

# Statistics

Sierra Nevada  
University



***“Empowering students as architects of their own learning.”***

<b>Course Code &amp; No. – Section:</b>	MATH 251 – Section 1
<b>Course Title (Credits):</b>	Statistics (4)
<b>Term &amp; Year:</b>	Spring 2020
<b>Course Ref. Number (CRN):</b>	10445
<b>Instructor:</b>	Dr. Steve Ellsworth
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<b>Office:</b>	TCES 225
<b>Office Hours:</b>	MW 11:00AM-5:00PM T 11:00AM-2:00PM Or by appointment – text to set time.
<b>Class Meeting Time:</b>	7:00PM-9:15PM
<b>Location:</b>	TCES 206
<b>Prerequisites:</b>	Accuplacer Score, MATH 101 or MATH 110, or approval of the instructor
<b>Required Text:</b>	<i>Elementary Statistics</i> , 13 <sup>th</sup> ed, Mario F. Triola, ISBN: 0-13-446245-6
<b>Required Computer Programs:</b>	<a href="#">Minitab 19 Lease (\$29.99)</a> <a href="#">Microsoft Office Download (Not Online Version)</a>
<b>Canvas Site:</b>	<a href="https://sierranevada.instructure.com/courses/1994">https://sierranevada.instructure.com/courses/1994</a>

## ***Course Description***

An introductory statistics course covering sampling, experimentation, exploratory data analysis, statistical inference, and drawing conclusions from data. Single variable data sets, paired data, and categorical data. Laws of chance and probability theory.

## *Student Outcomes*

The learner will experience/participate in/explain and perform the following: preliminary data analysis; descriptive statistics; probability theory; inferential statistics for single through multiple samples using some parametric and nonparametric methods; regression and correlation, and use of technology to ease the burden of discovery and computation with emphasis on interpretation; use of standard statistical tables; data collection, analysis and presentation of both and oral and written reports of procedures and findings.

The learner will be able to make better, informed decisions under conditions of uncertainty and variability and will:

- Use data to objectively analyze academic questions and improve decision making;
- Present data or results informatively;
- Apply statistical concepts to disciplines of interest;
- Understand data when it is presented and ask useful and probing questions and respond appropriately.

## *Course and SNC Mathematical Goals*

- A sense of number and the ability to discern whether a proposed numerical answer to a problem is reasonable – the ability to think correctly about numbers and to use data to make intelligent decisions in life.
- The ability to use mathematical knowledge to confront unfamiliar problems both in concrete and abstract situations – modeling a mathematical problem in several ways to facilitate a solution.
- The ability to discuss the mathematical ideas involved in a problem with other people and to write coherently about mathematical topics and their interrelations.
- General reasoning powers – understanding of mathematical implication and knowledge of why various mathematical statements follow from more basic ideas.
- General algebraic proficiency – the ability to manipulate algebraic expressions -- an understanding of the interrelationships between the symbolic, numeric, and graphic representations of real-world phenomena.
- The ability to visualize, compare, and transform problems geometrically – an understanding of the connections between algebra and geometry.
- An understanding of the uses of mathematics in other disciplines and the use of technology in the solution of mathematical problems.
- The ability to gather, organize, display, and summarize data – the ability to draw conclusions or make predictions from data.

The Mathematical Association of America's (MAA) Committee on the Undergraduate Program in Mathematics (CUPM) in developing future mathematics curriculum has made the following preliminary recommendations:

- Students should achieve mastery of rich and diverse set of mathematical ideas and should experience mathematics as an engaging field with contemporary open questions.
- Students should be able to think analytically and critically, to formulate and solve problems, and to interpret their solutions. They should understand and appreciate the value and validity of careful reasoning, precise definition, and close argument.
- Students should have experience applying knowledge from one branch of mathematics to another and from mathematics to other disciplines.
- Students should be able to use a variety of technology tools.

## ***Tentative Schedule***

***NOTE – topics, exam date, and any other aspect of the class schedule are subject to change upon notification by instructor. The Course Announcements section of the Canvas course website and in-class announcements will be used to alert students of changes to the syllabus.***

### ***Section One – Fundamentals of Statistics***

<b>CLASS DATES</b>	<b>CLASS TOPICS</b>	<b>TRIOLA CHAPTERS</b>
W 1/22	Course Introduction Minitab 19 and Excel Statistical and Critical Thinking Collecting Sample Data	1-1, 1-2, 1-3
M 1/27, W 1/29	Statistical and Critical Thinking Types of Data Collecting Sample Data Frequency Distributions and Histograms	1-1, 1-2, 1-3 2-1, 2-2
M 2/3, W 2/5	Scatterplots, Correlation, and Regression Measures of Center Measures of Variation Measures of Relative Standing	2-3, 2-4 3-1, 3-2, 3-3
M 2/10, W 2/12	Measures of Center Measures of Variation Measures of Relative Standing Exam I	3-1, 3-2, 3-3

