Mathematics Department
Siena Heights University
Syllabus Fall 2017

I. MAT 174: Data Analysis and Statistics 3 sh

II. **Prerequisite:** Precalculus or Equivalent

Recommendation: If your mathematics abilities are weak (does solving a linear equation make you sweat and bring tears to your eyes?), this may not be the course for you; please consider MAT 142 Statistical Reasoning with Applications or MAT 143 *Statistics In Society*

II. Course Description:

This course covers topics in introductory statistics including descriptive statistics (measures of center, variability, and shape, and the relationship between two variables)—describing both graphically and numerically, probability and probability distributions, discrete distributions, Normal probability distribution, sampling distributions, large-sample estimation, large-sample tests of hypotheses, inference from small samples, regression and correlation, and time permitting Analysis of Variance (ANOVA)/Chi-Square tests.

There will be an emphasis of the effective use on technology including simulations.

III. Instructional Materials:

- **Text:** *Elementary Statistics, 12^{h} ed*, Mario Triola, Addison-Welsey. ISBN:0-321-50024-5
  NOTE: The text comes packaged with a CD: *Stat software, TI programs, Data sets, Applets, Glossary…*
- **Technology/software**:
  - TI-Nspire CX or TI-Nspire CX CAS Graphing Calculator will be used in class and the recommended calculator for the class...TI-Nspire will also work (older model).
  - *Minitab* statistical software (installed on computers in classroom) may be used.
- **Loose-leaf** binder for assignments, handouts and projects is extremely convenient
- **CD-ROM** packaged with text…(see above) may be helpful in learning the content of the course.

IV. Resources available for learning

- Data CD packaged with textbook contains Minitab, TI and Excel data files used in the problems from the text.
- Math Tutoring Lab: Science 26
- PowerPoint presentations for each chapter will be available on line
- Engrade: *http://www.engrade.com/user/signup.php* Your grades and assignments will be recorded here. You will be given instruction to log on the first day of class.

V. Methods of Instruction:

In class students will discuss the concepts of statistics introduced from presentations, activities and reading. You are expected to read the section(s) covered in class prior to the class meeting. Working examples, activities, and projects will develop skills in problem solving and computation.. Students will keep a notebook of worked examples and written homework assignments. Students are expected to be active participants in discussions. Successful completion of this course requires substantial out of class study time (**the "Rule of Thumb" is 2-3 hours outside of class for every hour in class**). Hence, plan on studying 6-9 hours a week for this class. There are no quiz nor exam make-ups without prior approval. Students are encouraged to form study groups. I love quizzes!

Methods of Evaluation Student Achievement/Progress

Method	Percent
Assignments/Quizzes	40
Projects/Investigations	10
Exams (4-5)	40
Final Exam (comprehensive)	10

Assessments are judged by the following scale:

90% - 100%	**A**	Outstanding scholarship	
80% - 89%	**B**	Substantially above average scholarship	
70% - 79%	**C**	Average, competent scholarship	
60% - 69%	**D**	Below average scholarship	**Let's not have any of these!**
-∞ - 60%	**E**	Insufficient scholarship to warrant a passing grade	

VI. On getting through the course

1. The Mathematics Tutoring Lab (Science 26… **264-7882**) will be staffed by "Work-study math tutors", some of whom will tutor statistics. A schedule will be posted outside Science 26. Please be prepared when requesting help. The tutors will **not** do your homework for you, nor will they read the text for you. They are very happy and willing to help students who have put some effort into their work prior to coming for support. They won't wake you up for class either.
2. *Successful completion of this course requires a substantial amount of out of class study*. [Recall, 2-3 hours outside of class for every hour in class]. Students are encouraged to form study groups. Homework is assigned every class period and it is expected to be completed before the next class period unless otherwise stated.
3. **Complete honesty is expected in written work with proper acknowledgements to sources.** Any student engaged in any act of academic dishonesty may receive a failing grade and reported to the appropriate university authorities. Honesty with oneself and with others is of utmost importance in life. The work you do in this course should reflect your honesty and integrity. In practical terms, this means that you should be honest with yourself about how much time you spend on homework, how well you understand the material, and the level of reliance you have on others to complete the assignments. For example, you are encouraged to work with others on homework; merely copying someone else's work and turning it in as your own does not enhance your understanding and is dishonest. If you do work with others on the homework, write down on your assignment the names of the students you worked with. If there is clear evidence that a student has committed fraud to advance his/her academic status (for example, cheating on an exam or quiz), your instructor will be obliged to deal with the matter in accordance with the **Academic Dishonesty Policy** found in the *SHU Undergraduate Catalog*. If you are aware of such activity by another student in the course, you should bring the matter to your instructor's attention immediately.

VII. Cell Phones:

TURN THEM OFF! Students are not allowed to use cell phones in mathematics classes. Please turn them off as you enter the classroom and keep them stored out of sight in your backpack or pocket.

