

Curriculum: What you will learn.

The course focuses on three **fundamental** topics, each expanded below.

1. Traditional geologic mapping techniques

- a. Locating your self on the map
 - i. orienting the map with respect to your look-direction
 - ii. reading contours and topography (at various scales)
 - iii. using the Brunton compass for triangulation
 - iv. distance, height and pace approximation
- b. Rapid collection and plotting of planar and linear structural data in the field
 - i. strike and dip
 - ii. trend and plunge
 - iii. rake/pitch
 - iv. identifying bedding or other features vs. foliation, avoiding float
 - v. up indicators (paleochans, trace fossils, sole marks, x-bedding, turbs)
- c. Effective use of a field notebook
 - i. organization/clarity
 - ii. sketching
 1. visualization/3-D geometry/cartooning/block diagram
 2. conceptual, creative playground
 3. hypothesis generation and testing
 4. communication of concepts to others
 - iii. distinctions between observation and interpretation
 - iv. a memory resource: your daily record
- d. Working with Rocks
 - i. hammer, hand lens, magnet, acid, etc
 - ii. Classification schemes for dif. rocks (mineralogical, genetic, textural,...)
- e. Creating and Working with Geologic Maps
 - i. measuring unit thickness off a map
 - ii. how to deal with covered sections or regions outside the field area
 - iii. recognizing lateral and temporal classification of formations that have huge lateral extent...how to differentiate
 - iv. contacts
 1. faults: type, displacement, shear sense indicators, etc
 2. paraconformity, unconformity, conformable, etc.
 3. how to recognize them in maps, how to draw them
 - v. creating cross sections on maps
 1. topographic profile
 2. projection of structures onto line
 3. apparent dip calculation
 4. what happens at depth
- f. Mental Concepts for the Field
 - i. Not just collecting data for data's sake but continuously reevaluating your working hypothesis...iteratively deciding where your next stop should be, what data you need to collect in order to test your hypothesis.
 - ii. Synthesis: Linking disparate observations together

2. Digital tools for geologic mapping

- a. Knowing GIS: tools for making maps in the office
 - i. ESRI Arc Applications
 - ii. Loading, creating, editing and visualizing various forms of data
 1. Points, Lines, Polygons, Rasters
 - iii. Organizing files into an efficient directory structure
 - iv. Creating final maps: legends, colors, symbology, printing
- b. Knowing iPAQ handheld computers: mapping tools for the field
 - i. iPAQ basics: power, data storage, care, transferring data, charging
 - ii. ArcPad GIS Application
 1. Loading and displaying base-map data
 2. Map manipulation: panning, zooming, turning layers on/off
 3. Activating and troubleshooting the GPS
- c. "Rocksmith" Application: An extension within ArcPad for geologic mapping
 - i. Sherman's help documentation
 - ii. installing and running the application
 - iii. collecting point, line and polygon data

3. Preparation of a compact field manual

- a. Goal: Create a short (< 30p), compact field manual serving 2 proposes:
 - i. Summarizing Clark's Western US geology lectures into field notes
 1. Schematic maps, x-sections and strat. columns through time
 2. A time-line of tectonic events effecting the Western US
 - ii. Tip-Sheets regarding fundamental geologic concepts and terms
 1. well-drafted, well-annotated diagrams for fundamental concepts
 - a. lithologic and structural symbology, rock classification, geologic timescale, etc.

Rationale for digital mapping

- Map compilation/publication stalled by traditional, hand made methods
- Semester two does not require much effort as map is finalized in the field
- office map left at camp in traditional geology, digital everyone gets a fresh map daily

Still To be Written:

- Grading (pass-NP or Grade?), no quiz, no final exam, just labs
- Required Materials? Books?, Tools?
- Expectations: collaborative work but independent final products

Potential Local Field Trips

- Bevertail Point in RI
- Nahat beach exposures
- World's End
- Roxbury conglomerate exposures, Blue Hills for map reading skills
- Chestnut Hill Mall outcrop

Purchases?

- multiple copies of Compton of similar
- field notebooks
- field monitors/keyboards/USB memory sticks/solar panels for camp