

STA 2171: Statistics for Biology

Section 0001

Department of Statistics
Florida State University
Spring 2022

Course Information

Class Times and Location

This class will be taught **Face-to-Face (F2F)** (i.e., **in-person**) at the times and locations listed below.

- Tuesday & Thursday, 8:00 - 9:15 AM, OSB 0108
- Friday, 10:40 - 11:30 AM, HCB 0213

Instructor

- Name: Adam Dixon
- Email: ad18g@my.fsu.edu
- Office: OSB 209B
- Office Hours (In-person/Zoom): Wednesday 1:00 - 2:00 PM, or by appointment

Note: I will be available for scheduled office hours and appointments both in-person and through Zoom. Links to Zoom meetings can be found on the course's Canvas site.

Grader

- Name: Xiaoyi Wang
- Email: xw18b@my.fsu.edu

Course Website: Canvas (<https://canvas.fsu.edu>)

Course Description

Prerequisites

MAC 2311 Calculus I and Biology major status, or departmental approval.

Credit Hours: 4

Special Note

No credit is given for STA 2171 if a “C–” or better has been previously earned in STA 3032 or QMB 3200.

Required Materials

- A personal computer with a reliable Internet connection and Google Chrome or Mozilla Firefox
- TI-84 Plus (or equivalent) calculator. We will teach you how to use a TI-84 series calculator, but we cannot promise to be able to help with any other type of calculator. If you are unsure if a calculator you already have is “equivalent” to a TI-84 series calculator, please discuss it with me.

Note: A textbook is **not required** for this course. The instructor will provide all required course notes and exercises. Please note that the materials provided by the instructor were put together for your individual use only. While you may share these materials with classmates, we ask that you do not share them with third parties who are not enrolled in this class. If you seek help outside of class, you may, of course, allow your helper to see the materials, but please do not allow them to make copies or in any other way take our material. We appreciate your co-operation in protecting our material. Thank you!

Recommended Materials

Illowsky, B., & Dean, S. (2013). *Introductory Statistics*. OpenStax. <https://openstax.org/books/introductory-statistics/pages/1-introduction>

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.

Learning Objectives

This course has been approved to meet FSU’s Liberal Studies **Quantitative and Logical Thinking** requirements and is designed to help you become a critical analyst 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.

By the end of the course, students will:

1. Select and apply appropriate methods (i.e., mathematical, statistical, logical, and/or computational models or principles) to solve real-world problems.
2. Use a variety of forms to represent problems and their solutions.

The above two competencies will be assessed in the Liberal Studies 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.

Assessments and Grading

Assessments		
Type	Count	Total Weight
Attendance	5	10%
Quizzes	5	30%/50%*
LSQA	1	10%
Final Exam	1	30%/50%*
Subtotal:		100%
Extra Credit		
Bonus Questions	—	5%
Total:		105%

* - If your overall Quiz grade is **greater** than your Final Exam grade, then your overall Quiz grade will receive a 50% weight and your Final Exam grade will receive a 30% weight. On the other hand, if your overall Quiz grade is **less** than your Final Exam grade, then your overall Quiz grade will receive a 30% weight and your Final Exam grade will receive a 50% weight.

1. Since this course is taught in-person, attendance is encouraged, albeit **not mandatory**. While I will try to provide additional materials online for further study, I suggest you consider this content a supplement to – not a substitute for – regular, in-person attendance. Ultimately, it is important that you stay engaged with the course and do not fall behind.

To that end, there will be five (5) Attendance checks given through Canvas throughout the semester. These small assessments are intended to make sure you are interacting with the course at some level (in-person or online). As such, you will be given three (3) attempts and unlimited time for each Attendance check.

Your overall Attendance grade will be the simple average of your Attendance scores (each reported as a percentage rounded to two decimal places).

2. There will be five (5) timed Quizzes, each of which will cover approximately two weeks' worth of material, given through Canvas.

Your overall Quiz grade will be the simple average of your four (4) highest-scoring Quizzes (each reported as a percentage rounded to two decimal places). That is, **your lowest Quiz grade will be dropped**.

