STAT 269 – Introductory Statistics

Fall 2009

Professor: Dr. Marlin Eby

Education

- H.S., Lancaster Mennonite School
- B.A. (Mathematics), Millersville University
- M.Stat. (Statistics, Mathematics minor), University of Florida
- Ph.D. (Statistics), University of Florida

Positions

- Professor, Department of Mathematics and Statistics, University of South Carolina
- Statistical Consultant, Info Tech, Inc., Gainesville, FL
- Professor, Department of Mathematical Sciences, Messiah College

Office: Frey 322

Phone: 6850 – 24-hour access: 691-6021 (extension 6850)

Office Hours: If my office hours conflict with your schedule, contact me to schedule another time.

Monday: 10:00 - 10:50 and 2:00 - 2:50
Tuesday: 10:30 - 11:45
Wednesday: 3:00 - 3:50
Thursday: 1:20 - 2:35
Friday: 11:00 - 11:50

Help Sessions: starting now and continuing through the final exam week

Monday, Tuesday, Wednesday, and Thursday
7:00 - 9:00 p.m. in Frey 341

- Even if you do not have specific questions, you can benefit from listening as our assistants answer other students' questions.
- Take your class notes and handouts to the Help Room so that the staff can see how topics were presented in class.

Course Audience

Students majoring in athletic training, biochemistry, biology, biopsychology, chemistry, economics, environmental education, environmental science, environmental studies, family and consumer science education, human development and family science, nursing, nutrition and dietetics, pre-med, pre-physical therapy, psychology, or social work

This course satisfies the General Education Mathematical Sciences requirement.

This course is for **non**majors. STAT 291 is the beginning course for majors. There are some similarities since both are beginning courses, but there are very definite differences in range of topics covered, depth of coverage, mathematical rigor, mathematical prerequisites, etc. Be assured that any quantitative challenges you face in STAT 269 are appropriate for, and within the capabilities of, the nonmajor.

- If you suffer from quantitative anxiety, do not look at the entire course. Instead, take it one day at a time.
- Even though many of you are required to take this course, a positive attitude will go far toward making this

course a rewarding experience.
- Prior experiences in mathematics courses may not be relevant here since this is a statistics course – not a mathematics course. There are differences. This is true for both majors and nonmajors.

Course Objectives

We live in an increasingly quantitative world, and thus a degree of quantitative literacy is necessary for success. There are very good reasons why many of your majors require you to take this course. The goal of this course is to provide a solid foundation for the quantitative courses in your department, your employment after graduation, and/or graduate school – a fact which you may not fully appreciate until later.

Specifically, the objectives for this course are for you to:
- become familiar with both descriptive and inferential analyses
- use probability as the bridge between descriptive and inferential analysis
- intuitively understand each concept
- integrate topics by identifying commonalties
- understand the limitations of each analysis through consideration of conditions for validity
- express general concepts in terms of the application
- communicate results, clearly and completely, in a manner appropriate to nonquantitative audiences
- be introduced to the computer's capabilities in solving practical problems, using the computer for analysis only after understanding how to perform the analysis *manually*

My goal is not to make you a statistical practitioner but rather an intelligent consumer of statistical information. Knowing that valid research results are very much dependent on careful consideration of the statistical aspects will lead you to seek professional statistical help in most major research projects and, also, to review the research results of others with appropriate caution and skepticism.

Mathematical Sciences General Education Objectives

By the completion of this course, the student will demonstrate the ability to
- identify methods and assumptions of the mathematical sciences.
- understand at least one of the three mathematical sciences of computing, mathematics, and statistics from a liberal arts perspective.
- think logically, analytically, and abstractly through engagement in quantitative problem-solving activities.

Texts
- Elementary Statistics – Picturing the World, 4th edition by Larson and Farber (0-13-242433-9)
- Against All Odds: Inside Statistics video series at Media Services in Murray Library[1]

[1]This video series was produced in the late 1980's. Thus, the clothes, hairstyles, cars, computers, etc. are outdated. However, the statistical content is still current and the many real-life applications interesting.

