

The following outlines the deliverables you will be responsible for this project. All submissions should be made to Canvas unless otherwise instructed. Submissions should include **both Rmd and knitted HTML files** when appropriate as well as any other necessary files to meet the objective of the submission.

## 1 BIG PICTURE DEVELOPMENT

It will be easier to proceed if you understand how probabilities and expectations are used to draw conclusions regarding a population from a sample (aka inferential statistics). Two assignments will be given to help develop this big picture understanding. The second assignment will be due when you come to your first project meeting.

BIG PICTURE EXPECTATION (10 PTS) IN CLASS BY: 9/4/24, 2:00PM

BIG PICTURE STATS (10 PTS) AT MEETING BY: 9/13/24, 3:00PM

## 2 MEETINGS

Schedule a meeting with your professor during the weeks of September 10 and September 16 to discuss your progress and your plan for next steps as well as any submission required prior to the meeting. You must determine 3 additional weeks in which you will meet with your professor as part of your project deadlines. Use Calendly (see the syllabus) to schedule these meetings.

Come prepared to give an update on your progress and have at least two questions you have about the project, your project planning, or problems you are or anticipate having. This meeting will a graded activity and your grade will be based on your preparation for the meeting, your completion of work, and your participation in the discussion (the more ownership of this meeting you take, the better your grade will be).

You will be assessed on your meetings using the rubric available in Canvas. You may wish to review this in advance and prepare for the meeting.

MEETINGS COMPLETED (20 PTS) BY: 9/13/24, 9/20/24, 3:00PM

## 3 PEER EVALUATIONS

You will work on projects with 1-2 other classmates. There are many ways to collaborate as a team, but to ensure that we are meeting our learning objectives the following guidelines will define how your team operates. Each member of the team will maintain their own research journal and will maintain their own RMarkdown/SPSS Outputs files that represent their contribution to the team work. Each team member should engage with the variety of tasks that are required to complete the project (i.e., one person doing the coding and one person doing the writing is NOT acceptable). You are responsible to ensure that this is clearly communicated through your journal and the comments in your RMarkdown/SPSS Output file.

Teamwork is an area in which we can all continue to improve, but it is hard to do this without feedback. Therefore, you will be expected to complete at least two peer evaluations. The initial peer evaluation will serve as feedback regarding how you can improve your collaborative/teamwork skills this semester. A follow-up peer evaluation will reflect how you have improved and areas in which you can continue to improve. You will be assessed on the quality of feedback that you provide to your teammates, and how you have improved in your own teamwork over the semester will also impact your peer evaluation score. Each peer evaluation is worth 15 points.

“Everything is awesome” feedback is not acceptable because each of us has areas in which we can improve. Feedback should be edifying, honest, and given in love wanting the best for your teammate. Should you be uncertain about how to handle frustrations or conflict, make an appointment with your professor to discuss how you can handle the situation.

## 4 RESEARCH/ANALYSIS PLAN AND DEADLINES

ANALYSIS PLAN: Review the data definitions and the research question if provided by the client. Clearly define the research questions you would like to address, and create a plan to address them. See the Analysis Plan Template to help you organize the information needed.

R INITIALIZATION: For those using R, create an R project to contain all your work and save your environment/history and an R Markdown file to contain your code and the outputs. You will use the R Markdown file to run and record the results of your analysis. When it is time to write your report, you will create a copy of your Markdown file and incorporate your commentary for your reader.

\*\* Files in R do not autosave, so save both your R Markdown and R Project files often.

Using section labels (#, ##, etc.) in R Markdown, create an R code section and a short text description/formulas for each question and analysis you identified in your Analysis Plan (group items by how they relate to the research questions, not based on the type of analysis). Impose structure/hierarchy to make it easier to follow and search through your code (use the Outline feature). Work on learning to format the text portions so that it knits attractively (Latex is helpful here). Import the provided data.

SUBMISSIONS: Determine the number of draft submissions you think you ought to make and propose point values for each submission. Total project points (for submissions not already given) should be between 200 and 300 points.