3. There will be one (1) timed Liberal Studies Quantitative Assessment (LSQA), a university-mandated assessment covering one topic, given through Canvas.

Your LSQA grade will be reported as a percentage rounded to two decimal places.

4. There will be one (1) timed, cumulative Final Exam given through Canvas.

Your Final Exam grade will be reported as percentage rounded to two decimal places.

The Final Exam will be offered throughout Finals Week (April 25, 2022 - April 29, 2022). Further instructions will be given as Finals Week approaches. Please see the Tentative Pacing Schedule (TPS) for all other assessment dates.

Final instructions will be given prior to each assessment, but the following will generally apply:

- Each assessment will be **open resource** (unless noted otherwise), which means you can use your own notes, any material (e.g., notes, slides, emails, videos) I provide, or any other resources at your disposal (excluding other humans, unless told otherwise).
- You will be allowed to use your calculator.

Unless told otherwise (there will be opportunities for collaborative work), under no circumstances will you be allowed during an assessment to:

- Share resources, equipment, work, or answers with other students.
- Receive help from other students or people.
- Give help to other students.

If you are unable to begin and complete an assessment during its availability, there may be make-up opportunities (see the Make-Up Policy). **Assessments that are not submitted will receive a grade of zero. When a makeup is submitted, the zero will be replaced with the earned grade.**

Grade Distribution	
Letter Grade	Numerical Grade
A	93 – 105
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

Your overall course grade will be calculated according to the following.

$$\begin{aligned}\text{Overall Course Grade} &= 0.10 \cdot (\text{Attendance Grade}) \\ &+ 0.10 \cdot (\text{LSQA Grade}) \\ &+ 0.50 \cdot \max(\text{Quiz Grade}, \text{Final Exam Grade}) \\ &+ 0.30 \cdot \min(\text{Quiz Grade}, \text{Final Exam Grade})\end{aligned}$$

Your final letter grade will be assigned using the table above and the smallest whole number greater than or equal to your overall course grade (e.g., an overall course grade of 89.04 will be assigned an A- since 90 is the smallest whole number greater than or equal to 89.04).

Grades will not be curved, and there will be no opportunities for extra credit, make-ups, or any other form of grade improvement after the Last Day of Classes (April 22, 2022). Therefore, you should do your best throughout the entire semester.

Note on Technology-dependent Assessments

This course is heavily technology-dependent. While I will do my best to work with you on technology issues, please be aware that if you take an assessment but I can find absolutely no record of the fact, then I will not be able to give you credit for it.

Please **do not use Safari** when you take assessments on Canvas; use Chrome or Firefox instead.

We will not be using Honorlock.

Course Policies

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.

Recorded Lectures Policy

Please note that the recorded lectures and/or other recordings are the property of Florida State University and are being made available only to the students enrolled in this class. Students are not permitted to share the recorded lectures or other recordings with any person or entity outside of this class. Copyrights of the recorded lectures and other recordings are reserved by the instructor and Florida State University.

Email & Communication Policy

Please turn on the course notifications in Canvas by going to **Account/Notifications/** and checking the **Notify me right away** option for all of items under **Course Activities**.

If you email me, please do so from your **my.fsu.edu** account. While you can expect me to try to answer as quickly as possible, please allow me up to two working days to respond. If I have not responded by that time, I encourage you to send me a follow-up email.

You are also welcome to message me through Canvas, but my quickest responses will always come through email.

Please be sure to check our course's Canvas site and your `my.fsu.edu` email account daily.

Grade Appeal Policy

If you believe an assessment has been improperly graded, then you must discuss it with me within one (1) calendar week after your grade has been posted to Canvas. If I do not hear from you within this period, the grade will remain unchanged.

Make-Up Policy

Make-ups are for being unable to begin and complete an assessment during its availability. Make-ups will not be given due to undesired performance on an assessment, **nor will they be given once you begin an assessment.**

If you are unable to begin and complete an assessment during its availability, then please email me immediately. Unless told otherwise, you will have until Friday of the following week to make up the missed assessment unless you have a documented reason for being unable to do so. You will be allowed three (3) free make-ups (i.e., you can use them for any reason), but you must provide documentation for all further make-up opportunities, unless told otherwise. If you do not complete a make-up according to the above guidelines, then the missed assessment will receive a grade of zero (0).

