

Ma/BA 320/329 Applied Statistics 2020-21 Second Semester

INSTRUCTOR INFORMATION

Instructor:	Dr. Laurel Carpenter	Mr. Charles Lacey
Email:	llcarpen@bju.edu	clacey@bju.edu
Office:	AI 46	AI 74
Office Hours:	MWF 10:00-10:45A.M. (venue TBA) T 1:00-1:45P.M. (venue TBA) (Office hours may be via Teams) Other times by appointment Use Calendly to make appointments	MW 3:00-3:45P.M. (via Teams) T 9:00-9:50P.M. (via Teams) Th 1:00-1:45P.M. (via Teams) F 2:00-2:45 P.M. (via Teams) Other times by appointment
Calendly Link:	https://calendly.com/llcarpen/appoint ment	https://calendly.com/clacey-bju
Lecture:	Ma/BA 320-1	Ma/BA 320-2
	WW 8:00-8:50A.M., AI 210	WW 2:00-2:50P.M., AI 301
Lab:	Ma/BA 329-2,	Ma/BA 329-3
	Т 2:00-3:50р.м., АІ 220	Th 9:00-10:50а.м., Al 219

COURSE INFORMATION

Catalog Description

[Applied Statistics is a] software-based course including discrete and continuous probability distributions, hypothesis testing, confidence intervals, correlation and regression. Not applicable toward an Actuarial Science major or a Mathematics major or minor.

Prerequisite

Math ACT 20+, SAT 550+, Ma 090, or placement into Ma 103.

Textbook and Technology Requirements

- Textbook (required): Elementary Statistics, 13th edition, by Mario F. Triola ISBN 9780134462455
- Textbook (required): Naked Statistics: Stripping the Dread out of Data by Charles Wheelan ISBN 9780393347777 (paperback) or 9780393071955 (hardback)
- Textbook (recommended): Storytelling with Data: A Data Visualization Guide for Business
 Professionals by Cole Nussbaumer Knaflic ISBN 9781119002253 (available free in
 digital form through Mack Library)
- SPSS (strongly recommended): computer app for data analysis, student version basic grad pack is sufficient (version 26 or 27, check computer specifications before purchasing)
- Microsoft Office Lens (recommended): free app to convert handwritten work to PDF files
- Microsoft Teams (required): free app offering chat, collaboration, and conferencing

COURSE CONTEXT

Institutional Context

This course supports the following:

Institutional Goal 4

Demonstrate critical thinking in analyzing, evaluating, and synthesizing information and ideas.

Accounting PLO 2	Create solutions to business problems while working in a team composed of individuals with a variety of roles and different levels of commitment.
Accounting PLO 4	Acquire skills necessary to use technology tools effectively and efficiently (and apply those skills) to develop the other learning outcomes
Div of Management Goal 3	Develop analytical, problem-solving and critical thinking skills to deal effectively with real-world business issues, resulting in God-honoring decisions.
Business Admin PLO 5	Synthesize the totality of their business education by analyzing and formulating business strategies, business position and its long-term direction, resources and competitive capabilities for implementing strategies formulated, and measuring the success of implemented strategies with a biblical worldview.
Computer Science PLO 1	Design and implement efficient solutions to problems in various domains.
Information Tech PLO 1	Identify and deploy appropriate technology to solve problems in various domains.
Information Tech PLO 3	Communicate technical information effectively, including business proposals and network documentation.
Health Sciences PLO 1	Develop a philosophy of health science practice that is biblically sound, scientifically supported, and consistent with best practices in the field.
Div of Teacher Ed Goal 1	Demonstrate a knowledge of content and pedagogy to be effective teachers.
Mathematics Ed PLO 2	Solve problems in theoretical and applied settings in a variety of mathematical contexts.
Mathematics Ed PLO 3	Progress logically from premises to valid conclusions in a variety of mathematical contexts.
Exercise Science PLO 4	Apply the skills and abilities to critically evaluate, interpret and integrate information from the scientific literature related to exercise and health.

Course Goals

This course is designed to

- 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, regression, and a brief introduction to time series
- CG4: Address ethical concerns with data and data analysis from the perspective of society and the Bible.

Course Objectives

The student will 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 (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.

* National Council of Teachers of Mathematics

COURSE ASSESSMENT AND GRADING

Activities and Assessment

Category	Points	Description
Homework	40 pts	• Homework: Out-of-class exercises for each unit (4, 10 points each)
Writing	40 pts	 Discussion Boards: Read-post-respond discussions on current real-world statistics (4, 10 points each) Reading Summaries: Half-page summaries of chapters from <i>Naked Statistics</i> (10, 3 points each)
Quizzes	80 pts	 Quizzes: Canvas, open-book, timed quizzes focusing on information and skills (4, 10 points each) Communications Quizzes: Canvas, timed quizzes focusing on effective communication (4, 10 points each)
How-to-Log	50 pts	 How-to-Log: Semester-long compilation of instructions on performing a statistical analysis (3 checkpoints + final submission, 50 points total)
Tests	440 pts	 Unit Tests: Each Unit Test will have two portions: out-of-class (SPSS using HTL) and in-class (closed book). Both portions will focus on applications from the unit but with cumulative portions. (4, 50 point OC + 60 point IC)
Final Exam	150 pts	• Final Exam: In-class, closed-book, cumulative, 70-minute exam focusing on application (1, 150 points)
Project	200 pts	Semester project independently performing a complete statistical analysis (5 submission points, 200 points total)

The course grade will be based on performance in the following activities.