### ***Section Two – Probability and Distributions***

<b>CLASS DATES</b>	<b>CLASS TOPICS</b>	<b>TRIOLA CHAPTERS</b>
W 2/19	Fundamentals of Probability Addition and Multiplication Rules Complements, Conditional Probability	4-1, 4-2, 4-3
M 2/24, W 2/26	Counting Advanced Probability	4-4
M 3/2, W 3/4	Discrete Probability Distributions Standard Normal Distributions Applications of Normal Distributions	5-1, 6-1, 6-2
M 3/16, W 3/18	The Central Limit Theorem Assessing Normality Exam 2	6-4, 6-6

### ***Section Three – Probability and Distributions, Hypothesis Testing***

<b>CLASS DATES</b>	<b>CLASS TOPICS</b>	<b>TRIOLA CHAPTERS</b>
M 3/23, W 3/25	Hypothesis Testing Testing a Claim About a Mean	8-1, 8-3
M 3/30, W 4/1	Testing a Claim About a Mean Two Sample Procedures	8-3, 9-2, 9-3
M 4/6, W 4/8	Correlation and Regression Goodness of Fit Contingency Tables	10-1, 10-2 11-1, 11-2
M 4/13, W 4/15	ANOVA Exam III	12-1

### ***Methods of Assessing Student Outcomes***

Students will be assessed on the basis of their graded performance on three exams, one final, and a variety of assignments.

### ***Grading Policy***

- The course is graded on a straight scale: (A 93-100, A- 90-92, B+ 87-89, B 83-86, B- 80-82, C+ 77-79, C 73-76, C- 70-72, D+ 67-69, D 63-66, D- 60-62, F 0-59) unless a shift downward in the scale is appropriate (based on performance of the entire class).
- Grades on all work will be posted in Canvas. It is your responsibility to check the grades to make sure that there are no errors. Please contact your instructor by e-mail if there is an incorrect or missing grade.

#### **Point summary:**

In-class exams (3 @ 200 pts. each)	600 pts.
Assignments – From <i>Triola</i> , In-class, and CPAs (Rescaled based on % accrued for entire semester)	200 pts.
Take home final – due at 11:00 PM on Friday, April 17	200 pts.
<b>TOTAL</b>	<b>1000 points</b>

## *Assignment Grading Rationale*

### 20 point system (Points may be out of 40 or 80 for larger assignments)

#### 20 points

- All portions of the assignment are completed
- It is obvious that a high-quality and in-depth effort was put into the assignment
- If any answers or computations are incorrect they are not major mistakes or do not hinder understanding of the material
- Interpretations are relevant and concise, and yet have enough information to convey an understanding of the material
- It is obvious that no answers were simply copied from another student or group, although answers may be similar from students or groups that work together

#### 15 points

- All portions of the assignment are completed or possibly only a few very minor components are not completed
- A quality effort was put into the assignment but it may lack some depth and understanding
- There are at least one or a few errors that result from a misunderstanding of the material
- Interpretations are mostly relevant but there may be some lack of understanding of the material
- It is obvious that no answers were simply copied from another student or group, although answers may be similar from students or groups that work together

#### 10 points

- The assignment is most likely not completed
- The effort put into the assignment cannot be described as quality work
- There are at least several errors that result from a misunderstanding of the material
- Interpretations are frequently irrelevant and there is often a misunderstanding of the material
- It is obvious that no answers were simply copied from another student, although answers may be similar from students who work together

#### 5 points

- The assignment is not completed
- The effort can be described as minimal and half-hearted
- There are multiple errors that result in a misunderstanding of the material
- Interpretations are mostly irrelevant and there is a clear misunderstanding of the material
- It is obvious that answers were simply copied from another student or group

#### 0 points

- The assignment was not turned in or basically no real work was put into it.

## *Important Class Notes*

- You must bring a laptop with Minitab 19 and Excel on it in order to take an exam – it is very important that you accept this responsibility. The exams and homework require the use of these programs, so they are integral aspects of the class. It is essential that you have access to a computer with Minitab 19 and Microsoft Office at all times during the course.
- There are no late exams given, with no exceptions unless approved by the instructor. A make-up exam based directly on the content of the three exams over the semester will be given on Friday, April 17 at 10:00AM. This exam will replace any exam that is missed, or can be taken to replace the lowest score of an exam over the semester.
- If you are unable to take an exam on campus because of a college-related activity (field trip, sporting event, etc.) you must take the exam by midnight on the same day that it is scheduled. The person in charge of the trip (faculty, staff, or coach) must e-mail the instructor to make arrangements for how the exam will be given.
- You may use one 8.5x11 sheet of paper with notes (front and back) during the exams. Note sheets from prior exams in the course may also be used. No photocopies (like from the text) are allowed unless approved by the instructor. During exams no Internet sources other than the course Canvas site may be accessed. Also under no circumstances is it acceptable to share information with other students during exams. Any violation of these rules will result in failing the course.
- It is **strongly** recommended that you take very good notes during class sessions and that you study these notes extensively for the exams. If you need tips on how to take good notes ask your instructor or visit the Office of Academic Services and Instructional Support.
- Laptops and cellphones **absolutely** may not be used in class for personal use such as observing videos, instant messaging, texting, checking e-mail, doing assignments for other classes or browsing the web. If you bring a laptop to class it must be closed unless approved by the instructor. Cellphones must be turned off and put away, meaning that they are not allowed to be put on the desks during class. Since attendance is not required for the course you have the freedom to laptop work and cellphones outside of the classroom during the class period. If you have to use your cellphone please excuse yourself from the class in a nondisruptive manner. Each violation of this rule may result in the loss of up to 50 points from the overall class score.
- Copying or sharing of any information with others during exams will result in failing the course. Visiting websites other than our Canvas site during exams will also result in failing the course.
- In order to receive credit for the final exam the data that you collect must be approved in advance by the instructor. This approval will be done through an assignment posted on Canvas.

