Welcome to Online Statistics! I will be your instructor for Math 5. Please call me John.

Our overall objective will be to understand data and its many presentations. This can be as simple as creating a pie chart or as complex as deciding whether two groups have significantly different averages. Along this path to understanding we will also look at basic probability (like the chance of getting 3-of-a-kind in poker), the central limit theorem (why the bell curve is so common), estimations (confidence intervals and linear regression), and hypothesis testing.

In a way, statistics is more like a science than a math course: depending on how a problem is approached different outcomes are possible. For this reason many people empathize with Mark Twain: “Lies, damn lies and statistics.” Hopefully, by the end of the semester, you will be able to understand the difference.

There will be four class meetings in the Library Computer Lab, room L-171, Saturdays, from 10 – 11 a.m. on: 9/11/10, 10/16/10, 11/6/10, and 12/4/10. These meetings are not mandatory.

**WARNING:** This is a very challenging class. You should only take this ONLINE class if you’re the type of person that naturally explores a new textbook, you are highly self-motivated, and you’re comfortable with computers, the web, and Excel. The majority of drops in this class have been due to lack of time for homework (resulting in missed assignments) or lack of expertise with Excel.


**Required software:** Hawkes Learning Systems’ companion software: “HLS: Beginning Statistics Student Courseware”. The course code for our class is: CASTAT. The CD & license (and proof of purchase) to use this software is included with the purchase of your new book (from the Gavilan Bookstore). You may also purchase the license on the web site, itself: www.HawkesLearning.com. This software is where you’ll do each week’s homework, 5 of the weekly tests, and the final exam.

**Required web site:** http://ilearn.gavilan.edu This is the class home site and contains the course layout, handouts, topic summaries, weekly objectives, assignments, Q&A, and grades and is where you submit 10 of the weekly tests and the project.

**Required email address:** not ‘confidential’; make sure your correct email address is posted in your profile on the Gavilan site and that your data isn’t marked ‘confidential’; otherwise, you may not receive feedback on graded work or important announcements through the Q&A system.

Familiarize yourself with this Course Description, the Schedule, and the Project Handout.

This course is set up so that you may work up to about 2 weeks in advance of the schedule.

I’m looking forward to helping you do well in this class!

**PROCESS.** For each topic/section: read the book, then look at the ‘instruct’ mode of your HLS software, then try some problems from the text and/or the ‘practice’ mode of the software by hand or calculator. Finally, look in the “weekly objectives ().xls” file to see how to do this with Excel. When you’re comfortable with the material, use the ‘certify’ mode of the software to get homework credit for that section. When you’re comfortable with the week’s material, do the weekly test (either in Excel or as a Web Test, depending on the week). You should expect to spend at least two hours per section.
HOMEWORK. All homework is done through the HLS software. You may not get help from any person when actually in the ‘certify’ mode of your software. When you ‘certify’ a section successfully (before the due date), you post that certification (through the software) to the HLS web site. I will transfer your scores from the HLS web site to the Gavilan web site. Each week’s homework is worth 2 points. If you don’t certify any sections for the week you’ll get 0; if you certify at least 1 section you get 1 point; and if you certify all that week’s sections you’ll get 2 points. Read the description of each homework assignment on the Gavilan site to see if there are any errata or helpful hints.

TESTS: are worth 5 points. Ten are done in Excel and five in the HLS (Web Test) software. You may not get help from any person on tests or the final exam. The “weekly objectives () .xls” files are the best preparation for the tests.

FINAL EXAM: is worth 10 points and is done as a Web Test in the HLS software. You may make as many attempts (before the due date) as you like; (you won’t see wrong answers until after the test is due). Your best score will be used. (This is also the case for the five weekly tests done as HLS Web Tests.)

FINAL PROJECT: is worth 10 points and is also to be done in Excel. Read the project handout.

Grades will be based on: 15 homework (30 points), 15 tests (75 points), the project (10 points), and the final exam (10 points). There are 125 total points possible. Your total percent determines your grade: 100% ≥ A ≥ 93% > A- ≥ 90% > B+ ≥ 87% > B ≥ 83% > B- ≥ 80% > C+ ≥ 77% > C ≥ 70% > D ≥ 60% > F. Late homework and tests will be scored 0. Satisfactory completion of this course is a grade of C or better.

