

University of International Business and Economics
International Summer School

STAT 203 Statistical methods and applications

Instructor: Xiaofang (Stephanie) Shi

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Credit: 2 units

Text and Other Materials:

1. Text: Fundamentals of Statistics by Michael Sullivan (Fourth Edition)
Required:
2. Supplementary Text: None.
3. Library Resources:
 - ✧ Moore, David S., *Statistics: Concepts and Controversies*, 6th edition,
 - ✧ W. H. Freeman, NY, 2001.
 - ✧ Parker, Marla, ed., *She Does Math!*, Mathematical Association of America, 1995.
 - ✧ Mason, R., *Statistical Design and Analysis of Experiments*, Wiley, NY, 1989.
4. Web-based Resources:
 - ✧ Rice Virtual Stats Lab - <http://onlinestatbook.com/rvls.html>
 - ✧ HyperStat Online Textbook - <http://davidmlane.com/hyperstat/index.html>
 - ✧ Interactive Online Multimedia Statistics Course - <http://onlinestatbook.com/index.html>
 - ✧ Globally Accessible Statistical Procedures - <http://www.stat.sc.edu/rsrch/gasp/>
 - ✧ Online Statistics Calculators - <http://www.danielsoper.com/statcalc/default.aspx>
 - ✧ StatPages Statistical Resources - <http://statpages.org/index.html>
 - ✧ Guessing Correlations - <http://istics.net/stat/Correlations/>
 - ✧ Regression Applet - <http://www.stat.sc.edu/~west/javahtml/Regression.html>
 - ✧ Let's Make a Deal - <http://www.stat.sc.edu/~west/javahtml/LetsMakeaDeal.html>
 - ✧ JAVA Stats Applets - <http://www.stat.duke.edu/sites/java.html>
 - ✧ Exploring Data - <http://forum.swarthmore.edu/workshops/usi/dataproject/index.html>
 - ✧ Federal Statistics - <http://www.fedstats.gov/toolkit.html>
 - ✧ Journal of Statistics Education Data Sets -
http://www.amstat.org/publications/jse/jse_data_archive.html
 - ✧ State and County Economic and Demographic Profiles -
<http://quickfacts.census.gov/qfd/index.html>
 - ✧ Adventures in Math - <http://www.cut-the-knot.com/probability.html>
 - ✧ AIDS Testing and Probability -
<http://www.imsa.edu/edu/math/journal/volume3/webver/aidstest.html>
 - ✧ Shodor Project Interactivate - <http://www.shodor.org/interactivate/>
 - ✧ MathWorld (Encyclopedia of Mathematics) - <http://mathworld.wolfram.com>
 - ✧ Drexel Math Forum - <http://mathforum.org/>
 - ✧ Intermath - <http://intermath.coe.uga.edu/>
 - ✧ Texas Instruments - www.education.ti.com
 - ✧ Math Nerds - www.mathnerds.com

5. Technology Resources: Graphing calculator (e.g. TI-83, TI-84 or TI-Inspire), spreadsheet (e.g. Microsoft Excel), statistical package (e.g. SPSS)

Course Description:

A noncalculus introduction to descriptive statistics and inferential hypothesis testing, linear regression and correlation, basic probability, the normal distribution and estimation.

Prerequisite:

Three credits of college mathematics with a grade of “C” or above. A student will not be allowed credit for MATH 2400 after completing MATH 3350 with a grade of "C" or above.

Course Objectives:

(Please see Course calendar to identify optional topics.)

After completion of the course the student will be able to:

