# MAT 121 - Probability & Statistics for the Liberal Arts I
# Summer 2015

Instructor:     Thomas (Tom) Heath
Email:          teheath@syr.edu
Office:         Archbold 103C
Office Hours:   MW 2:30 - 3:30

Classroom:      Hall of Languages 102
Time:           MTWTh 12:00 - 2:25

**Course Description:** MAT 121 - Probability & Statistics for the Liberal Arts I is the first of two courses in a sequence. The focus will be on using data to understand concepts of probability and statistics. We will cover methods of summarizing and graphing data, descriptive statistics, probability, discrete and normal probability distributions, and confidence intervals. NOTE: A student may not receive credit for MAT 121 after completing any MAT course numbered 180 or higher with a grade of C or better.

**Course Goals:** By the end of this course, students will be able to:

- Describe data using measures of both center and variance.

- Summarize and organize data using charts, tables, and graphs.

- Interpret results from both raw data, as well as from charts, tables, and graphs.

- Estimate population values based on sample data using confidence intervals.

- Use statistical software (viz., Minitab) to interpret data.

In addition, it is my hope that students will see that the material covered in class is not merely mathematical abstraction, but rather it has the potential to be useful in everyday applications.

**Prerequisite(s):** A basic knowledge of algebra will suffice.

**Texts:** Students should have access to the following texts:

- *Elementary Statistics* by Mario F. Triola (SU Custom Edition)

- Minitab Student Workbook

NOTE: unless otherwise instructed, students are not required to bring the textbook with them to class. However, on days we work with Minitab, students should be sure to bring the Minitab Workbook. Both books are available for purchase at the student bookstore.

**Liberal Arts Core Requirement:** The MAT 121/122 sequence can be used to satisfy the quantitative skills requirement of the liberal arts core in the College of Arts and Sciences.

**Calculators:** Calculators will be required for the many computations we will be doing throughout the course. While no specific calculator is required, I strongly recommend either a TI-83 or a TI-84. That being said, any basic scientific calculator will suffice.

**Grade Distribution:** Final averages will be computed using the following percentages:

| | |
|---|---|
| Participation and In-Class Assignments | 10% |
| Homework | 10% |
| Labs | 10% |
| Project | 20% |
| Midterm Exams (2) | 15% each |
| Final Exam | 20% |

**Letter Grade Distribution:**

| | | | | |
|---|---|---|---|---|
| 93.00 - 100.00 | A | | 77.00 - 79.99 | C+ |
| 90.00 - 92.99 | A- | | 73.00 - 76.99 | C |
| 87.00 - 89.99 | B+ | | 70.00 - 73.99 | C- |
| 83.00 - 86.99 | B | | 60.00 - 69.99 | D |
| 80.00 - 82.99 | B- | | 0 - 59.99 | F |

**Homework:** Homework will be assigned regularly to be collected for a grade. Answers should be accompanied by complete solutions, that is, I expect you to show your work. A part of your homework grade will be based on whether or not your solutions are written in a logical and coherent manner.

**Labs:** Periodically throughout the summer we will go to the computer lab to perform statistical analyses on raw data using Minitab software. You will be required to produce and submit for a grade lab reports.

**Project:** You will complete a project which will incorporate material covered throughout the course. Details for the project will be discussed during the first week of class. The purpose of this project is to tie together as much of the material as possible, while giving you an idea of how one might make use of such information.

**Midterm Exams:** We will have two in-class exams. Each of the exams are closed notes and closed book, though I will supply you with a formula sheet. It will be your responsibility to understand when to make use of the various formulas (of which, we will have many). NOTE: Under no circumstances will a make-up exam be offered. In extreme situations, I may decide to replace the grade of a missed exam with all, or part of the final exam grade. This will be done at the discretion of the instructor.

**Final Exam:** The final exam will be given on the last day of class during our regular meeting (August $13^{th}$) and will be cumulative. Do not make plans to leave campus before the final exam. If for whatever reason you are required to leave campus prior to this date, you must get in touch with me as soon as possible so that we can make arrangements.

**Course Policies:**

- **General**

  - Refrain from using your cell phone during class.

  - Exams are closed book, closed notes.

  - On days that we are in the computer lab, you are not to use the computers for any purpose other than completing labs.

- **Grades**

  - Grades will be maintained on Blackboard. Students are encouraged to check their grades regularly, and to verify that the grades that are entered match those received on assignments.

- **Labs and Assignments**

  - Students are encouraged to work together on homework assignments, but each student is required to submit his or her own work.

  - No late assignments will be accepted under any circumstances. I will accept submission of assignments in any reasonable form (e.g., scan/picture, typed, etc.) provided I am able to read it.

  - Office hours are a great way to get help with assignments or the material. You are encouraged to come to my office regularly during office hours; you need not set an appointment, just stop by!

