# GEL 2530 - Introduction to Geologic Field Work

## FIELD DAY 1 (100 pts)

| | | |
|---|---|---|
| LOCATION: | MSU Denver<br>Science Building, Denver,<br>CO 80204 - Room SI2012 | GPS: 39.74397583301858,<br>-105.00158782495242 |
| TIME: | Start 9:30 AM: Meet in SI2012<br>*(Leave "home" at appropriate time to arrive BEFORE start time)* | |

"II First 3 Notebook Pages"Video Lecture (click here)

"III Field Notebook Entries"Video Lecture (click here)

GENERAL INFO

- ☐ Bring a Sack Lunch
- ☐ Bring ALL your Course Equipment including writing utensils
- ☐ Bring any personal item you deem necessary for the day (e.g. sunscreen, hat, jacket, etc.)
- ☐ "Facilities" are available

| | |
|---|---|
| FIELD OBJECTIVES: | 1. Establish Eye Height & Pace Distance<br>2. Familiarize / start using Brunton™ Geological Transit<br>3. Field Notebook Entries<br>4. Height Measurement Exercises<br>5. Pacing Exercises |

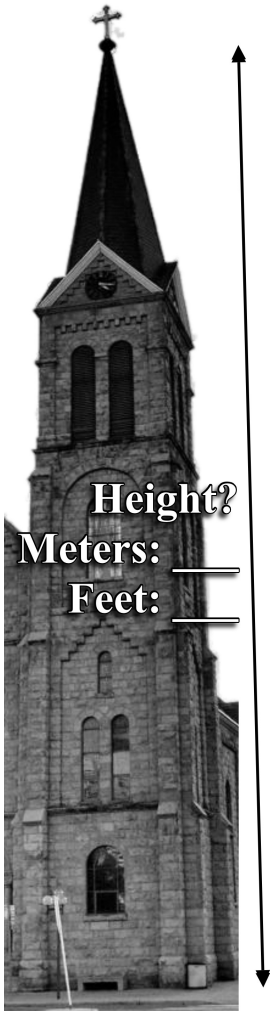
| | |
|---|---|
| **GRADING:** | - All exercises to be answered / documented in Field Notebook -<br>**Field Notebook Due on CANVAS by 6:00 PM**<br>***Use your cell phone (PDF creator app?) to make quality copies of today's notebook entries & exercises for upload***<br>***You will lose 5% per hour late with a minimum of 50% score after that***<br>You may work in groups of up to 3 people. However, each individual must turn in their individual notebook with ALL notes and data by the end of the day |

General Grading Rubric: Generally my grading is pretty much straight forward. I will deduct points from each exercise below for errors, falsehoods, idiosyncrasies, omissions, non-legibilities, computation discrepancies, missing data, calculation mistakes, etc. etc. Percentages of total points may be deducted for repeated errors or larger omissions. This includes missing (forgotten) essential field equipment.

| | | |
|---|---|---|
| Field Notebook Entries | Including opening pages with address, eye height, pace distance, and Index data | 5 points |
| Exercise Method Ia - Height Measurement with Clinometer on Level Ground - see below - | | 15 points |
| Exercise Method III - NO Brunton™, NO Problem: Height by Parallax - see below | | 15 points |
| Exercise Method IV - NO Brunton™, NO Problem: Height by Stick - see below | | 15 points |
| Exercise Method V - NO Brunton™, NO Problem: Height by Shadow & Stick - see below | | 15 points |
| Exercise Method II - Height of Sloping Hills if d is NOT known - see below | | 15 points |
| Exercise Pace and Brunton™ Traverse with Error Correction - see below | | 20 points |

**Field Reconnaissance Exercises**

| | |
|---|---|
| Measuring the Height of an Object | In field work, the thickness of formations on a cliff outcrop across a valley, for example, needs to be ascertained. In preparation for such a task we will measure the height of the St. Elizabeth's Church Tower, using all four of the following field methods. Record all measurements and calculations **neatly** in your field notebook. |

| Method | Church Tower Height | |
|---|---|---|
| *Copy this header and title into your field notebook*<br>Field Work Handbook, p.26, Brunton™ Method:<br>Method Ia - Height Measurement with Clinometer on Level Ground<br>*Please summarize the way you used this method in your fieldnotes and indicate any calculations you have made!*<br>*Sketch the church tower. Then SHOW the method with measurements in your notebook in association with the tower!* | _____ m<br>_____ ft |  |
| *Copy this header and title into your field notebook*<br>Field Work Handbook, p.28, :<br>Method III - NO Brunton™, NO Problem: Height by Parallax<br>*For this method to work correctly you should pace a fairly large distance. Please summarize the way you used this method in your fieldnotes and indicate any calculations you have made!*<br>*Sketch the church tower. Then SHOW the method with measurements in your notebook in association with the tower!* | _____ m<br>_____ ft | |
| *Copy this header and title into your field notebook*<br>Field Work Handbook, p.30:<br>Method IV - NO Brunton™, NO Problem: Height by Stick<br>*Please summarize the way you used this method in your fieldnotes and indicate any calculations you have made!*<br>*Sketch the church tower. Then SHOW the method with measurements in your notebook in association with the tower!* | _____ m<br>_____ ft | |
| *Copy this header and title into your field notebook*<br>Field Work Handbook, p.31:<br>Method V - NO Brunton™, NO Problem: Height by Shadow & Stick<br>*Please summarize the way you used this method in your fieldnotes and indicate any calculations you have made!*<br>*Sketch the church tower. Then SHOW the method with measurements in your notebook in association with the tower!* | _____ m<br>_____ ft | |
| *Copy this header and title into your field notebook*<br>Field Work Handbook, p.27:<br>Method II - Height of Sloping Hills if d is NOT known<br>*Please summarize the way you used this method in your fieldnotes and indicate any calculations you have made!*<br>*Sketch the staircase. Then SHOW the method with measurements in your notebook in association with the tower!* | _____ m<br>_____ ft | In the Science Building Staircase, measure the height of the second floor from the first floor using the straight eyesight Brunton™ method. |