There is no mystery about what is expected of you on quizzes and exams since all material that I expect you to learn will be covered in **class** or in the **suggested homework**. Thus, your notes, the handouts, and the suggested homework problems give you a complete guide as to what is expected both in content and method. In choosing the text for this course, I sought to find the text that most closely matches the topics and methodology presented. The match is not perfect, and there will be some discrepancies between the text and the class presentation. Our text is good, but you should never use it as your primary resource, since you would miss some of what is expected of you. The appropriate role of the text is to supplement and reinforce your understanding. The videos serve an enrichment function and thus can assist in the learning as well.

Grades

The grading policy is designed to ensure fairness for all students. The procedure for determining your course grade is explicitly detailed in this section. This allows you to determine your grade at any time in this course based on the items that have been returned to you after grading.

- Your course grade will be determined solely on your performance on the following components.
- Thus, extra credit will never be an option in this course.
- Partial credit is given for partially correct solutions.

Unit Exams: 3 @ 100 points — 300 points

- October 1 (Thursday)
  November 5 (Thursday), but possibly November 10 (**Tuesday**)
  December 8 (**Tuesday**)
- not explicitly cumulative

Final Exam — 125

- Tuesday, December 15 @ 8:00
- cumulative

Quizzes: 7, but possibly 8 — 100

- September 10
  September 17
  September 24
  October 15
  October 29
  November 5 (**possibly**)
  November 19
  December 1 (**Tuesday**)
- lowest score is dropped
- percentage of total points earned on the remaining quizzes is applied to 100 points
- given at the beginning of class
- each quiz will consist of problems similar to the suggested homework for the sections covered since the last quiz or exam

Computer Homework: up to 5 — 50

- percentage of total points earned on the homeworks is applied to 50 points

Total 575 points

The course grade will be determined on the basis of total points earned as a percentage of 575. The following percent cutoffs will be used to determine your course grade.

Percent Cutoff	Grade	Total Points Cutoff
93	A	535
90	A-	518
87	B+	501
83	B	478
80	B-	460
77	C+	443
73	C	420
70	C-	403
67	D+	386
60	D	345
0	F	

- Your grade is determined totally by your demonstrated level of mastery of the material and not by your relevant standing within the class or the performance of the class as a whole. That is, there will be no curving of any grades.
- Good grades are not uncommon in this course but are usually achieved only with serious effort.

Formula Sheets and Calculator

- For each exam, I will supply a copy of the STAT 269 – Formula Sheet.
- When needed on quizzes and exams, you may use the statistical tables in *Appendix B*.
    - You must have your own copy of the tables for quizzes and exams.

- For each unit exam, you may also use one side of an 8½" × 11" handwritten sheet.
- For the final exam, you may use both sides of an 8½" × 11" handwritten sheet.

- On quizzes and exams, you may use a calculator.
    - You may not use any of your calculator's graphics or statistics capabilities. That is, a calculator is to be used only for calculations.
    - You must have your own calculator for quizzes and exams.
    - You are expected to know how to use your calculator before quizzes and exams.

To benefit from using the STAT 269 – Formula Sheet, one must clearly understand its purpose.

- It is not a study guide.
- It is not a "cheat" sheet.
- It will not help you determine the method that should be used to solve an exam problem. Only proper preparation for the exam will help you determine the method.
- It is simply a formula sheet. You should consult it only to confirm the details of the formula for the method that you have already determined based on your proper exam preparation.

Course Outline: in order of coverage

Chapter	Sections Covered	Video Program
1	1 - 3	1-1 4-2 6-2 7-2 8-2
2	1 - 5	1-2 2-1
5	1 - 4	2-2 3-1 3-2
7	1 - 4	10-2 11-1 12-1
6	1 - 3	10-1 11-1 12-1
8	1 - 2, 4, 3	7-1 11-1 11-2 12-1
9	1	4-2 5-1 6-1 13-1
10	4	7-1

Especially if you are a first-year student, be certain that you are ready for this 200-level course in statistics.

We will cover many topics but at a depth appropriate for the nonmajor. However, we will be encountering only a small portion of the vast discipline of statistics.

