

Geological Sciences (BA/BS) – Sciences

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Step 1: Student Learning Outcome

DLO 1.4: Analyze data of various spatial and temporal scales using modern computational and quantitative methods.

Step 2: Assessment Methods and Measures

For this assessment, the students from GEOL306 (Structural Geology) used a web-based interactive computer platform called Jupyter Notebook to modify provided Python scripts that calculate strain within geological materials. This assessment corresponds to part of one of their weekly lab activities. Tensors for different types of strain (i.e., pure, simple and sub-simple strain) are provided as well as a reference figure (i.e., a star) to be deformed. The students must extract relevant parameters from the tensors (as described in detail in a handout that accompanies the activity), use them to deform the star, plot the resulting data using the provided modifiable plotting script, and compare and contrast their findings. The exercise builds upon the programming and linear algebra tools that students acquired within their GEOL300 Data Analysis. The goal is to demonstrate and investigate ways to quantify what is treated as a qualitative observation in the field (e.g., Is the rock strained? By how much? What type of strain?).

Step 3: Criteria for Success

For this exercise, success would demonstrate the ability to apply computational and qualitative skills in an applied setting. In terms of scoring, this would be demonstrated if 60% of the students scored 75% or higher in the exercise. The score was obtained by comparing to a key that has all the results and plots filled out (see DLO1.1-F23-GEOL306-LaboratoryKey in Supporting documents).

Step 4: Summary of Results

Of the 11 students in the class, one had stopped coming to class and eventually withdrew, leaving 10 to complete the exercise. Of these, only 2 (20%) met the criterion for success. Two other students did not turn in the exercise at all, and the mean of the eight remaining students was 59%. Most students in the class fell in the second quartile (see DLO1.4-F23-GEOL306-ScoreDistribution in Supporting documents).

Step 5: Action Plan

- 1.** Go over exercise in more detail in the laboratory
- 2.** Some students had not taken GEOL300, so couldn't scaffold upon this content
- 3.** No students came to office hours that week, so a point will be made to encourage them to do so if they encounter difficulties (even more than is currently done)