| | |
|---|---|
| Pace and Brunton™ Traverse with Error Correction | During this exercise you will need to do a mapping traverse using your Brunton and pacing distances. Do the following directional pacing exercises as outlined below. Transfer you traverses **TO SCALE** into your field notebook. Once you completed your original traverse, indicate your error corrected path on your map. |

Intro

Pace-and-Brunton mapping is a reconnaissance tool for mapping smaller areas in the field. The map is made by pacing a series of distances or paths, with each leg of the path having a compass direction and a pacing distance.

How to

For this exercise, go to the starting point A (Which is the yellow hydrant outside the science building). From here, do a sighting along the first bearing given and pace off the associated distance to point B (you may want to mark point B). Here, you take the next indicated sighting in a new direction and pace of that distance to point C, and so forth. Eventually you will have completed the path and should end up exactly at point A again, if no error (either through pacing or sighting) was introduced. This is rarely the case and you will end up somewhere in the vicinity of point A, but not directly on it. Let's call your ending point A'. This gap between A and A' is called the error-of-closure.

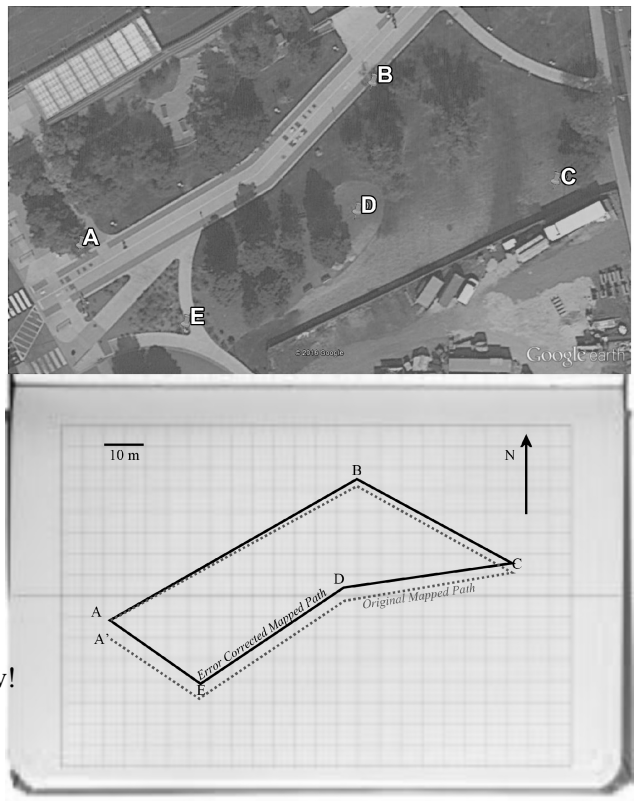
Error correction:

The error-of-closure can be fixed on your map with a simple error correction procedure. What you will need is the bearing from A' to A and the distance from A' to A.

Step 1: Divide the distance between A' and A into the number of segments (n) of your traversed leg minus the one back to A. In our case this number will be 4 (A to B; B to C; C to D; D to E; not E to A because we are returning back to A on this leg)

Step 2: At every point of direction change after A (e.g.; B, C, D, E), move your original mapped point in your field notes in the direction of the error bearing by an equal increase of the fractional error amount, or in other words by 1/4 of the error distance (remember, we had 4 segments that need correcting). So we correct point B by 1/4 of total error distance, point C by 2/4 (½) of total error distance, point D by 3/4 total error distance and point E by 4/4 error distance, which should now move A' back unto A. (See mapping example of exercise below.)

| |
|---|
| START: Outside at the SW corner of the science building is a bright yellow hydrant. This is your starting point. Mark this point "A" on your map.<br>*Hint: The hydrant is metal. Please mitigate any magnetic deviations imposed on your compass.* |
| **Traverse Point A to Point B**<br>**N 61° E 65.5m** |
| **Traverse Point B to Point C**<br>**S 61° E 40.5m** |
| **Traverse Point C to Point D**<br>**S 81° W 39.5m** |
| **Traverse Point D to Point E**<br>**S 57° W 40.0m** |
| **Traverse Point E to Point A**<br>**N 53° W 26.0m** |




Please enter you completed map into your notebook, as depicted in the example! Don't forget scale & North arrow!

Use a ruler with protractor to draw your path and the error corrected path in your field notebook, as shown!