



**Instructor:** Elizabeth Allgood  
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**Office Hours:** Thursday 11:30 am -1:00 pm

### **Course Information**

Course Name: Statistics for Biology  
Class Times & Location: Mon/Wed 3:35-4:50 pm; HCB 0314  
Recitation & Location: Fri 12:20-1:10 pm; HCB 0213  
Blackboard Website: <http://campus.fsu.edu>  
Credit Hours: 4

**Prerequisites:** MAC 2311 and biology major status or departmental approval.

**Special Note:** Only two semester hours of credit are given for STA 2171 if "C-" or better has been previously earned in STA 2023. No credit is given for STA 2171 if a "C-" or better has been previously earned in STA 2122 or STA 3032 or QMB 3200.

**Textbook:** (Recommended) Samuels, Myra L., Jeffrey A. Witmer, and Andrew Schaffner, Statistics for the Life Sciences, 5th Edition, 2016, ISBN-10: 0-321-98958-9, ISBN-13: 978-0-321-98958-1.

### **Required Material:**

TI-83/84 Calculator (or other calculator with statistical functions): Learning to use a calculator to complete basic statistical functions will fulfill the Liberal Studies Technology Requirement. Please bring your calculator to every class. Cell phones are not an acceptable calculator for quizzes or exams.

**Special Note:** No credit given for STA2122 if a grade of C- or better is earned in STA2171, STA3032, or QMB3200.

### **Course Description:**

This course provides an introduction to statistics emphasizing applications in Biology. Topics include descriptive statistics, elementary probability, the binomial and normal distributions, confidence intervals and hypothesis tests for means and proportions, correlation and regression, contingency tables and goodness-of-fit tests, analysis of variance and non-parametric tests.

The purpose of this course is to prepare students for further study and job preparation in the field of Biological Sciences including Medicine, Dentistry, other healthcare professions, Veterinary Medicine, Zoology and Botany. It will emphasize understanding of data and interpretation of statistical analyses. It will require students to think of data, and report the results of their analyses, in context.

## Course Objectives:

By the end of the course, students will demonstrate the ability to:

- (1) Analyze and address problems drawn from real world scenarios by applying appropriate mathematical, statistical, logical, and/or computational models or principles.
- (2) Interpret and evaluate data and information as presented in a variety of modes (such as tables, graphs, and charts), using appropriate technology. They will also be able to clearly communicate a summary of their findings to peers.

*The above two competencies will be assessed in the L.S. Quantitative Assessment for STA 2171, which includes a written summary of results.*

- (3) Use descriptive statistics and graphical methods to summarize data accurately.
- (4) Use inferential statistics to make valid judgments based on the data available.
- (5) Select the appropriate statistical tools to analyze a particular problem.
- (6) Describe the goals of various statistical methodologies conceptually.
- (7) Develop a healthy skepticism toward statistical studies and their results based on a sensible consideration of the techniques employed.

## Grading Outline:

- **Midterm (20%):** There will be a Midterm Exam given on Wednesday, March 4<sup>th</sup>, and it will be worth 20% of your total grade. A calculator, eraser, pens/pencils will be needed for this test. Proper preparation for the exam includes keeping up the homework, lecture notes, and examples along with the homework exercises. Students will also be allowed a one-page cheat sheet for formulas, notes, and examples, but it must be handwritten on a page no larger than 8.5x11 in. No computer generated formula sheets will be permitted.
- **Homework (10%):** For each topic, students will be assigned homework that must be completed and turned in on announced due date. Length of assignment will vary according to material content. Will be graded and returned to student. Similar questions will appear on Midterm Exam. Students must hand in homework at the beginning of class. *No late work will be accepted for unexcused absences, including the middle or end of class!*
- **In-Class Activities (6%):** We will have 6, in-class group activities during the semester. Each student who comes to class and signs the roster for that day will receive full credit. Activity dates will be announced on Blackboard
- **Attendance (5%):** Students earn 5pts for each time they are present for an Attendance Check. Students need to be present for 5 attendance checks to receive full credit; however, there will be more than 5 checks during the semester, so it is possible for students to earn Extra Credit. Students who walk in after attendance has been taken will receive half or no credit (see Attendance section).
- **Quizzes (30%):** There will be 7 regular quizzes and the Liberal Arts Assessment during the semester. Students may not work together on quizzes, but students are permitted to bring in one 3x5 note card (both sides). Students may DROP their lowest quiz grade (only 6 will count). All quizzes weighted equally for Quizzes portion of the overall grade.
- **Liberal Arts Assessment (4%):** Will be conducted on Friday October 21<sup>st</sup>. The Assessment will cover Paired Data: ability to carry out a Paired t-test simply from a set of raw data and make appropriate conclusions based on the result of the test. It's basically like a Quiz over Notes 8, except it is written by

