

**University of North Georgia  
College of Science and Mathematics  
Mathematics Department  
Mathematics 2400, Elementary Statistics**

Semester: Spring 2016

Instructor: Dr. Bikash C Das

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**Office Hours:**

Mon: 11:00 am – 12:00 pm

Tue: 9:00 am -10:00 am, 12:00 pm – 3:00 pm

Wed: 11:00 am – 12:00 pm

Thu: 9:00 am -10:00 am, 12:00 pm – 3:00 pm

Fri: 11:00 am – 12:00 pm

**Important Dates:**

1. Course changes and late registration: Friday, January 15, 12:00 pm.
2. Mid-Semester Withdrawal without a 'WF' grade: Monday, March 7, 11:59 pm
3. Final Exam: Friday, May 6, 8:00 am – 10:00 am

**Text and Other Materials:**

Text: Introductory Statistics, this text was adapted by The Saylor Foundation under a Creative Commons Attribution-Non Commercial-Share Alike 3.0 License without attribution as requested by the work's original creator or licensee.

**Library Resources:**

- Moore, David S., *Statistics: Concepts and Controversies*, 6<sup>th</sup> 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.

**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](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](http://www.education.ti.com)
- Math Nerds - [www.mathnerds.com](http://www.mathnerds.com)
- Wolfram Alpha Knowledge Engine - <http://www.wolframalpha.com/>
- AMS Math Moments - <http://www.ams.org/mathmoments/>

**Technology Resources:**

Spreadsheet (e.g. Microsoft Excel), Access to computer and web based learning software WeBWork. Follow instructor's separate email instructions for WeBWork.

**Course Description:**

A non-calculus 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.

Course Calendar:

M	W	F	M	W	F
01/11 Orientation and Lecture on Introduction and Data	01/13 Lecture on Introduction and Data	01/15 Lecture on Random Sample and Data Distribution Quiz 1	01/18 MLK DAY	01/20 Lecture on Data Distribution	01/22 Lecture on Data Distribution
01/25 Lecture on Central Tendency	01/27 Lecture on Central Tendency and Measure of Dispersion	01/29 Lecture on Data Distribution	02/01 Lecture on Quantitative Analysis, Z-Score	02/03 Lecture on Quantitative Analysis, Box Whisker Diagram	02/05 Test 1
02/08 Lecture on Correlation	02/10 Lecture on Regression	02/12 Lecture on Coefficient of Determination	02/15 Lecture on Basic Probabilities, Ideas Quiz 2	02/17 Lecture on Probabilities and Rules of Complements and Union	02/19 Lecture on Rules of Complements and Union
02/22 Lecture on Dependence and Independence of events	02/24 Lecture on Dependence and Independence of events	02/26 Lecture on Conditional Probability	02/29 Lecture on Conditional Probability	03/02 Lecture on Discrete Random Variable	03/04 Test 2
03/07 Lecture on Discrete Random Variable and Binomial Distribution	03/09 Lecture on Binomial Distribution	03/11 Lecture Continuous Random Variable, Standard Normal Distribution Quiz 3	03/14 Spring Break	03/16 Spring Break	03/18 Spring Break
03/21 Lecture on Normal Distribution	03/23 Lecture on Normal Distribution	03/25 Lecture on Sampling Distribution, distribution of Sample Mean	03/28 Lecture on Sampling Distribution, distribution of Sample Mean and Sample Proportion	03/30 Lecture on Sampling Distribution, distribution of Sample Mean and Sample Proportion	04/01 Test 3
04/04 Lecture on Confidence Interval Mean (Z interval) Quiz 4	04/06 Lecture on Confidence Interval Mean (Z interval)	04/08 Lecture on Confidence Interval Mean (t interval)	04/11 Lecture on Confidence Interval proportion (z interval)	04/13 Lecture on Testing Hypothesis	04/15 Lecture on Z test mean
04/18 Lecture on t test mean	04/20 Lecture on Z test proportion	04/22 Review For Final	04/25 Review For Final	04/27 Final Project Presentation	04/29 Final Project Presentation
			(F) 05/06 Final 8:00 am -10:00 am		

**Methods of Instruction:** The methods of instruction 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:** Formal assessments will be in the form of written tests and/or short quizzes and summative assessment will be in the form of a final examination. There will be **three** regular exams and a cumulative final exam. HWs are assigned on WeBWork, the **students are expected to do all homework assignments. Recitation Quizzes will be assigned on almost every week, on WeBWork.** Problems on quizzes and tests will be similar to those of homework assignments.

HWs: 100 (20%)

10 in class quizzes:  $10 * 5 = 50$  (10%)

3 in class tests:  $3 * 50 = 150$  (30%)

Final Project: 75 (15%)

Final exam: 125 (25%)

A 10% scale will be used: A: 450 – 500 | B: 400 – 449 | C: 350 – 399  
D: 300 – 349 | F: below 300

Any student who is not satisfied with his/her grades during this course should discuss this with the instructor.

**Make-up Information:** There will be **no makeup tests.** If you anticipate missing a test, please let me know and we will arrange a time to take the test early. You may NOT start a test or take a test and then ask me not to count it.

There will be **no makeup Tests.** Tests may be taken early. If you miss a Test or do not take it early, you will receive a zero for that Test score. Your lowest Test grade will be replaced by a better Final grade.

**Attendance Policy:** Attendance is mandatory and will be taken daily. **If you do miss a class, you are responsible for any material covered in class during your absence.** If you miss a day, please get the notes from another student in the class. **All unexcused absences from tests are counted as 0 points towards the final grade and will not be replaced or dropped.** The instructor reserves the sole administrative right to assign a student "W" grade at any point of the semester for more than four consecutive and (or) more than 6 total absences and (or) missing subsequent portion of the online work.

**Students are expected to refer to the Supplemental Syllabus for the following information:** (<http://ung.edu/academic-affairs/policies-and-guidelines/supplemental-syllabus.php>)