To assist in summarizing each chapter, use the following at the end of each chapter:

- Chapter Summary
- Review Exercises
- Chapter Quiz

To assist in summarizing each unit consisting of several chapters, use the following:

- Cumulative Review

Handouts

To assist you in organizing the many handouts in this course, I provide you with STAT 269 – Handout Index which ties them to specific chapters and sections. I suggest that all handouts be kept in a separate section of your notebook or in a separate folder.

Much thought has gone into the creation and continual refinement of these handouts. They are an essential component of the learning process. They are designed to facilitate the organization and synthesis of topics.

Integration of topics is crucial for success in this course – just as integration of your experiences is crucial for success in life.

By studying these handouts, you can:

- know what is necessary for an objectively complete solution
- note the similarities and differences among the various analyses
- identify patterns

Note

If you experience difficulties after reviewing your class notes and handouts, reading the text again, and attempting the suggested homework problems, you need to seek help before the quiz or exam.

Questions are welcomed at any time during class. However, the first part of each class before a quiz or exam will usually be reserved for questions on homework. Of course, homework questions can always be asked outside class (e.g., in my office and during evening help sessions). Please reserve homework questions for those problems which you have seriously attempted to solve. If you have questions, ask them. Don't be concerned about what your classmates might think. Students benefit most from asking specific questions. If you do not understand my answer, ask a follow-up question or seek clarification.

Because of my flexible lecturing style, each day's lecture will end at a natural breaking point but not necessarily at the end of a section. Reading should be done prior to class discussion so that you have an introduction to the topics that will be covered. Reading should also be done after the class discussion to provide additional insights and coherence.

Before attempting homework problems, you should actually replicate the calculations from the examples given on the board or handouts in class. In general, we will not take the time in class to perform the actual details of the calculations such as adding and multiplying, and you may be lulled into thinking that you clearly understand the calculation details and do not need to practice performing them before a quiz or an exam. By attempting to replicate the calculations from the class examples as your first task after class, you will identify weaknesses before it is too late to correct them.

Although I do not expect you to have prior course experience in statistics, some of you have had an introduction to statistics in high school, MATH 101, or research courses in your major. STAT 269 is an introductory college statistics course for nonmajors and is likely to be more rigorous than any of your prior course experiences in statistics. In your previous experiences in statistics, the emphasis may have been on the *how*. In STAT 269, we consider the *how* but also, when possible intuitively, the *why*. Both process (i.e., understanding) and result are important. As appropriate for a foundational course, we also consider limitations, conditions for validity, and communication. While breadth of exposure to topics is desirable in an introductory course, it should never be realized at the expense of understanding.

My teaching style is basically lecture, but I allow for openness in class through questions, humor, stories, and occasionally tangents. However, this open style should not be allowed to mask the overriding course goal of a significant and serious educational experience.

Warning

I realize that my handwriting is poor. Although I attempt to make it legible, I do not always succeed. You will not offend me by asking me to interpret something that I have written on the board. To compensate for my poor handwriting, I try to say everything that I write on the board.

My Expectations of Students

I take seriously my responsibilities in this class and expect you to do the same. The following expectations are reasonable for a college course.

- Your most important responsibility, while enrolled at Messiah, is to your courses.
- Attend every class.

    - If you have an excused absence, you may obtain missed handouts in my office.
    - If you are absent when a graded item is returned, it can be retrieved only in my office.
- Be punctual and ready to begin class on time.
- Do not let the time that the class meets negatively influence your attendance and attitude.
- Realize that a Tuesday-Thursday class schedule requires us to cover in each class 1½ times the material that is covered in each class for a course on a Monday-Wednesday-Friday class schedule.
- Read the assigned sections in the text.
- Take complete notes. At a minimum, this includes everything that I write on the board.
- Use your notes, handouts, and suggested homework – not your text – as your primary reference for content and method.
- Do as many exercises as is necessary to achieve mastery.
- Review notes and handouts after each class to ensure a smoother transition from one lecture to the next.
- Ask questions when necessary.
- Seek help as soon as difficulties become evident and accurately inform your parents and advisor.
- Use all resources available: in-class lectures, question opportunities, and problem sessions; office consultations, help sessions, your textbook, and library videos.
- Homework that is to be turned in should be completely ready for turning in prior to the start of class.
- Out of respect for God's word, be attentive during the devotional time at the beginning of class.