BOB JONES UNIVERSITY
Department of Mathematics

Ma 340 ~ Applied Statistics - EXP

Spring Semester 2025-26

Professor:	Charles Lacey, clacey@bju.edu
Office:	Al 70
Office Hours:	Daily by appointment, `https://calendly.com/clacey-bju/scheduler`
Preferred Contact:	MS Teams or Email
Textbooks:	*Elementary Statistics*, 13^{th} edition, by Mario F. Triola; *Naked Statistics: Stripping the Dread out of Data*, by Charles Wheelan
Technology:	Laptop that meets institutional requirements; Calculator: TI-30XS or similar
Course Website:	`http://math.bju.edu/ma340/`

Course Description

A software-based course in which students will apply a selection of statistical and data visualization tools to a data set and develop a deliverable appropriate to the research question and intended audience. Statistical topics include hypothesis testing of means and proportions (both single and multiple populations), correlation and linear regression, pertinent confidence intervals, and introductory principles and methods of data visualization. Completion of CpS 110 prior to this course is strongly recommended for all non-education majors. EXP

Prerequisite: CpS 110 or Ma 125

Course Context

This course supports the following objectives of the mathematics, computer science, and information technology programs:

- MS1: Understand the essential theory of mathematics/computer science and appropriately apply the theory in solving problems.
- MS2: Use critical-thinking/analytical skills to understand mathematical/computing problems and design solutions with the aid of appropriate tools.
- MM1: Progress logically from premises to valid conclusions in a variety of mathematical contexts.
- MM2: Apply mathematics to model real-life situations.
- CS1: Design and implement efficient solutions to problems in various domains.
- IT1: Identify and deploy appropriate technology to solve problems in various domains.
- IT3: Communicate technical information effectively, including business proposals and network documentation.

Course Goals

CG1: Introduce the scope of statistical analysis to students in a variety of disciplines.

CG2: Define a general process for performing statistical analyses.

CG3: Identify the foundational statistical tools, including appropriate use of descriptives, hypothesis testing, confidence intervals, and regression.

CG4: Address ethical concerns with data and data analysis from the perspective of society and the Bible.

Course Objectives

The student shall be able to ...

1. Articulate the process for effectively using data to answer questions.
2. Understand data collection techniques (NCTM/CAEP A.4.2, A.4.3)* and perform basic descriptive analysis, including
   (a) Creation/interpretation of statistical graphs (NCTM/CAEP A.4.2, A.4.3)
   (b) Calculation/interpretation of summary statistics (NCTM/CAEP A.4.2)
3. Understand the basic principles of probability, including the Central Limit Theorem, and how they apply to inferential statistics (using predominantly normal random variables) (NCTM/CAEP A.4.1, A.4.5)
4. Construct the appropriate hypotheses based on the data and question of interest and determine the correct statistical tool to evaluate the hypotheses. (NCTM/CAEP A.4.2)
5. Use a standard statistical package (R, Python, or SPSS) to run basic data analysis.
6. Independently perform a basic data analysis.
7. Interpret the results of their analysis and communicate those results to the average user.
8. Identify and avoid ethical issues with the use of data and data analysis.
9. Describe and reflect critically over what has been learned, showing how faith integrates with learning and how learning will inform future personal and professional practices.

* National Council of Teachers of Mathematics

Course Requirements

The course grade will consist of

- **Tests:** Approximately 5 in-class unit tests worth 80-120 points.**
  Tentative Test Date are shown in the course schedule and on Canvas, but are subject to change.
- **EXP - Statistical Analysis Project:** A multi-stage statistical analysis project will be completed over the duration of the semester.
  - EXP project meetings and submissions are worth 200 points in total. See the EXP Project instruction for more details.

  - Other lab assignment will be given related to the EXP project further contributing to the overall grade in the course.
  - An unsatisfactory grade (<70 pts) on the final draft of the EXP project will result in no more than a D in the course.

- **EXP - Reflection:** See EXP Requirements below.
- **Content Quizzes:** Approximately 12 content quizzes worth 10 points each.**
- **Reading Quizzes:** Approximately 14 reading quizzes worth 3 points each.**
- **Homework:** Approximately 12 assignments worth 5 ± 2 points each.**
- **Weekly Check-In:** 15 weekly reports of class engagement worth 5 points each.
- **Final:** The cumulative final exam is worth 150 pts.