No make-ups for Attendance or Quizzes will be given after the Last Day of Classes. If you are unable to submit the Final Exam during its availability, then you must email me immediately.

Note: Since assessments will be given online, you may experience technical issues during testing that prevent you from making a complete submission. If this happens, please email me as soon as possible, and we will figure something out.

Classes Subject to HB233 Recording

In this class, consistent with state law and university policy, students are permitted to make recordings of class lectures for personal use only. As noted, sharing, posting, or publishing classroom recordings may subject you to honor code violations and legal penalties associated with theft of intellectual property and violations of other state law. Moreover, students and educators have expressed concern that recording classroom activities may negatively impact the learning experience for others, especially in classes that involve questions, discussion, or participation. To protect a learning environment in which everyone feels free to experiment with ideas, we ask you refrain from recording in ways that could make others feel reluctant to ask questions, explore new ideas, or otherwise participate in class. Students must monitor their recording so that they do not include participation by other students without permission. Students with disabilities will continue to have appropriate accommodations for recordings as established by the Office of Accessibility Services.

Public Health Protocols

In our classroom, I will expect everyone to wear a proper, well-fitting mask. As our President has informed the university community, FSU expects everyone on campus to use face-coverings. In re-

gions where virus rates are high, the CDC recommends that even vaccinated individuals wear masks in public indoor spaces, like classrooms, especially where social distancing is not possible. Florida infection and hospitalization rates are greater now than they were at the height of the 2020 surge due to the Delta variant, a more infectious and easily transmissible version of the COVID-19 virus. The best way to protect against serious illness is to be fully vaccinated, but not everyone among us can be. Because the Delta variant can infect even vaccinated individuals and can be spread by them to others, it poses a special threat to members of the community with underlying health conditions and children at home who are too young for vaccination.

For these reasons, FSU expects each member of the community to comply with the public health protocols our President set forth on August 9, 2021, including (1) wearing masks in public indoor spaces, (2) getting fully vaccinated, (3) being tested for the virus if you have symptoms, and (4) staying home and away from others if you are sick. Please remember that you should NOT attend class in person if you have tested positive for COVID-19 or are quarantining after exposure. Finally, please bear in mind that the COVID-19 situation is fast-moving, and that university guidance on the issue may change at any time.

Final Exam Rescheduling Policy

You may not take the final exam before final exams week. Individual students who need to reschedule the final exam for a different time during final exams week should talk to me about it first to get my approval and then fill out and follow the instructions on the “Request to Reschedule a Final Examination” form at

https://artsandsciences.fsu.edu/sites/g/files/upcbnu321/files/2022-01/Request_to_Reschedule_01032022.pdf

The form needs to be submitted to the College of Arts and Sciences before 5:00 PM on the Last Day of Classes.

If you experience a documented emergency that prevents you from observing the above deadline, contact me as soon as you are able to, and we will take it from there.

Sexual Misconduct and Title IX Reporting

As an instructor, I am obliged to report all instances of sexual misconduct that I become aware of to the University’s Title IX Director; I cannot hold such information confidential. If you would like to discuss your situation in confidence, you may contact the Victim Advocate Program (<https://dos.fsu.edu/vap/>), Counseling and Psychological Services (<https://counseling.fsu.edu/>), the Employee Assistance Program (<https://eap.fsu.edu/>), University Health Services (<https://uhs.fsu.edu/>), or pastoral counselors.

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.

Drop and Withdrawal deadlines are given in the University’s academic calendar at <https://registrar.fsu.edu/calendar/>

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>)

Academic Success

Your academic success is a top priority for Florida State University. University resources to help you succeed include tutoring centers, computer labs, counseling and health services, and services for designated groups, such as veterans and students with disabilities. The following information is not exhaustive, so please check with your advisor or the Dean of Students office to learn more.

Americans with Disabilities Act

Florida State University (FSU) values diversity and inclusion; we are committed to a climate of mutual respect and full participation. Our goal is to create learning environments that are usable, equitable, inclusive, and welcoming. FSU is committed to providing reasonable accommodations for all persons with disabilities in a manner that is consistent with academic standards of the course while empowering the student to meet integral requirements of the course.