VIII. SHU General Education Learning Outcomes.

The general education learning outcomes (see page 10 of the undergraduate catalog) receiving major emphasis in this course are C1 and B3. The writing required for activities and data projects address C1 while homework assignments and quizzes address B3.

VIX. Department Learning Outcomes:

The Mathematics Department has identified the following five learning outcomes to be achieved by majors and minors in its program.

1. Students will read and understand mathematics, differentiating between correct and incorrect mathematical reasoning.
2. Students will effectively communicate mathematics to others, both in writing and speaking.
3. Students will demonstrate abilities to work independently and in-groups to develop mathematical models using appropriate technologies.
4. Students will demonstrate a mathematical maturity leading to independent investigations, increased responsibility for learning, and participation in the professional mathematics community.
5. Students will demonstrate mastery of the content of the courses required for the major including the calculus, foundations, algebra, and analysis.

X. State of Michigan Standards for preparation of elementary and secondary teachers:

The following Michigan standards for the preparation of **elementary teachers** are addressed by this course:

1.5 Programs prepare prospective teachers who can:

1.5.2 demonstrate number sense and knowledge of number systems; apply numerical computation and estimation techniques and extend them to algebraic expressions; model the use of the four basic operations in multiple contexts; use a variety of mental computation techniques; apply estimation strategies to quantities, measurements, and computation to determine the reasonableness of results; model, explain, and develop a variety of computational algorithms;

1.5.6 use both descriptive and inferential statistics to analyze data, make predictions, and make decisions; collect, organize, represent, analyze, and interpret data;

1.5.7 apply concepts and interpret probability in real-world situations, construct sample spaces, model and compare experimental probabilities with mathematical expectations, use probability to make predictions;

1.5.7 use algebra to describe patterns, relations, and functions, and to model and solve problems;

1.5.11 use counting to enumerate and order; use matrices, finite graphs, and trees to model problem situations; describe basic algorithms for accomplishing tasks;

1.5.12 describe and represent mathematical relationships; use mathematical modeling to solve real-world problems;

1.5.14 understand and apply concepts of variable and function.

The following Michigan standards for the preparation of **secondary teachers** are addressed by this course:

1.5 Programs prepare prospective teachers who can:

1.5.2 apply numerical computation and estimation techniques and extend them to algebraic expressions;

1.5.6 use both descriptive and inferential statistics to analyze data, make predictions, and make decisions;

1.5.7 understand the concepts of random variable, distribution functions, and theoretical versus experimental probability and apply them to real-world situations

XI. Academic Honesty:

The search for truth and dissemination of knowledge are the central missions of a university. Siena Heights University pursues these missions in an environment guided by our Roman Catholic tradition and our Dominican heritage. Integrity and honesty are therefore expected of all members of the University community, including students, faculty members, administration, and staff. Actions such as cheating, plagiarism, collusion, fabrication, forgery, falsification, destruction, multiple submission, solicitation, and misrepresentation, are violations of these expectations and constitute unacceptable behavior in the University community. The penalties for such actions range from verbal warning, all the way to expulsion from the University.

Students are responsible for their own work and accomplishments. You are encouraged to discuss problems with others, but the actual written work submitted should be your own. The first occurrence of cheating on any assignment will result in a grade of zero on that assignment. The second time the same student is observed cheating will result in that student being given an E for the course. All cases of academic dishonesty will be documented and reported to the appropriate authorities on campus. For a complete explanation of the Academic Dishonesty Policy, refer to page 169 of the SHU Undergraduate Catalog 2004-2006.

Students With Disabilities

Section 504 of the Rehabilitation Act of 1973 (Section 504), prohibits discrimination on the basis of physical or mental disability (29 U.S.C. Section 794). Siena Heights University is committed to furnishing appropriate auxiliary aids and services where necessary to afford any student with a disability an equal opportunity to participate in, and enjoy the benefits of, a service, program, or activity conducted by a public entity.

An academically qualified (has met admission standards) student with a disability who is in need of auxiliary aids/services is obligated to provide detailed documentation of the nature of the disabling condition to the Office of Disability Resources (303 Sacred Heart Hall/ 517 264-7683). The student will discuss with the coordinator of the ODR how the disability impacts performance in the academic setting. The student should initiate this process at the beginning of the semester, so that accommodations may be arranged before the student experiences difficulty. This process is not retroactive-a student may not disclose a disability in order to retake a failed test. Once appropriate accommodations/services have been determined, the student presents a Letter of Accommodation (provided after consultation with the coordinator of the ODR) to his/her course teaching staff and discusses a plan for implementing the accommodation/service.

Classroom Emergency Preparedness and Response Information

To Report an Emergency or Suspicious Activity
Call the Department of Public Safety at 517-264-7800 (Adrian Campus). If the line is unavailable or you are calling from another University location, dial 911.