PROJECT DEADLINES: Develop a plan to complete your project (including all draft submissions, two peer reviews, and three meetings) with time to revise and review before your final due date. Determine a due date for each of your submissions including your final project. Be sure to include three weeks to meet with your professor to discuss questions as well as recent submissions (in addition to the ones already specified; these will count as 20 points each). Upload this plan to Canvas prior to your meeting. Once approved, add these completion dates to your journal and note if you meet your goal or not.

Submission recommendations, proposed point values, and proposed deadlines will be reviewed and possibly amended by the professor before becoming binding. Since you are setting these deadlines, no late work

will be accepted. Students may request a change to deadline, but it must be done at least 3 business days in advance of the original deadline and is subject to professor approval.

ANALYSIS PLAN/R (15 PTS) AT MEETING BY: 9/20/24, 3:00PM  
SUBMISSIONS/DEADLINES (15 PTS) IN CLASS BY: 9/20/24, 2:00PM

## 5 RESEARCH JOURNAL

Best practices in research include a systematic method of *journaling* – keeping a record of research-related activity including observations, conjectures, results (both positive and negative), insights, and reflections.

Journals should be kept by each member of the team, and your contribution to work will be evaluated using the journal. Your journal should be digital, be able to be submitted as a Word document or a PDF, and should demonstrate the following characteristics.

1. **Reflection:** The student will succinctly reflect on research activities including work attempted, insights and results gained, and further paths of inquiry to be pursued.
2. **Organization:** The student will create a single document (useful to self and others) that will serve as a quick reference of their work .
3. **Documentation:** The student will document when (dates) and for how long (approximate elapsed time) course-engagement occurred.

### GUIDELINES FOR JOURNALING

1. **Style:** As long as all other elements are addressed, the student may use personal style in developing their research journal, although your professor reserves the right to direct changes to improve effectiveness. Journal entries are not meant to be formal pieces of research. Entries are to be useful rather than polished. Informal writing, abbreviation, and bulleted phrases are all acceptable as long as they can be easily deciphered by another mathematician. Daily entries should take less than five minutes.
2. **Frequency:** The student should journal on each day that they engage in research activities.
3. **Date/Time:** Each entry should start with the date, an approximation of total elapsed time for that day, and a running total of time spent on research.
4. **Entry:** The entry for a day should be a brief synopsis of and reflection on the research activity. Some prompts that could be addressed are ...
  - (a) What was the question you focused on?
  - (b) What attempts were made? with what outcomes?
  - (c) What impact might these outcomes have on other avenues of inquiry?
  - (d) What questions arose? Do they need immediate attention, future attention, or setting aside?
  - (e) What challenges appear to be hampering progress? How might these difficulties be resolved?
  - (f) What should you work on next time?

5. **Submission:** The Research Journal is to be updated in your Teams research channel prior to each research meeting and is to be submitted to Canvas (or elsewhere if directed) with each project submission. Submissions should include your name in the file name as well as on the first page of the file. Failure to submit the journal will result in a 0 on that portion of the submission (your professor will not go searching for it).

## 6 MATHEMATICAL EVIDENCE OF ANALYSIS

Students will use R/RStudio for their analysis (Math Ed students may use SPSS only with permission of the instructor). You will submit an RMarkdown file (both .rmd and a knitted .html file). Those using SPSS will submit an Output file (or you may paste your complete output into a Word document).

Your files should be organized clearly using sections/headers, including notes/commentary on results (outside the code when using R) presented above the code/output.

## 7 WRITTEN REPORT

Students will present their analysis as written report for decision makers. Relevant/appropriate descriptives should be included prior to in support of your inferentials. Descriptives should be used to lead the reader to pose the question answered by the inferential.

Your conclusions for each question should include a discussion of what the statistic tell us is true about the data (use English, not jargon - no “reject the null” language). You should also proceed one step further and suggest what your conclusions imply about the general research question. Be sure to use a standard reporting style to present your test data (APA is expected when presenting statistical results, but is neither required nor recommended for other formatting choices).

The average person should be able to read your report and understand what the results were, and the statistician should be able to read your report and be convinced based on the statistics that your conclusions are accurate.