

Final Project

Rubric

Note: The Final Project is 30% of the total grade for this course.

Name:

Category	# Points Earned
Proposal	10
Meetings with Staff	5
Design Elements	25
Execution	25
Code Quality	15
Analysis & Website	15
In-class “Flash Talk”	5
TOTAL	100

Proposal (10 points)

- _____ (2 points) A **hypothesis** is stated that can be tested using data and computation. It is specific enough that you can reasonably evaluate it within the time frame for the project. Background context for the problem is given.
- _____ (2 point) There is a brief **description of the data** to be used in the project, and the **data sources** and **format** of the data are specified.
- _____ (3 points) The **steps** of the program are numbered, specific, and manageable. You must list which tools (e.g., Python, Excel, Google Earth, etc.) you will use. You do not need to turn in skeleton code, but I strongly recommend you write out skeleton code at this time if you are planning a Python project.
- _____ (1 point) There is a description of how **user input** could be used to make some aspect of the program interactive.
- _____ (1 point) There is a description of how your results will be **presented visually** on your project website (e.g., table, chart, screenshots, etc.).
- _____ (1 point) The major **roadblocks** are listed. What could go wrong with the steps you outlined, and what is your backup plan?
- _____ Total

Meetings with Staff (5 points)

In the week before the project is due, you must meet with a TA or the instructor to discuss your progress.

- _____ (2 points) Checked in with staff at least once.
- _____ (3 points) Discussed a self-evaluation of your project with staff. You must print out a copy of this rubric and grade your project in its current state. This will help you look over the rubric and reflect on your progress. Your self-evaluation will **not** affect your final grade on the project.
- _____ Total

Design Elements (25 points)

A *bug* is a problem with the code, whereas an *error* might be an issue with the data or the user inputs.

- _____ (5 points) Data imported and cleaned up. **Excel:** data is imported correctly. In any tool, errors or inconsistencies in the data are addressed. **Python:** data is read in from one or more files or URLs correctly. Extra text in each file is stripped away before analysis.
- _____ (5 points) Well-formatted output. **Excel:** cell formatting and/or conditional formatting is used to highlight the results and special cells. **Python:** results of the analysis are either printed to the screen (using `print` statements) or written into an output file in a reasonable format.
- _____ (10 points) Problem breakdown. **Excel:** sheets break the problem down into meaningful subproblems and partial results. **Python:** functions and variables are used to break the problem down into meaningful pieces. One could reuse these functions in a different context to compute something different.
- _____ (5 points) Interactive component. **Excel:** data validation is used to let the user interact with the spreadsheet. **Python:** the `raw_input()` function or another interactive function is used to let the user interact with the program when it is run.
- _____ Total

Execution (25 points)

A *bug* is a problem with the code, whereas an *error* might be an issue with the data or the user inputs.

- _____ 20 points to start.
- _____ (× -1/-5 points) Bugs in the code (minor/major).
- _____ (× -1/-5 points) Errors are not handled (minor/major).
- _____ (5 points) Test function or toy dataset that demonstrates correctness. **Excel:** Include a small table with simple made-up data to test your formulas. A reader can look at your data and predict the outcome of the formula on this data, then verify that the formula is correct. **Python:** A test function should take no input, call the original function several times with some test inputs, and return True if and only if all test calls return the expected values. Otherwise, the test function should return False.
- _____ Total (≥ 0 points)

Code Quality (15 points)

- _____ (3 points) Naming conventions. **Excel:** descriptive sheet names and row/column labels. **Python:** descriptive variable and function names.
- _____ (5 points) Good use of comments. **Excel:** first sheet describes all other sheets, and comments/text boxes are used to describe the formulas. **Python:** header comments (top of .py file), function descriptions and inputs/outputs (triple-quoted string), and comments for tricky parts of code.
- _____ (5 points) Organization of source code. **Python:** Blocks of code that are run multiple times are not cut-and-pasted, but instead are written as loops and functions. **Excel:** Raw data is not copied and pasted between sheets or within a sheet; formulas are used to refer to cells.
- _____ (2 points) Checking for potential errors that could occur if the data source changes. **Excel:** Formulas that could fail with bad data values check input (e.g., using “IF” formulas). **Python:** Functions that could produce incorrect results when given bad input check to make sure that input values are valid.
- _____ Total

Analysis & Website (15 points)

- _____ (2 points) The “front page” of the website has a concise statement of the problem and the hypothesis.
- _____ (4 points) Methods, analysis, and results are presented well (writing is concise, tables/plots/screenshots are used, etc.).
- _____ (3 points) Website presentation (organized well, no spelling mistakes, no dead hyperlinks, files available for download unless data should not be made public, etc.)
- _____ (4 points) Discussion of expected and unexpected findings.
- _____ (2 points) Reflection on approach, what went well and what did not.
- _____ Total

In-class “Flash Talk” (5 points)

On the final day of class, you will give a “flash talk” about your project lasting 1 to 2 minutes. You do not need to make slides; instead, you will be able to load your webpage on the projector. Practice your talk at least five times on your own before class time. Make sure you cover the following points:

- _____ (1 point) What is your hypothesis and why it is interesting to explore?
- _____ (1 point) Very briefly, what is your approach to the problem was and what tools did you use?

_____ (1 point) What data did you analyze?

_____ (1 point) Was your hypothesis true based on your findings? You will be able to navigate to your webpage to show any charts or visual results.

_____ (1 point) What are the limitations of your approach?

_____ Total