- ✧ Distinguish the use of descriptive statistics from the use of inferential statistics.
- ✧ Distinguish qualitative data from quantitative data.
- ✧ Provide a strategy for collecting a random sample from a given population.
- ✧ Identify the different types of sampling.
- ✧ Construct a frequency distribution and relative frequency distribution for a given set of data.
- ✧ Construct an appropriate graphical representation of qualitative and quantitative data.
- ✧ Construct a histogram for a given set of data.
- ✧ Compute and provide a qualitative interpretation for the mode, median, and mean of a given set of data.
- ✧ Compute and provide a qualitative interpretation for the range, standard deviation, and IQR of a given set of data.
- ✧ Compute and provide a qualitative interpretation for z-scores.
- ✧ Construct and provide a quantitative interpretation for boxplots.
- ✧ Find the proportion of data between two given values using the Empirical Rule or Chebyshev's Theorem.
- ✧ Find the value of a given percentile for a normal distribution.
- ✧ Compare scores from two different normal distributions using standard scores.
- ✧ Construct a scatterplot for a given set of paired data.
- ✧ Compute and provide a qualitative interpretation for the correlation coefficient and coefficient of determination of a given set of paired data.
- ✧ Compute the slope and Y-intercept of the least squares prediction line and use the equation for the least squares prediction line to predict the value of one variable from the value of the other variable. Find and explain the residual for a given point.
- ✧ Compute and interpret probabilities.
- ✧ Distinguish a discrete random variable from a continuous random variable.
- ✧ Construct and identify probability distributions.
- ✧ Compute and interpret the mean, variance, standard deviation of a discrete random variable.
- ✧ Find the proportion of data between two given values for any normal distribution.

- ✧ Compute and provide a qualitative interpretation for the mean of all sample means and the standard error of the mean for a given population and sample size.
- ✧ Construct and provide a qualitative interpretation for confidence intervals for a population mean and proportion.
- ✧ Perform the six steps of hypothesis testing for a single mean z-test, single mean t-test, t-test for two independent samples, and t-test for two matched samples.
- ✧ Distinguish Type I errors from Type II errors and provide a strategy for minimizing the chance of one or the other occurring.
- ✧ Determine the appropriate hypothesis test to use in a given situation.

Methods of Instruction:

The methods of instruction are determined by the instructor; however, the instructor is encouraged to use a variety of methods. These methods may include, but are not limited to lecture; problem-solving sessions with informal assessment by the student or instructor; discussion; group projects; timely feedback from test, quiz, or project results (formative assessment); question and answer; computer or calculator based explorations; and student presentations. Students will be encouraged to assess and monitor their own problem-solving process to determine when an error has been made or a new strategy should be used.

Evaluation Methods:

Formative assessment will be in the form of written tests and/or short quizzes and summative assessment will be in the form of a final examination. Special projects and daily grades may be used at the discretion of the instructor. Final grades are determined by the percentage as follows: 90-100=A, 80-89=B, 70-79=C, 60-69=D and below 60=F.

Course Calendar:

	<i>Topic</i>	<i>Sullivan Chapter and Sections</i>
	Graphical Summaries	1.1, 2.1, 2.2, 2.3
	Numeric Summaries	3.1, 3.2, 3.4, 3.5
	Normal Distributions	7.1, 7.2
	Linear Regression	4.1, 4.2, 4.3
Opt	Linear Regression (Adv)	13.2
	Two-Way Tables	5.3
	Sampling/Experiments	1.3, 1.4 (just identification), 1.6
	Probability	5.1, 5.2, 5.3, 5.4
Opt	Probability (Adv)	5.5
	Probability Distributions	6.1, 6.2
	Sampling Dist. & CLT	8.1, 8.2

	Confidence Intervals (t)	9.2
	Type I/II errors	10.1
	1 sample t test	10.3, 10.4
	1-Prop z-tests & CI's	9.1, 10.2
Opt	2-Prop z-tests & CI's	11.1
Opt	t-Test of Matched Pairs	11.2
Opt	t-Tests: Ind. Samples	11.3

Make-up Information:

NO makeup tests will be given.

If you miss one test, the grade you make on the final exam will be used as a makeup test grade. You will be given a zero on any other test that you miss. There is no make-up for homework grades. Late homework will not be accepted. . If you do not miss a test and have 2 or less absences, then you may replace your lowest test grade (including the homework grade) with the grade on the final exam if the final exam grade is higher.

All cell phones/ipods, laptops must be kept off and out of sight during class time and tests; Calculators on your cell phone are not allowed. Using cell phone during testing will result in a Zero of the test. Behave and dress professionally (no hats during the test)

Attendance Policy:

1. It is important to be on time and in class every day. If you must be absent, please look in the Shared Class Files for notes, handouts, and assignments. You do not need to contact your instructor. The instructor will check the roll daily, after 2 absences (include excused and unexcused absences), 1 point will be deducted from your overall points for each additional absence. If you have no absence at all, extra 2 credit points will be added to the overall points. Six or more absences could result in possible withdrawal from the course.
2. It will be probably require 6-8 hours minimum of outside study per week to Successfully master the material.