the department and will cover a very focused portion of material. Students MAY NOT bring in a notecard for this. You will need to write answers in your own words.

- **Project (25%):** Through the course of the semester, you will complete several “mini group projects” with the aid of the instructor and an Academic Engagement Associate (AEA). There can be no more than 3 students per group (students may work by themselves if they wish). Groups will stay intact through the entire semester and will be finalized in class on Friday, January 23rd.
  - Throughout the semester, students will be presented with datasets and research questions for each of the basic tests we learn in this class. Students will learn to use Microsoft Excel to complete the projects
  - There will be a 5 datasets total for groups to work with. Four of the datasets will require students to implement one of the following tests for each: a Two-Sample hypothesis test, a TwoWay ANOVA, a Chi-Square Contingency Table test, and a Multiple Regression test. The fifth dataset will be a “mystery” dataset which will require students to decide on their own which test would be most appropriate.
  - For each dataset given, groups will create some basic charts/graphs, create a table of summary statistics, carry out the necessary statistical tests, and state conclusions. Groups will compile all of their work into a portfolio to be turned in at the end of the semester. I would encourage you to complete each step as we proceed through the semester instead of waiting till the end to do all of it. It will be easier that way!

### **Final Grading Scheme:**

Letter grade	Final Grade
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

**Course Policies Regarding Make-up Work:** All tests and home works are mandatory. In the event of circumstances beyond your control of which may include medical illness, deaths in family, legal issues, etc., the instructor will make necessary arrangements to facilitate completion of assignments once a suitable, timely, and acceptable written excuse is submitted. Make-up exams can be made by appointment.

If a student misses a regular lecture or activity, the student may come to office hours or email the instructor to arrange an appointment to copy notes or make up an activity. Activities must be made up within 2 weeks of assignment.

**Working Together:** It is okay to work together on homework. However, when it comes time for you to write up the solutions, I expect you to do this on your own, and it would be best for your own understanding if you put aside your notes from the discussions with your classmates and wrote up the solutions entirely from scratch. Working together on exams, of course, is expressly forbidden.

**Help Outside Class:** You may ask me questions via sending me email, or you may visit my office during the office hours. The Statistics help room in Strozier Library is also a good resource center. Additionally, your classmates are also good sources of information. You may also hire a tutor for an hourly fee from the statistics department.

**Blackboard Website:** Please check the blackboard site regularly for announcements, homework, notes, and current grades. Note it is your responsibility to ensure that your grades are inputted correctly into blackboard. Please notify me within 2 weeks of missing or incorrect grades from the date the quiz or exam was turned in.

### **Attendance Policy and Make-Ups:**

#### First day attendance policy and Attendance Expectations

“The University requires attendance on the first day of class. Being absent on the first day without first alerting me as the instructor will result in your being dropped from the class.”

Missed Attendance Checks: I will make announcements on Blackboard whenever attendance is taken, and students will have 1 week to email/show the instructor a documented excuse if they were absent. Excused absences include documented illness, deaths in the family, documented crises, jury duty, religious holy days, and official University activities. Other situations will be considered on a case-by-case basis.

Missed Group Activities: Students who miss in-class activities have 1 week to show documentation for an excused absence for that day. Students who do so will receive credit for the activity. Students without a documented excuse will not be able to make up or receive credit for missed activities.

Late Homework: Homework cannot be completed late except with special permission by the instructor.

#### Missed quizzes:

##### *With Documentation or Valid Extenuating Circumstances:*

Preferably notify me before the quiz is given in class, but no more than 1 week after the quiz takes place. A make-up time will be set up with an opportunity to receive full credit.

