Guidelines for Term Project

GEO 382S (Physical Hydrology), UT Austin, Instructor: Bayani Cardenas

The goal of this term project is to provide the student with the experience of working with and analyzing real-world hydrologic data or processes. The expectation is for the students to find or collect their own data, analyze the data, and then present it as a report as one would for an agency or for a research paper. In a few cases, the project may be based on modeling where synthetic data is used. Graduate students are encouraged to choose a topic or analyze data outside of their thesis but possibly complementing it. Another possibility is to analyze thesis-related data that would normally not be done within the current scope of the thesis. Through the course of picking a topic, collecting data, and analysis, the students should work closely with the instructor.

FORMAT AND OUTLINE

At least 15 pages of double-spaced text (Times New Roman, 12 pt) with 1" margins, excluding Cover Page, Figures, Tables, and References

It should have the following sections:

1. Introduction and Literature Review
2. Objective and Methods
3. Data, Results and Discussion
4. Conclusion
5. References

Final Presentation will be a 12 minute oral presentation (Powerpoint is suggested but not required)

POTENTIAL TOPICS

Below are some potential topics that students may choose from but students are also *encouraged* to propose their own topics with consent from and after consultation with the instructor. Note that due to the size of the class, there are not enough suggested topics to go around. These topics will be assigned on a first-come-first-serve basis. Phd students are expected to work individually. MS students can work in pairs depending on project difficulty, while undergraduate students will work in groups of three or more students with the limit on the number per group also depending on the difficulty.

Level of difficulty
🌶=a little bit more work than one homework set (this is for slackers since there are none in the class, I have not suggested topics falling under this category)
🌶🌶= mostly gathering and digging for data followed by some analysis
🌶🌶🌶= you would need to learn or know some basic methods not covered in class
🌶🌶🌶🌶= you would need to learn or know some quantitative methods not covered in class

🌶🌶🌶🌶🌶= you would need to learn or know some quantitative methods not covered in class and not yet tested by the instructor

The novelty of the topics does not necessarily correlate with the pepper rating. Most of the project topics, if you end up doing excellent analysis and are able to dig up appropriate data, could lead to journal papers. 4-5 peppers approaches or is within the realm of publishable papers if the analysis works out.

The number of students does not apply to Phd and MS students.

The transmission of dam-induced stage changes in the Lower Colorado River: data interpretation and flood wave modeling (*2 students*) 🌶🌶🌶🌶🌶 Stage data from different parts of LCR over tens to more than 100 km will be collected and analyzed to determine how a dam-induced flood travels through the LCR. Dam-induced stage variations will be modeled using kinematic wave or diffusive wave approximations. The model will be driven by upstream data.

Temperature variations in the riparian zone of the the Lower Colorado River due to dam-induced stage changes (*2 students*). 🌶🌶🌶🌶 Temperature in a piezometer transect on the banks of the LCR will be monitored.

Comparison and linking runoff properties and hypsometric properties of watersheds in Texas (1 *student*) 🌶🌶🌶🌶
This will require analysis of DEMs so advanced skills in ArcGIS or MATLAB are needed.

Calculation of ET in an idealized small watershed/hillslope system taking into account aspect distribution (1 *student*) 🌶🌶🌶🌶🌶
This will require modifying a yet to be published model that calculates ET a point to take into account 3D topography.

Is Texas getting warmer? Focus on extreme temperatures (*several students*) 🌶🌶
Students will collect ground and air temperature archives from weather stations across the state and delineate trends for number of days above 100 F or some other threshold, if any.

Long-term (decadal) discharge variations in undammed Texas rivers 🌶🌶 (*several students*)
Historical discharge data from undammed rivers or those little affected by dams in TX will be analyzed.

Comparison of flood hydrographs from urban and undeveloped watersheds 🌶🌶 (*several student*) Historical discharge data from undammed rivers or those little affected by dams in TX will be analyzed.