Labs

Weekly labs are an important part of this course. During labs, students will learn how to apply the concepts they have been reading about in their assignments and discussing in lecture. Using SPSS, students will work with data sets from multiple sources. Students will need to use skills acquired in lab to complete their homework assignments as well as complete the out-of-class portion of each unit test and work on the data analysis project.

Missing more than one lab during the semester may result in withdrawal from the course.

Homework

Because homework is one of the primary means by which students develop good statistical insight, it is crucial to success in this course. Homework in statistics includes more than just working *exercises*. Homework also includes reading and understanding textbook examples and being able to make connections and apply statistics in many different scenarios. For this reason, personal study habits will be considered as important as working exercises.

- Readings and Exercises are correlated to the lectures and labs and are listed in the Course Guide on Canvas.
- Homework is due on Saturday before each Unit Test and is graded by a self-evaluation on performance and study habits via Canvas.

Discussion Boards

Discussion board activities in Canvas are designed to help students draw connections between the course content and how it is applied. Each discussion board includes a reading (or assignment), an original post, and two or three response posts.

Reading Summaries

Summaries of readings in *Naked Statistics* are worth a total of 30 points extra credit and are due in Canvas.

Quizzes

- All quizzes are in Canvas and are timed.
- Regular Quizzes focus on information and skills gained from textbook readings and homework.

• **Communications Quizzes** focus on applying information based on readings from *Storytelling with Data* as well as information given in class.

How-to Log

The How-to Log is an instruction manual that the student will add to continually throughout the semester. It is expected that by the end of the semester, a student's How-to Log will contain information and instructions on how to successfully perform and report a thorough statistical analysis.

- Students are expected to be updating their How-to Logs during each lab, as well as work on it between lectures.
- The first three submission of the How-to Log are peer-reviewed. Students will receive 5 points for submitting their How-to Log for review and 5 points for reviewing one other student's How-to Log within the time frame.
- The final submission of the How-to Log is instructor-graded and is worth 20 points.

Tests

- Unit tests will consist of two parts: an out-of-class portion and an in-class portion. Both portions of the test may contain questions over any part of the course whether lecture, lab, or homework.
 - The Unit OC Test, out-of-class portion of the test, is a 2-hour timed test delivered via Canvas. It will utilize SPSS. The student may consult their own How-to-Log during the Unit OC Test.
 - The Unit IC Test, in-class portion of the test, is a written test occurring in lecture class on the days designated in the schedule.
- Each unit test will focus on information from that unit but may also contain questions from previous units.

Final Exam

- The final exam is a written test and occurs at the time designated in the university final exam schedule according to your lecture section.
- The final exam is cumulative and may include information from any of the lectures, labs, readings, and homework throughout the semester.

Late or Missing Work

- Assignments (including Labs, Homework, Discussion Boards, and Quizzes):
- Students are expected to turn in assignments on time. Missing work will be given a grade of 0.
 Assignments may be accepted late in extenuating circumstances only by instructor approval.
- Reading Summaries for Naked Statistics by Wheelan are worth up to 3 points before the due date, up to 2 points after the due date until the last lecture class meeting of the semester, and worth no points after the last lecture class meeting.
- Tests:
 - Missed tests may be made up only by instructor approval. Except in extenuating circumstances, late tests will be penalized 10 percent per day until four days are past; at which point, the test will be given a grade of 0.
- Project submissions:
 - Missed project submissions may be made up only by instructor approval. Except in extenuating circumstances, late project submissions will be penalized 10 percent per day until four days are past; at which point, the project submission will be given a grade of 0.

Grading Scheme

Final grades will be assigned according to a standard 10 percentage point scale calculated out of the total points available during the semester (\approx 1,000 pts). Percentages will be rounded to the nearest whole percentage when determining final grades.

Extra Credit

• Extra points are built into the course. No additional extra credit work will be granted.

OTHER

Classroom Decorum

The classroom is a professional environment. Students are expected to be respectful to their instructor and peers in behavior, attitude, attire, and use of technology. The instructor has the right to require students who are participating in distracting behavior to leave the class.

Attendance

- Students are allowed only 2 personal absences from lecture and only 1 personal absence from lab. Missing more than 20 minutes of any part of a lecture or lab will count as a full absence.
- Students should notify the instructor by email as soon as possible after an absence (preferably within 24 hours).
- If the absence is planned, the student should notify the instructor before missing class.
- Students who are absent are personally responsible to obtain notes from fellow classmates.
- BJU attendance policy is in effect (see https://home.bju.edu/bju-policies/ for details).

Academic Honesty and Integrity Policy

BJU academic honesty and integrity policy is in effect (see https://home.bju.edu/bju-policies/ for details).

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