Shelter in Place – General Guidance
Although it is unlikely that we will ever need to shelter in place, it is helpful to know what to do just in case. No matter where you are on campus, the basic steps of shelter in place will generally remain the same:

- If you are inside, stay where you are. If you are outdoors, proceed into the closest building or follow instructions from emergency personnel on scene.
- Shelter-in-place in an interior room, above ground level, and with the fewest windows. If sheltering in a room with windows, keep away from the windows. If there is a large group of people inside a particular building, several rooms maybe necessary.
- Shut and lock all windows (locking will form a tighter seal) and close exterior doors.

- Turn off air conditioners, heaters, and fans. Close vents to ventilation systems as you are able. (Facilities staff will turn off ventilation systems as quickly as possible).
- Make a list of the people with you and call the list in to Public Safety so they know where you are sheltering.
- Visit Campus Safety @ Siena for incident updates http://www.sienaheights.edu/campussafety.aspx or call the Information Line 517-264-7900. If possible, turn on a radio or television and listen for further instructions. If your e-mail address or mobile device is registered with SHU Alerts, check for alert notifications.
- Make yourself comfortable and look after one other. You will get word as soon as it is safe to come out.

Evacuation
An evacuation will be considered if the building we are in is affected or we must move to a location of greater safety. We will always evacuate if the fire alarm sounds. In the event of an evacuation, please gather your personal belongings quickly (purse, keys, cell phone, SHU ID card, etc.) and proceed to the nearest exit. ***Ground Floor – Exit doors next to SCI 45; 1st Floor – Exit doors next to SCI 131.*** Do not use the elevator. ****A second way out of the building for both floors - note the exit door by science 40 and the one upstairs on the east end.***

Once we have evacuated the building, proceed to our primary rendezvous location ***Enter Studio Angelico, if needed.*** In the event that this location is unavailable, we will meet at ***Performing Arts Theater.***

SHU Alerts
SHU Alerts provides free notification by e-mail or text message during an emergency. Visit Campus Safety @ Siena for a link and instructions on how to sign up for alerts pertaining to your campus. If you receive a SHU Alert notification during class, please share the information immediately.

Additional Information
Additional information about emergency preparedness and response at SHU as well as the University's operating status can be found on Campus Safety @ Siena website http://www.sienaheights.edu/campussafety.aspx or by calling the Department of Public Safety at 517-263-0731.

Tentative Schedule MAT 174				
Class #		**Date**	**Text Sections**	**Topic**
1	Tues	29-Aug	1.1-1.2	Introduction to Statistical Thinking
2	Thurs	31-Aug	1.3-1.5	Topics of Data, Critical Thinking, Collecting Sample Data
3	Tues	5-Sep	2.1-2.3	Frequency Distributions and Histograms
4	Thurs	7-Sep	3.2-3.3	Measures of Center and Variation
5	Tues	12-Sep	3.3-3.4	Measures of Variation and Relative Standing and Boxplots
6	Thurs	14-Sep	10.1-10.2	Correlation (Part I Basics)
7	Tues	19-Sep	10.3	Regression (Part I Basics)
8	Thurs	21-Sep	**Ch. 1,2,3,10**	**Exam 1**
9	Tues	26-Sep	4.1-4.4	Fundamentals of Probability and Basic Multiplication Rules
10	Thurs	28-Sep	5.1-5.2	Random Variables
11	Tues	3-Oct	5-3-5.4	Binomial Probability Distributions (including: Mean, Variance, Std. Dev.)
12	Thurs	5-Oct	6.1-6.3	Normal Distribution
13	Tues	10-Oct	6.4-6.5	Sampling Distributions and Estimators; Central Limit Theorem
14	Thurs	12-Oct	**CH 4,5,6**	**Exam 2**
15	Tues	17-Oct	7.1-7.2	Estimating a Population Proportion
16	Thurs	19-Oct	7.3-7.4	Estimating a Population Mean (σ known and unknown)
17	Tues	24-Oct	7.5	Estimating a Population Variance
18	Thurs	26-Oct	8.1-8.2	Basics of Hypothesis Testing
19	Tues	31-Oct	8.2-8.3	Testing a Claim about a Proportion
20	Thurs	2-Nov	8.4-8.5	Testing a claim about a mean (σ known and unknown)
21	Tues	7-Nov	8.6	Testing a Claim about a Standard Deviation or Variance
22	Thurs	9-Nov	**Ch 7,8**	**Exam 3**
23	Tues	14-Nov		**NO CLASS: Thanksgiving (Enjoy your break)**
24	Thurs	16-Nov	9.1-9.2	Inferences about Two Proportions
25	Tues	21-Nov	9.3	Inferences about Two Means: Independent Samples
26	Thurs	23-Nov	9.4	Inferences from Dependent Samples
27	Tues	28-Nov	9.5	Comparing Variation in Two Samples
28	Thurs	30-Nov	**Ch 9**	**Exam 4**
29	Tues	5-Dec		**Project Presentations**
30	Thurs	7-Dec		Review for Comprehensive Final Exam
31	Tues	12-Dec	Chapters 1-9	FINAL Comprehensive Exam