## *Keys to Success in Statistics*

- Make absolutely certain that you are prepared for the course. MATH 101 or MATH 110 is the prerequisite for the course. Students without either of these prerequisites must have approval from the instructor or an advisor to take the course.
- Have or develop an intellectual curiosity in how statistics can be used in applied in real-world situations. Don't always think that ideas are important only if they apply to your life.
- Become proficient in Minitab 19 and your spreadsheet program. Spend time exploring them on your own initiative. Avoid the temptation not have or maintain Minitab 19 and a spreadsheet program on your laptop.
- Take great notes in class.

- Don't expect to understand all of the material right away in class. Be persistent. Don't be passive.
- Work with other students who are as serious (or more serious) than you about learning.
- Ask questions during the exams.
- Don't miss classes and/or blow off homework and in-class activities because these are major reasons why some students struggle in the class. Don't fall behind.

### ***ADA Accommodations***

In accordance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, students with a documented disability are eligible for support services and accommodations. If a student wishes to request an accommodation, please contact the Director of Academic Support Services, Henry Conover, at (775) 831-1314 x7534, [hconover@sierranevada.edu](mailto:hconover@sierranevada.edu) or go to the OASIS offices on the third floor of Prim Library within the first week of the semester.

### ***The SNC Email System***

The SNC email system is the official communication vehicle among students, faculty members and administrative staff and is designed to protect the confidentiality of student information as required by the Family Educational Rights and Privacy Act of 1974 Act (FERPA). Students should check their college email accounts daily during the school year.

Students have a right to forward their SNC e-mail to another e-mail account (for example, @hotmail or @gmail). However, confidentiality of student information protected by FERPA cannot be guaranteed for SNC e-mail forwarded to an outside vendor. Having email redirected does not absolve a student from the responsibilities associated with official communication sent to his or her SNC email account.

### ***Sanctions for Cheating and/or Plagiarism***

#### **The Honor Code**

The faculty of SNC believes students must be held to high standards of integrity in all aspects of college life in order to promote the educational mission of the College and to encourage respect for the rights of others. Each student brings to the SNC community unique skills, talents, values and experiences which, when shared within the community, contribute to the quality of the educational environment and the growth and development of the individual. Students share with members of the faculty, administration and staff the responsibility for creating and maintaining an environment conducive to learning and personal development, where actions are guided by mutual respect, integrity, responsibility and trust. The faculty and students alike must make diligent efforts to ensure high standards are upheld by their colleagues and peers as well as themselves. Therefore, faculty and students accept responsibility for maintaining these standards at Sierra Nevada College and are obligated to comply with its regulations and procedures, which they are expected to read and understand.

## Consequences of Violating the Student Honor Code

SNC students and faculty share the responsibility for maintaining an environment of academic honesty. Thus, all are responsible for knowing and abiding by the SNC Faculty/Student Honor Code published in the current SNC Catalog. Faculty are responsible for presenting the Honor Code and the consequences of violating it to students at the start of their classes AND for reporting all incidences of academic dishonesty to the Provost. Students are responsible for knowing what constitutes CHEATING, PLAGIARISM and FABRICATION and for refraining from these and other forms of academic dishonesty. Violations of the Honor Code become part of a student's academic record.

1<sup>st</sup> Offense: Student receives a zero for assignment/exam and counseling with faculty on the honor code, consequences for violating the honor code, and the value of academic honesty in learning.

2<sup>nd</sup> Offense: Student fails course and receives counseling with faculty on the honor code, consequences for violating the honor code, and the value of academic honesty in learning.

3<sup>rd</sup> Offense: Student is expelled.

### *The Sierra Nevada College Mission Statement:*

Sierra Nevada College graduates will be educated to be scholars of and contributors to a sustainable world. Sierra Nevada College combines the liberal arts and professional preparedness through an interdisciplinary curriculum that emphasizes entrepreneurial thinking and environmental, social, economic and educational sustainability.

### *The Core Themes:*

Liberal Arts	Professional Preparedness
Entrepreneurial	Thinking Sustainability