** Point assignments are subject to change.

EXP Requirements

This course has been approved for EXP (Bruins Engage!) credit and addresses each of the five criteria for experiential learning: engagement, mentorship, challenge, ownership, reflection. To receive EXP and course credit students must satisfactorily complete all EXP course elements within the required timeframe, including:

- Exit Survey
- C- (28 points out of 40) or higher on the summative reflection questions
  - EXP Summative Reflection – approximately 150-word minimum for each of the four elements.
  - Students may revise their summative reflection one time to meet the C- standard.
- Failure to complete any of the above will result in *an F for the course.*

Note that students cannot pass the class unless they complete the required EXP elements, regardless of their grade in the rest of the class.

Course Evaluation

All course/assignment grades are based on the evaluation of the work communicated by the student. Unclear or incomplete communication of the solutions, which includes the process, may result in a penalty at the professor's discretion.

Letter grades will be based on a standard 10-point scale

Office Hours

Office hour appointments can be made using the Calendly site (appointments may be made up to two weeks in advance), `https://calendly.com/clacey-bju/scheduler`. If there are no available times at which you are able to meet, send Mr. Lacey a message including some days/times between 7:30am and 3pm when you are available.

General Policies

Deportment

Compliance with student handbook policies is expected during class. The classroom is to be a professional environment. That means you are to come to class prepared for the day's discussion, your attention is expected to be on course related material, and you are expected to positively contribute to the class.

Absences

BJU attendance policy is in effect (see `https://home.bju.edu/bju-policies/` for details).

- Scheduled tests/quizzes should be taken before your planned absence; please contact your professor to make arrangements for doing so. You are personally responsible for getting notes from your classmates and discussing the missed material with them. You should not expect your professor to privately re-teach you the material you missed. Your professor is always available to help you with specific questions. If an unannounced quiz/assessment is taken during the class that you miss, you will NOT be allowed to make it up, and you WILL receive a zero on the assignment. Work may always be completed early (see your professor if you wish to take a test early).
- Missing an in-class test because you feel you are not prepared to take it is not acceptable. Work missed for this reason will not be made up and you will receive a zero on the assignment.
- For absences due to incapacitating illness or emergency, you should contact the instructor as soon as you realize you will not be in class to make arrangements to make up any missed work. Tests will be made up without penalty for the first occurrence. Each subsequent time a test is missed because of incapacitating illness or emergency, an additional 10% grade penalty for that test will be incurred. A 10% penalty will be assessed for a late submission of take-home tests. All late work must be made up by the next class period unless other arrangements have been made with the professor.

Presentation of Work

The goal is professional, fluent, and clear communication of what you know.

- Proper use of mathematical notation is expected. The structure of notation conveys specific meaning and should be used appropriately.
- Mathematical presentation is like grammar. There are subjects, verbs ($=, \leq, >$, etc.), and objects. Always write in "complete sentences."
- Tests/presentations/projects are not about what you know, but about what you can communicate about what you know – so the presentation of your work/logic should always be neat, orderly, clearly defined, and with the appropriate amount of supporting detail. (Excessive steps are not required; however, answers alone are not (usually) acceptable.)
- Clearly label problems/sub-problems. Problems do not necessarily have to be worked in order but must be clearly labeled either way. Your professor will communicate their expectation on presenting problems out of order.

- Answers are to be presented as the logical conclusion of your work, not as the only important thing (e.g. at the start of the problem and/or unconnected with any justifying work).

Your professor may refuse to accept work that does not meet the minimum presentation requirements above, or they may choose to deduct up to 10% from the assignment.

Problems Expectations

The goal is to prove your mastery (not your just barely comprehending).

- Read all words carefully in a question. Everything is important, so know what the meanings of all words are and how those words tell you to respond.
- Theory is a precise expression of important ideas. While it is not graded word for word, jot for jot, the precise ideas must be maintained. Embrace thorough, smooth learning and presentation. Can you recite the theory from the last class period quickly, comfortably, and conversationally?
- Theory tells us how to solve problems. Know exactly what problems connected to each theorem or definition look like, and know how to solve them.
- Know what the key steps of each problem are. Present only the key steps (or the minimum needed to get the answer right and show all your logic).
- Do enough practice for each type of problem so that you are smooth.