##### *Without Documentation:*

Must NOTIFY me BEFORE to have an opportunity to take it for full credit, AND make-ups must generally be COMPLETED BEFORE the quiz is given in class. Accommodating make-ups after the quiz is given in class is up to the instructor and depends on the circumstance. Late notifications of missing quizzes will most likely result in make-ups for partial credit at best.

**Missed Midterm exam:** Students should alert the instructor as soon as they are aware of a conflict with the exam date. A make-up time for the exam will be scheduled at a convenient time for the student. A missed exam without a valid excuse must be made up quickly and will most likely be for less credit.

### **Classroom Courtesies:**

1. Come to class on time and stay for the entire class period. Try to avoid arriving late or leaving early in the class.
2. Bring your own calculator, pencils/pens, erasers, writing paper, handwritten notes and printed notes to every class.
3. Turn off ALL devices you hold when you enter the classroom to prevent interruptions and distractions. **Do not use cell phones, laptops, iPods, etc. in class.**
4. When an exam is schedule, bring with you a working calculator, sharpened pencils and erasers. Please do not use any other devices such as a cell phone as a substitute for a calculator.
5. On a test you may not communicate with your classmates. Any form of cheating on a test will have serious consequences and cases of academic dishonesty may be referred to the University Judicial Official.
6. I encourage students to ask questions; no questions are considered “stupid”, so if you have difficulty understanding something please bring it to my attention. If the question is not solved in the class, you may come to me after the class or in the office hours.
7. I expect that everyone will maintain a classroom conducive to learning. Private communications are not allowed, especially during tests. Neither are reading extraneous materials, or sleeping.
8. Food is not allowed in the classroom.

**Grade Appeal During Term:** If a student has a question regarding the grading of an assignment/exam, the student should come to office hours or email the instructor and set up an appointment to discuss the assignment/exam in question. Explanation of grading rubric for assignment/exam will be given by the instructor, but such a meeting will not always result in points being awarded back to student. All appeals must be made within two weeks of grade posted on Blackboard.

## **LIBERAL STUDIES FOR THE 21<sup>st</sup> CENTURY:**

### **Quantitative and Logical Claims**

The *Liberal Studies for the 21<sup>st</sup> Century Program* at Florida State University builds an educational foundation that will enable FSU graduates to thrive both intellectually and materially and to support themselves, their families, and their communities through a broad and critical engagement with the world in which they live and work. Liberal Studies offers a transformative experience; this course has been approved as meeting the Liberal Studies requirements and thus is designed to help you become a critical analyzer of quantitative and logical claims.

In order to fulfill the State of Florida’s College mathematics and computation requirement the student must earn a “C” or better in the course.

### **University Attendance Policy:**

Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness.

### **Academic Honor Policy:**

The Florida State University Academic Honor Policy outlines the University’s expectations for the integrity of

students' academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to “. . . be honest and truthful and . . . [to] strive for personal and institutional integrity at Florida State University.” (Florida State University Academic Honor Policy, found at <http://fda.fsu.edu/Academics/Academic-Honor-Policy>.)

### **Americans With Disabilities Act:**

Students with disabilities needing academic accommodation should:

- (1) register with and provide documentation to the Student Disability Resource Center; and
- (2) bring a letter to the instructor indicating the need for accommodation and what type. This should be done during the first week of class.

This syllabus and other class materials are available in alternative format upon request.

For more information about services available to FSU students with disabilities, contact the:

Student Disability Resource Center

874 Traditions Way

108 Student Services Building

Florida State University

Tallahassee, FL 32306-4167

(850) 644-9566 (voice)

(850) 644-8504 (TDD)

[sdrc@admin.fsu.edu](mailto:sdrc@admin.fsu.edu)

<http://www.disabilitycenter.fsu.edu/>

### **Free Tutoring from FSU**

On-campus tutoring and writing assistance is available for many courses at Florida State University. For more information, visit the Academic Center for Excellence (ACE) Tutoring Services' comprehensive list of on-campus tutoring options - see <http://ace.fsu.edu/tutoring> or contact [tutor@fsu.edu](mailto:tutor@fsu.edu). High-quality tutoring is available by appointment and on a walk-in basis. These services are offered by tutors trained to encourage the highest level of individual academic success while upholding personal academic integrity.

### **Syllabus Change Policy**

"Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice."

