i>Percent</i>	<i>Grade</i>		<i>Percent</i>	<i>Grade</i>		<i>Percent</i>	<i>Grade</i>		<i>Percent</i>	<i>Grade</i>
93-100	A		87-89.9	B+		77-79.9	C+		67-69.9	D+
90-92.9	A-		83-86.9	B		73-76.9	C		63-66.9	D
< 60	F		80-82.9	B-		70-72.9	C-		60-62.9	D-

Course Expectations and Guidelines

In class responsibilities

Students will:

- Attend all classes and arrive punctually.
- If unavoidably late for a class, enter quietly and unobtrusively, and behave in other required ways to minimize distraction.
- Remain alert and attentive during lectures, discussions, and other class/lab activities.
- Avoid unnecessary conversation during lectures, discussions, and other class/lab activities.
- Contribute to class experiences by asking relevant questions, offering relevant examples or views, adequately answering questions posed by others, engaging in critical and independent thought, and challenging both the instructor and the curriculum materials assigned for the course.
- Demonstrate courtesy and respect in dealing with instructors and classmates.
- Recognize and seek to understand diverse points-of-view.

Out-of-class responsibilities

Students will:

- Place academic obligations at the top of the list of college-related priorities.
- Plan to spend 2 to 3 hours out-of-class time in academic study for every one hour of class attendance.
- Thoroughly plan and prepare for classes.
- Notify the instructor in advance, if possible, or in a timely fashion, if unable to attend a class or lab, take a scheduled exam or quiz, submit a scheduled assignment, or remain in the classroom for the entire class meeting because of unavoidable circumstances.”
- Academic dishonesty will not be tolerated and those engaging in it will be prosecuted. See the Academic Honesty & Dishonesty pamphlet published by the Dean of Students Office for further information.

Emergency Evacuation/Shelter-in-Place Procedures: In the event of an emergency evacuation (i.e. fire or other emergency), classes meeting in Science I are directed to **reassemble at Chase Gymnasium** so that all persons can be accounted for. Complete details of the College’s emergency evacuation, shelter-in-place, and other emergency procedures can be found at <http://www.oneonta.edu/security> .

Lecture meets MF 12:00-12:50 p.m., ***Lab meets:*** W, 12:00-2:50 p.m., Sci1 205

Lecture and Lab Schedule (*this schedule is subject to change if more time is required for some topics*).

<i>Date</i>	<i>Day</i>	<i>Topic</i>
Aug 26	W	Course Overview and ; Intro to Maps Elements, Scale/Projection, Reference frames, and features representation
Aug 28	F	The math of mapping: Datums, distance and angles; coordinates
Aug 31	M	Mapping with coordinates; Intro to Excel
Sep 2	W	Lab 1 Stride and Compass Survey
Sep 4	F	Lab 1 Survey data reduction in Excel
Sep 7	M	Converting Bearing-distance to Easting-Northing
Sep 9	W	Lab 2 Repeat Stride and Compass Survey
Sep 11	F	Lab 2 Survey data reduction
Sep 14	M	Topographic surveys: the 3 rd dimension and the math of 3D data
Sep 16	W	Lab 3 Topographic profiles with hand site and tape
Sep 18	F	Reduce Lab 3 data
Sep 21	M	Introduce Geomorphic mapping exercise: Silver Creek
Sep 23	W	Lab 4 Geomorphic mapping with tape and compass
Sep 25	F	Reducing bearing/distance data to coordinates
Sep 28	M	NO CLASS
Sep 30	W	Lab 5; Mapping with GPS handheld units
Oct 2	F	Download data into MapSource and Excel
Oct 5	M	Introduction to Total station surveys
Oct 7	W	Lab 6 Total Station Survey
Oct 9	F	Reduce Total Station data
Oct 12	M	Intro to Digital Spatial Data: Layer types
Oct 14	W	Lab 7: Accessing online spatial data

Oct 16	F	Make a map from data layers
Oct 19	M	NO CLASS: Lab 8 GPS survey of Geomorphic Features
Oct 21	W	NO CLASS: Lab 8 GPS survey of Geomorphic Features
Oct 23	F	Finish Lab 8 Geomorphic features map in Global Mapper
Oct 26	M	Photographs as spatial data: Scale; camera orientation; relief displacement; projections; Air photos as maps
Oct 28	W	Lab 9 Photogrammetry and Total Station Measurement
Oct 30	F	Analyze data for Lab 9
Nov 2	M	More on photographic scale in natural settings
Nov 4	W	Lab 10 Photogrammetry in Natural Settings
Nov 6	F	Analyze data for Lab 10
Nov 9	M	Stereophotography
Nov 11	W	Lab 11 Stereophotographs as Measurement Tools
Nov 13	F	Reduce Data for Lab 11
Nov 16	M	Creating a geologic cross section
Nov 18	W	Lab 12: Using Excel to Generate a Geologic Cross Section
Nov 20	F	Work on Lab 14
Nov 23	M	NO CLASS
Nov 25	W	NO CLASS
Nov 27	F	NO CLASS
Nov 30	M	Overlaying geology with other layers in GIS; image rectification
Dec 2	W	Lab 13: Geology, topography, and landslides
Dec 4	F	Work on Lab 13
Dec 7	M	Work on Lab 13
Dec 9	W	Review of mapping techniques
Dec 11	F	Hand in Labs; Review for final exam
Dec 14	M	FINAL EXAM, 2:00-4:30

Fall 2009

August 23-25	Sunday-Tuesday	New student arrival & orientation
August 26	Wednesday	Classes begin
September 25	Friday	College closes after last class
September 30	Wednesday	Classes resume
October 23-25	Friday-Sunday	Homecoming & Family Weekend
November 20	Friday	College closes after last class
November 30	Monday	Classes resume
December 9	Wednesday	Follow Monday class schedule
December 10	Thursday	Follow Tuesday class schedule
December 14-18	Monday-Friday	Finals