Contact: Let me know as soon as possible if you are going to miss a graded work due date and time: email jhaussermann@gavilan.edu or text message (831) 869-9031. Students requiring special services or arrangements because of hearing, visual, or other disability should contact me, their counselor, or the Disabled Student Services office. Also, I usually send email from my personal account: jhaussermann@yahoo.com, so be sure to include that in your address book.

Questions & help: all (non-personal) questions should be entered in the Q&A forum, online. I also encourage you to take advantage of the Math Lab (to get help from other instructors and tutors). The Math Lab is in PB 14 (new portable) and is open weekdays from 9 – 1 p.m. NOTE: generally, I only check for questions in the afternoon. So I will not be able to respond to last minute questions on items that are due at noon. Start your work early!

Prerequisites: Intermediate Algebra (Math 233) is a prerequisite for this course. In particular, you will need to understand and be able to work with: fractions, percent, decimals, squares, square roots, summation notation (∑), factorials (n!), and lines. You must be able to use formulas & graphs in Excel.

Honor: Students are expected to exercise academic honesty and integrity. Violations such as cheating and plagiarism will result in an F for the course and may include recommendation for dismissal.

Resources:
- **Textbook** has instructions on how to use Excel at the end of each chapter and in Appendix B.
- **HLS Software** is good for instructing and testing the basic concepts.
- **Excel** is a very powerful statistical tool (without the ‘analysis pack’).
• **Fold-out formula sheet** in your textbook has key formulas grouped by chapter / topic. There is one error that I know of on this formula sheet, so there is a corrected version “Hawkes formula sheet.pdf” on the Gavilan web site.
• **Weekly objectives (.xls)** contain worked out problems, in Excel. You can download these for your use. They are the best preparation for specific weekly test questions (after you understand the topics).
• **<topic> concept.xls** files are designed to illustrate topics in Excel via graphs or results.
• **<topic>.pdf** handouts explain topics that aren’t so mechanical.
• **Web & Library:** do your own searches for helpful material. Let others know if you find something!
• **Math Lab** for direct human help with problems and concepts.
• Me via the Gavilan online class site with weekly summaries and the Q&A forum; also, 4 monthly meetings. Ask questions!

**Objectives:** This course will cover the following topics (not necessarily in this order or grouping).

**Organization of Data:**
- Population & Sample
- Frequency Distributions
- Graphs and Charts

**Numerical Descriptive Measure:**
- Measures of the Center
- Comparison of Mean, Median, Mode
- Measures of Dispersion
- Mean, Standard Deviation and Variance for Grouped Data
- Measure of Position (Q₁ and Q₃)

**Probability:**
- Sample Space, Events
- Counting Techniques (Counting Rule, Combinations and Permutations)
- Union of Events and the Addition Rule
- Intersection of Events and the Multiplication Rule
- Mutually Exclusive Events
- Conditional Probability and Independent Events

**Discrete Probability Distributions:**
- Discrete Random Variables
- Binomial Distribution

**Continuous Probability Distributions:**
- Continuous Random Variables
- The Normal Distribution
- The Normal Approximation of the Binomial

**Estimations: Single Population**
- Confidence Intervals for \( \mu \) (large and small samples, \( \mu \) known and unknown)
- Confidence Intervals for \( \sigma, \sigma^2 \)
- Confidence Intervals for \( \rho \)

**Determination Sample Size**

**Estimation: Two Populations**
- Confidence Intervals for the Difference of Two Means (large and small samples, \( \sigma \) known and unknown)
- Confidence Interval for the Mean of the Differences (paired data)
- Confidence Interval for the Difference of Two Proportions

**Hypothesis Testing**
- Hypothesis Tests about \( \mu \) (large and small samples, \( \sigma \) known and unknown)
- Hypothesis Tests about \( \sigma, p \)
- Hypothesis Tests about the Difference of Two Means (large and small samples)
- Hypothesis Tests about the Mean of the Differences (paired data)
- Hypothesis Tests about the Difference of Two Proportions
- Hypothesis Tests about the Ratio of Two Standard Deviations

**More Chi-Squared (\( \chi^2 \)) and F-Distribution Tests**
- Goodness of Fit (hypothesis tests about the underlying population distribution of sample data)
- Test for Association (hypothesis tests about the independence of sample data)
- Analysis of Variance (ANOVA):
  - (hypothesis tests about the equality of 3 or more means)

**Linear Correlation & Regression:**
- Linear Correlation Coefficient
- Linear Regression