## Pacing Schedule

	Monday	Tuesday	Wednesday	Thursday	Friday	Week
<b>Aug</b>	<sup>24</sup> Syllabus/Charts & Graphs	<sup>25</sup>	<sup>26</sup> Sampling	<sup>27</sup>	<sup>28</sup> Descriptive Statistics	<b>1</b>
	<sup>31</sup> Group Activity 1					<b>2</b>
<b>Sept.</b>		<sup>1</sup>	<sup>2</sup> Quiz 1 (HW 1 Due)	<sup>3</sup>	<sup>4</sup> Projects (Finalizing Groups/Intro to Excel)	<b>2</b>
	<sup>7</sup> No Class	<sup>8</sup>	<sup>9</sup> Probability Part 1	<sup>10</sup>	<sup>11</sup> Probability Part 2/Binomial	<b>3</b>
	<sup>14</sup> Normal Distributions Part 1	<sup>15</sup>	<sup>16</sup> Normal Distributions Part 2	<sup>17</sup>	<sup>18</sup> Quiz 2 (HW2 Due)	<b>4</b>
	<sup>21</sup> Sampling Distributions, Group Activity 2	<sup>22</sup>	<sup>23</sup> Confidence Intervals (One-Sample)	<sup>24</sup>	<sup>25</sup> Quiz 3 (HW3 Due)	<b>5</b>
	<sup>28</sup> Confidence Intervals (Proportions)	<sup>29</sup>	<sup>30</sup> Group Activity 3			<b>6</b>
<b>Oct.</b>				<sup>1</sup>	<sup>2</sup> Quiz 4(HW4 Due)	<b>6</b>
	<sup>5</sup> Projects (Descriptive Stats, Charts, Conf. Interval)	<sup>6</sup>	<sup>7</sup> Hypothesis Testing (Introduction/Two Sample Tests)	<sup>8</sup>	<sup>9</sup> Hypothesis Testing (One-sided Testing) (and Excel for HT)	<b>7</b>
	<sup>12</sup> Midterm Review	<sup>13</sup>	<sup>14</sup> Midterm (HW 5 Due)	<sup>15</sup>	<sup>16</sup> Group Activity 4	<b>8</b>
	<sup>19</sup> Paired Data and Paired t-test	<sup>20</sup>	<sup>21</sup> Non-Parametrics (Wilcoxon rank-sum Test, Wilcoxin-Signed Rank Test)	<sup>22</sup>	<sup>23</sup> Liberal Studies Assessment (HW6 Due)	<b>9</b>
	<sup>26</sup> One-Way ANOVA	<sup>27</sup>	<sup>28</sup> F-test/Two-Way ANOVA	<sup>29</sup>	<sup>30</sup> Group Activity 5	<b>10</b>
<b>Nov.</b>	<sup>2</sup> Multiple Comparisons: Tukey Test, Non-Parametrics: Kruskal-Wallis Test	<sup>3</sup>	<sup>4</sup> Quiz 5 (HW7 Due)	<sup>5</sup>	<sup>6</sup> Projects (Use Excel for ANOVA)	<b>11</b>
	<sup>9</sup> Chi-Square Goodness of Fit Test	<sup>10</sup>	<sup>11</sup> No Class	<sup>12</sup>	<sup>13</sup> Chi-Square Contingency Table Test (and Excel for Chi-Square Test)	<b>12</b>
	<sup>16</sup> Group Activity 6	<sup>17</sup>	<sup>18</sup> Quiz 6 (HW8 Due)	<sup>19</sup>	<sup>20</sup> Linear Regression	<b>13</b>
	<sup>23</sup> Regression Inference (and using Excel for Linear Regression)	<sup>24</sup>	<sup>25</sup> No Class	<sup>26</sup>	<sup>27</sup> No Class	<b>14</b>
	<sup>30</sup> Multiple Regression					<b>15</b>

<b>Dec.</b>		1	<sup>2</sup> Quiz 7 (HW9 Due)	<sup>3</sup>	<sup>4</sup> Project Portfolio Workday (Last day to ask Qs)	<b>15</b>
	7	8	<sup>9</sup> Project Portfolio Work Due at NOON (Hard Copy in my box 2nd floor OSB)	10	11	<b>16</b>