To receive academic accommodations, a student:

1. must register with and provide documentation to the Office of Accessibility Services (OAS);
2. must provide a letter from OAS to the instructor indicating the need for accommodation and what type; and,
3. should communicate with the instructor, as needed, to discuss recommended accommodations. A request for a meeting may be initiated by the student or the instructor.

Please note that instructors are not allowed to provide classroom accommodations to a student until appropriate verification from the Office of Accessibility Services has been provided.

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

Office of Accessibility Services
874 Traditions Way
108 Student Services Building
Florida State University
Tallahassee, FL 32306-4167
(850) 644-9566 (voice)
(850) 644-8504 (TDD)
oas@fsu.edu
<https://dsst.fsu.edu/oas>

Confidential Campus Resources

Various centers and programs are available to assist students with navigating stressors that might impact academic success. These include the following:

Victim Advocate Program
University Center A, Rm. 4100
(850) 644-7161
Available 24/7/365
Office Hours: M-F 8-5
<https://dsst.fsu.edu/vap>

Counseling and Psychological Services
Askew Student Life Center, 2nd floor
942 Learning Way
(850) 644-8255
<https://counseling.fsu.edu/>

University Health Services
Health and Wellness Center
(850) 644-6230
<https://uhs.fsu.edu/>

Department of Statistics Contact Info

- **Main Office:** OSB 214
- **Phone:** (850) 644-3218

Tentative Pacing Schedule

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Jan 3rd	4th	5th	6th 1 First-Day Attendance	7th 2 Prerequisites & Notation
10th	11th 3 Summary Statistics	12th	13th 4 Summary Statistics	14th 5 Summary Statistics
17th MARTIN LUTHER KING, JR. DAY (No Class)	18th 6 Summary Statistics	19th	20th 7 Summary Statistics	21st 8 Attendance 1 Summary Statistics
24th	25th 9 Probability	26th	27th 10 Probability	28th 11 Quiz 1 Probability
31st	Feb 1st 12 Binomial Distribution	2nd	3rd 13 Binomial Distribution	4th 14 Attendance 2 Binomial Distribution
7th	8th 15 Normal Distribution	9th	10th 16 Normal Distribution	11th 17 Quiz 2 Normal Distribution
14th	15th 18 Central Limit Theorem	16th	17th 19 Central Limit Theorem	18th 20 Attendance 3 LAST DAY TO DROP Central Limit Theorem
21st	22nd 21 Inference for Pop. Means	23rd	24th 22 Inference for Pop. Means	25th 23 Quiz 3 Inference for Pop. Means
28th	Mar 1st 24 Inference for Pop. Props.	2nd	3rd 25 Inference for Pop. Props.	4th 26 Attendance 4 Inference for Pop. Props.
7th	8th 27 One-Way ANOVA	9th	10th 28 One-Way ANOVA	11th 29 LSQA One-Way ANOVA

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
14th SPRING BREAK (No Class)	15th SPRING BREAK (No Class)	16th SPRING BREAK (No Class)	17th SPRING BREAK (No Class)	18th SPRING BREAK (No Class)
21st	22nd 30 Two-Way ANOVA	23rd	24th 31 Two-Way ANOVA	25th 32 Quiz 4 Two-Way ANOVA
28th	29th 33 Simple Linear Regression	30th	31st 34 Simple Linear Regression	Apr 1st 35 Attendance 5 Simple Linear Regression
4th	5th 36 Multiple Linear Regression	6th	7th 37 Multiple Linear Regression	8th 38 Quiz 5 Multiple Linear Regression
11th	12th 39 Nonparam. Statistics	13th	14th 40 Nonparam. Statistics	15th 41 Nonparam. Statistics
18th	19th 42 Misc. Topics	20th	21st 43 Misc. Topics	22nd 44 LAST DAY OF CLASSES Misc. Topics
25th FINALS WEEK	26th FINALS WEEK	27th FINALS WEEK	28th FINALS WEEK	29th FINALS WEEK