

## STAT 250 INTRODUCTION TO BIOSTATISTICS

*“This course will cover statistical analysis and interpretation of data in the biological sciences; probability; distributions and statistical inference for one- and two-sample problems.” 3 credits*

Prerequisite: 3 credits in mathematics

### Objectives:

In this course you will gain problem solving skills that will allow you to decide for yourself if research involving data is trustworthy or not. Mathematical calculations are necessary but more important is interpreting the values computed. At the end of the semester you will be able to organize data using numerical and graphical summaries, apply properties to data based on the distribution that it follows, make calculations that prove or disprove a hypothesis, interpret the trend in new data compared to a previous standard, diagnose the trustworthiness of inference, collect data without bias and diagnose bias in collected data.

### Faculty Contact:

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### TA information:

Thomas  
(814) 863-  
Email:

Office hours:

Office hours:

### Materials:

*Textbook:* Marcello Pagano and Kimberlee Gauvreau's *Principles of Biostatistics* Second Edition, Duxbury.

*Calculator:* Any kind that can compute a square root (graphing ok) – cell phones prohibited.

*Vocabulary Journal:* A journal in which you can log vocabulary terms and their definitions, by hand, from the textbook as you read (stapled loose leaf paper is acceptable).

*Essentials:* Notebook or paper to take notes on lectures, to work out problems in class; pen, pencil, eraser, etc.

*Computer:* One day each week you will have the use of a computer in class (lab). Outside of class, any computer on campus can provide the same information as do the ones in class. You will need to access ANGEL regularly for all course information.

### Course Format:

You are encouraged to travel through the world of biostatistics with your classmates. Before each lecture, you will receive a reading assignment to complete. The lecture will present examples that illustrate the concepts in the reading assignment. The lab class is a time for the teacher and classmates to work together on examples using statistical software to solve the problems instead of working by hand. A brief quiz will be administered online in each lab as attendance. Homework is checked weekly by a homework quiz. After two or three lectures, you will be tested on your understanding of the material during an out-of class exam at the e-testing center. A short project is due after each exam, with some class time devoted to working on such; projects will be graded in the format of an online quiz. A cumulative final exam will be given as scheduled by the University at the conclusion of the semester.

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### Work load:

Please check ANGEL regularly for new information, announcements and course emails. For each lecture, you will have a reading assignment and a set of problems to work on and finish outside of class. Projects are to be completed outside of class with the possibility of class time for discussion of ideas. Because Statisticians work together on projects, you are expected to work together with your classmates while maintaining your own individuality in your work.

### Course Policies:

Assignments (see document on lessons tab in ANGEL), lectures, and study guides will be posted in a timely manner on ANGEL. Please print out and review each lecture before it is presented in class, bringing a printout to the lecture to assist you in following along. It is your responsibility to provide the printout.

The vocabulary journal will be hand-graded for accuracy and completion and returned in a timely manner. All projects, homework and lab quizzes will be graded by ANGEL for immediate feedback. Exams are graded online for immediate feedback. All grades will be updated monthly on ANGEL.

You are expected to complete all your own work in a collaborative setting. Please remember that copying anyone else's work is considered cheating. As a reminder, the University has a policy on academic honesty. You are expected to abide by the procedures set forth in the University's document at <http://www.psu.edu/dept/ufs/policies/47-00.html#49-20>.

Any student in this course who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact us personally as soon as possible, so we can discuss accommodations necessary to ensure full participation and facilitate your educational opportunity.

### Assignments:

During each reading assignment, you will define vocabulary from the reading, labeled by chapter and numbered by word, kept together in a journal, handwritten, to be handed in at the beginning of the class of the last lecture (Ch 22). The vocabulary journal will not be checked weekly. Typed journals or late journals receive no credit. Please arrange to turn in the journal early if you know you will not attend class on the due date. Grading: 100 points

Homework is expected to be completed at the conclusion of each lecture but is not turned in. Weekly online quizzes will assess the completeness and correctness of each assignment. One quiz (2 chances) is given for each chapter, available on ANGEL and due on Wednesdays by 11pm. Please complete each homework assignment and have your work ready before you start the quiz. Answer quiz questions based on your completed assignment. Quizzes not submitted will **not** count. Be sure to press the SUBMIT button before the due time. Grading: 20 points for each quiz

Lab quizzes, a brief 10 question quiz (2 chances) taken through ANGEL, are to be taken during the scheduled lab time, in the lab classroom, only. Late or missed lab quizzes, and those taken outside the lab classroom will be scored as a zero. When taking each quiz on ANGEL, be sure to only press the SUBMIT button when you are completely finished taking the quiz. Lab quizzes are open notes, open book, and open for discussion among classmates. Missed lab quizzes, excused or not, may **not** be made up. Lab quizzes reflect lab attendance. Grading: 10 points for each quiz

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Exams, 25 multiple choice questions, given in the e-testing lab may **not** be made up. If you know ahead of time that you will miss an exam, you must notify Mrs. Shook prior to the date of and you may take it early, but not later than the original scheduled time. When completing the exam, only press the SUBMIT button when you are completely finished. Tentative dates are Mondays September 14, October 5, 26, November 16 and December 7. All needed tables will be provided. A front of one 8.5”X11” sheet of handwritten notes is allowed for each exam as well as, a writing utensil and a calculator (graphing ok – cell phones prohibited). You will be provided with scrap paper that must be turned in before you leave the center. More information is available at [www.testing.psu.edu/students.html](http://www.testing.psu.edu/students.html). Grading: 50 points for each exam