- **Attendance and Absences**

  - Attendance is expected every day that we have a scheduled meeting. If, for whatever reason you are absent from class, it is your responsibility to get the class notes/assignments from a classmate. Absence from class does not excuse you from due dates!

**Course Supervisor:** Problems you are unable to resolve with your instructor should be brought to the attention of the course supervisor: Professor Graham Leuschke, Carnegie 317G

**Academic Integrity:** The Syracuse University Academic Integrity Policy holds students accountable for the integrity of the work they submit. Students should be familiar with the Policy and know that it is their responsibility to learn about instructor and general academic expectations with regard to proper citation of sources in written work. The policy also governs the integrity of work submitted in exams and assignments as well as the veracity of signatures on attendance sheets and other verifications of participation in class activities. Serious sanctions can result from academic dishonesty of any sort. For more information and the complete policy, see `http://academicintegrity.syr.edu`.

**Faith Tradition Observances:** You must notify your instructor by the end of the second week of classes when you will be observing your religious holidays. Then, appropriate accommodations will be made according to the guidelines that can be found at `http://supolicies.syr.edu/emp_ben/religious_observance.htm`.

**Students with Disabilities:** If you believe that you need accommodations for a disability, please contact the Office of Disability Services (ODS), `http://disabilityservices.syr.edu`, located in Room 309 of 804 University Avenue, or call (315) 443-4498 for an appointment to discuss your needs and the process for requesting accommodations. ODS is responsible for coordinating disability-related accommodations and will issue students with documented disabilities Accommodation Authorization Letters, as appropriate. Since accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible. You are also welcome to contact your instructor privately to discuss your academic needs although your instructor may not be able to arrange for disability-related accommodations. Making arrangements with ODS takes time. Do not wait until just before the first test.

**Tentative Course Schedule:** Be aware that these dates are *tentative* and may change at the instructors discretion:

## JULY 2015

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|---|---|---|---|---|---|---|
| | *Sections 1.2-1.3* 6<br>**1.2:** Statistical and Critical Thinking<br>**1.3:** Types of Data | *Sections 1.3-1.4* 7<br>**1.3:** Types of Data<br>**1.4:** Collecting Sample Data<br>Discuss Project | *Sections 2.2-2.3* 8<br>**2.2:** Frequency Distributions<br>**2.3:** Histograms | *Sections 2.4-3.2* 9<br>**2.4:** Graphs that Enlighten and Graphs that Deceive<br>**3.2:** Measures of Center | | |
| | *Sections 3.3-3.4* 13<br>**3.3:** Measures of Variation<br>**3.4:** Measures of Relative Standing and Boxplots | *Lab 1* 14<br>We will meet in Physics 115 | *Catch-Up/Projects/Review* 15<br>We will use class time to catch up as needed and to further discuss projects. Time permitting, we will review for Exam 1. | *Review/Exam 1* 16<br>Up to an hour of review prior to the exam. The exam itself will last 1 hour. | | |
| | *Sections 4.2-4.4* 20<br>**4.2:** Basic Concepts of Probability<br>**4.3:** Addition Rule<br>**4.4:** Muiltiplication Rule (Basics) | *Sections 4.5-4.6* 21<br>**4.5:** Multiplication Rule<br>**4.6:** Counting | *Lab 2* 22<br>We will meet in Physics 115. | *Sections 5.2-5.3* 23<br>**5.2:** Probability Distributions<br>**5.3:** Binomial Probability Distributions | | |
| | *Sections 5.4-6.2* 27<br>**5.4:** Parameters for Binomial Distributions<br>**6.2:** The Standard Normal Distribution | *Sections 6.3-6.4* 28<br>**6.3:** Applications of Normal Distributions<br>**6.4:** Sampling Distributions and Estimators | *Sections 6.5-6.6* 29<br>**6.5:** The Central Limit Theorem<br>**6.6:** Assessing Normality | *Lab 3* 30<br>We will meet in Physics 115 | | |

## AUGUST 2015

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|---|---|---|---|---|---|---|
| | *Catch-Up/Projects/Review* 3<br>We will use class time to catch up as needed and to further discuss projects Time permitting, we will review for Exam 2. | *Review/Exam 2* 4<br>Up to an hour of review prior to the exam. The exam itself will last 1 hour. | *Section 7.2-7.3* 5<br>**7.2:** Estimating a Population Proportion<br>**7.3:** Estimating a Population Mean | *Section 7.3-7.4* 6<br>**7.3:** Estimating a Population Mean<br>**7.4:** Estimating a Population Standard Deviation | | |
| | *Lab 4* 10<br>We will meet in Physics 115 | *Catch-Up/Present Projects* 11<br>We will use class time to catch up as needed. Project Presentations. | *Review* 12<br>Review for final exam | *Final Exam* 13<br>The final exam will last 2 hours | | |