Failure to meet these expectations will be reflected in lower test scores.

Late Policy

Assignments not submitted as directed by the due date will incur the following late penalty.

- No late homework/in-class assignments are accepted.
- Written assignments/projects/take-home tests are penalized at 15% if submitted within 3 calendar days of the due date and are a 0 after that. Oral presentations are a 0% if not presented on the day assigned.

  Late paper submissions must include the date and time the paper is submitted and be in the credenza by 8am the next day. The next day day penalty begin at 8am.
- In-class tests must be taken by the date given in class (or selected time in the case of the oral exam) unless there is incapacitating illness (see attendance policy below). Missing a test/taking the test late (including the oral exam) will result in a 10% penalty unless excused by the professor. Tests should be made up prior to the next class period unless other arrangements have been made with the professor.
- Work may always be completed early (contact your professor if you wish to take a test early).

Academic Integrity Policies

University academic integrity policy is in effect (see `https://home.bju.edu/bju-policies/` for additional details).

Definitions of Integrity Violations

Integrity is the reflection of the character and nature of God in our actions; therefore, students will be expected to work with integrity. In academia, violations of integrity generally fall into one or more of the following categories:

- Cheating: unauthorized use or attempted use of assistance, information, or aids in any academic assignment
- Falsification: submitting work done by others, changing work after submitting an assignment, reporting false information about the completion of an assignment
- Unacceptable collaboration: working with others when not permitted, using AI to generate ideas, thoughts, or content without the explicit permission of the professor
- Faciliation of Cheating: helping another student violate academic integrity, communicating quiz/test questions to other students
- Plagiarism: the intentional or unintentional use to any degree of the ideas or words of one's source material without proper acknowledgement

All work done for this class must represent your own effors, your own understanding, and your own communication of the material.

Course Integrity Policies

If information is taken from other sources (which is at times appropriate), it always needs to be referenced and credit given where it is due. Use standard referencing techniques as taught in En 102. Solutions found on the internet are not to be copied.

- Homework: While you are encouraged to work together on the homework assignments, simply copying someone else's solution is neither useful nor acceptable. Your homework should represent your work and your understanding of the work.
- Tests (In-Class and Take-Home): No resources may be used while taking the test unless permitted by the professor. The presence of any unauthorized material on your desk, in your calculator, on your laptop, etc. while taking a test will be construed as cheating and will be dealt with as such. Cheating on a test will likely result in a zero on the test and will be submitted to the Academic Integrity Committee.
- Projects: You are encouraged to discuss the general ideas needed to complete the project as discussed in this course with your classmates but are not permitted to "work together" on your project (outside of your own team and any faculty appointed advisors). Your projects must represent your own ideas, your own work, and your own communication of your work.

If you have a question about any source you are considering using, it is wise to gain your professor's approval before using it. You are always permitted to ask your professor for help. Any help they choose to provide is acceptable.

AI Usage Policy

The goal of the assignments in this course is to learn to develop the skills covered, NOT to complete the tasks assigned. The use of AI to complete or jumpstart tasks defeats the goal of the assignments. Therefore, you may not use generative AI tools in this course for any assignment without the professor's express permission. AI tools include, but are not limited to, CoPilot, Apple Intelligence, Chat GPT, Bing Chat, Google Bard, Grok, Deepseek, Grammarly, and language translators.

Documentation of Permitted AI Use

Should an AI tool be used with permission, its use must be documented (including the tool used, a summary of the prompts provided and the portions of the assignment that were based on AI generated work). See `https://style.mla.org/citing-generative-ai/` for details on citing the use of AI.

AI Usage for Coding

Use of generative AI to develop code (such as Python or R) may be helpful during the project (each student has permission to use AI for only this purpose, other purposes require express permission). It would be wise to consult with your professor before incorporating it into your work. Reliance on AI to generate code has not yet resulted in an acceptable paper. If you do use it, you must document it as indicated above. You may NOT use AI to generate the text/discussion in your project.