After each exam, a brief project is worked on in and outside of class but is not turned in. Online quizzes will assess the completeness and correctness of each project. One quiz (1 chance only, you may save and return) is given for each project, available on ANGEL and due on Wednesday or Fridays by 11pm. Please complete each project and have your work ready, either printed or saved on the computer on which you access the quiz before you start the quiz. Answer quiz questions based on your completed assignment. If working in a group, each group member must submit their own quiz, but answers may be the same as other group members. Group members not submitting a quiz will receive no score even if their group members submitted successfully. Quizzes not submitted will **not** count. Be sure to press the SUBMIT button before the due time. Late project quizzes are **not** accepted. Tentative due dates are September 18, October 9, 30, December 4 and 9. Grading: 50 points each

The cumulative, multiple-choice final exam is scheduled by the University. All needed tables will be provided. Two 8.5”X11” sheets of handwritten notes are allowed (front and back or four fronts). Grading: 100 points

### Grading Tables:

| <i>What?</i>       | <i>Points</i> |
|--------------------|---------------|
| Homework Quizzes   | 300           |
| Lab Quizzes        | 100           |
| Exams              | 250           |
| Projects           | 250           |
| Vocabulary Journal | 100           |
|                    |               |
| <b>Total</b>       | <b>1000</b>   |

| <i>Total Points</i> | <i>Letter Grade</i> |
|---------------------|---------------------|
| 930 and above       | A                   |
| 900-929             | A-                  |
| 870-899             | B+                  |
| 830-869             | B                   |
| 800-829             | B-                  |
| 770-799             | C+                  |
| 700-769             | C                   |
| 600-699             | D                   |
| Below 600           | F                   |

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## Semester Schedule:

| Monday                             | Wednesday   | Friday   |
|------------------------------------|---|--|
| Aug 24<br>Syllabus<br>Lecture Ch 1 | 26<br>HW Quiz Syllabus and Ch 1 due<br>Lecture Ch 2<br>Lab Survey 1 | 28<br>Lecture Ch 3                                     |
| 31                                 | Sept 2  | 4  |
| Lecture Ch 6                       | HW Quiz Ch 2, Ch 3 due<br>Lab Ch 1-3<br>Lab Quiz 1                  | Review   |
| 7                                  | 9   | 11   |
| No Classes                         | HW Quiz Ch 6 due<br>Lab Ch 6<br>Lab Quiz 2                          | Lecture Ch 7   |
| 14                                 | 16  | 18   |
| Exam 1 Ch 1-3, 6                   | Project 1<br>Lab Survey 2   | Lecture Ch 8a<br>Project 1 due                         |
| 21                                 | 23  | 25   |
| Lecture Ch 8b                      | HW Quiz Ch 7, Ch 8 due<br>Lab Ch 7-8<br>Lab Quiz 3                  | Lecture Ch 9   |
| 28                                 | 30  | Oct 2  |
| Review                             | HW Quiz Ch 9 due<br>Lab Ch 9<br>Lab Quiz 4                          | Lecture Ch 10  |
| 5                                  | 7   | 9  |
| Exam 2 Ch 7-9                      | Project 2<br>Lab Survey 3   | Lecture Ch 11a<br>Project 2 due                        |
| 12                                 | 14  | 16   |
| Lecture Ch 11b                     | HW Quiz Ch 10, Ch 11 due<br>Lab Ch 10-11<br>Lab Quiz 5              | Lecture Ch 13  |
| 19                                 | 21  | 23   |
| Lecture Ch 14                      | HW Quiz Ch 13 due<br>Lab Ch 13<br>Lab Quiz 6                        | Review   |
| 26                                 | 28  | 30   |
| Exam 3 Ch 10, 11, 13               | Project 3<br>Lab Survey 4   | Lecture Ch 15-16.1<br>Project 3 due                    |
| Nov 2                              | 4   | 6  |
| Review                             | HW Quiz Ch 14, Ch 15-16.1 due<br>Lab Ch 14-16.1<br>Lab Quiz 7       | Lecture Ch 17  |
| 9                                  | 11  | 13   |
| Project 4 Introduction             | HW Quiz Ch 17 due<br>Lab Ch 17, Project 4<br>Lab Quiz 8             | Lecture Ch 18  |
| 16                                 | 18  | 20   |
| Exam 4 Ch 14-16                    | HW Quiz Ch 18 due<br>Lab Ch 18, Project 4<br>Lab Quiz 9             | Vocabulary Journal Due<br>Lecture Ch 22                |
| 30                                 | Dec 2   | 4  |
| Project 4 Questions                | HW Quiz Ch 22 due<br>Lab Ch 22, Project 4<br>Lab Quiz 10            | Review – Discrete and Continuous Data<br>Project 4 due |
| 7                                  | 9   | 11   |
| Exam 5 Ch 17, 18, 22               | Project 5 due<br>Lab Survey 5                                       | Review – Nominal and Ordinal Data                      |