

**Virginia State University**  
**School of Engineering, Science, and Technology**  
**Department of Mathematics & Computer Science**  
**Stat 210 – Elementary Statistics (3 credit hours)**  
**Spring 2009**

**Instructor's Name:** \_\_\_\_\_ **Office:** \_\_\_\_\_ **Phone:** \_\_\_\_\_

**Email Address:** \_\_\_\_\_@vsu.edu

**Office Hours:** (Additional office hours are available by appointment only.)

Monday	Tuesday	Wednesday	Thursday	Friday

**Course Description:** (from VSU Undergraduate Catalog): An introductory statistics course without a calculus prerequisite. Presentation of data, frequency distributions, descriptive statistics, elementary concepts of probability. Random variables, binomial and normal distributions, sampling procedures, Student's t-test, linear correlation. Interpretation of examples of data which occur in daily life. This course cannot be taken as a mathematics elective by mathematics major. **Course Prerequisites:** GEMA 112 and GEMA 113 (Basic Mathematics) or the equivalent.

**Required Text:** Larson, Ron & Farber, Betsy (2008). *Elementary Statistics: Picturing the World*. Upper Saddle River, NJ: Prentice-Hall, Inc.

**Required Online Software Package:** In addition to the textbook, each student **MUST** purchase the *MyMathLab Student Access Kit* (available pre-packaged with new textbooks at no additional cost from the VSU bookstore or sold separately online at [www.mymathlab.com](http://www.mymathlab.com) with a credit card or debit card). *MyMathLab* is the online resource for completing and submitting assignments. Each individual instructor will determine the amount of usage and weights of *MyMathLab* grades and the relationship to other course requirements and assignments.

**Required Calculator:** Students must have a **TI-83** or **TI-84** (Texas Instruments) graphing calculator and bring it to every class period. **DO NOT** ask to borrow your professor's calculator unless your battery dies during class. (NOTE: Cell phone calculator usage IS NOT allowed at any time.)

**Notebook:** It is **strongly recommended** (but not required) that you purchase a **LOOSELEAF notebook** (at least 2 inches) for this course.

**Classroom Management Policies:**

1. Set all cell phones and pagers to "OFF" or "SILENT" upon entering the class. (**DO NOT** set the phone to "VIBRATE".) **Then put your cell phone completely out of sight for the entire duration of the class!** Your cell phone should not be visible at any time once class has begun. No cell phone communication of any kind will be allowed during class for any reason. **Text messaging, sending email, internet usage, etc.** during class are **NOT ALLOWED**. You **MAY NOT** leave the classroom to answer a cell phone call.
2. **Homework** WILL NOT be accepted after the due date. **There are NO EXCEPTIONS.** At their discretion, some instructors may accept **other assignments** after the due date when provided with a legitimate excuse or prior notice.

3. Disruptive behavior and **cursing** will not be tolerated at any time. All students are expected to show respect to their instructors and classmates at all times. Although you will have numerous opportunities to discuss and work in collaboration with your classmates, you are not to have any side conversations with other students while the instructor is teaching. Please be silent and listen to the professor and allow your classmates to be able to hear the instruction as well.
4. You should use the restroom **PRIOR TO** entering the classroom. Once class has begun, you should only leave the classroom for an extreme emergency.
5. Class will begin and end promptly as scheduled. At 15 minutes after the scheduled class time, you will be considered absent. Many instructors will close and lock the classroom door at that time. If the door is locked when you arrive, **DO NOT KNOCK**. You will not be allowed to enter. Packing up or leaving class before the instructor has dismissed class is also rude and disruptive. Please plan to stay until class has been dismissed.

### **Attendance Policy:**

Classroom attendance is **MANDATORY**. Instructors may penalize any student who exceeds three unexcused absences from a Mon/Wed/Fri class, two unexcused absences from a Tue/Thu or Mon/Wed class, or only one unexcused absence from a class that meets once per week or once during the summer session.. Instructors may also give bonuses or special opportunities for students who do not exceed the maximum absence limit.

An **“EXCUSED ABSENCE”** is one in which the student provides an official written medical, legal or professional excuse to the instructor from an authorized source. All other absences are considered **“unexcused”**. Unless specified or verified, a notification of absence from the Office of Student Support Services does not constitute an excused absence.

Students who are covered under the *American Disability Act* should privately inform the teacher of this fact and provide supporting documentation so that appropriate instructional and testing arrangements can be made.

### **Learning Outcomes, Activities, and Evaluation Strategies**

#### **Knowledge**

1. define what is meant by descriptive statistics, inferential statistics, a population, and a sample.
2. define what is meant by simple random sampling and a table of random numbers.
3. define the following different types of variables and data: qualitative, quantitative, discrete and continuous.
4. define the following terms related to the grouping of continuous data: class, class frequency, relative class frequency, class limits, class width, class mark, frequency and relative frequency distributions.
5. understand what is meant by a percentile, the five-number summary, and the interquartile range of a large data set.
6. understand the following basic terms and concepts relating to probability: experiment, outcome, sample space, event and properties including complement of an event, union and intersection of events.
7. distinguish between the theoretical (“equal-likelihood”) method and the empirical (“relative-frequency”) method of assigning probabilities to the outcomes and events in a sample space.
8. describe the basic properties of the normal distribution and the normal curve.
9. what is the point estimate of a population mean?
10. what is the interval estimate of a population mean when population standard deviation is known?
11. define margin of error.
12. state the basic properties of t-distribution, degrees of freedom, t-curve.
13. what is the interval estimate of a population mean when population standard deviation is unknown?
14. define null and alternative hypotheses, significance level, and confidence level.
15. define the two-tailed hypothesis tests for one population

**Evaluation Strategies:** Objective questions (short answer, fill-in-the-blank, true/false, multiple choice) on written assignments and chapter tests.

## Skills

1. determine whether a given statistical situation involves descriptive or inferential statistics.
2. identify the population and the sample in a situation involving inferential statistics.
3. determine whether a given type of data is qualitative or quantitative, and if quantitative, whether it is discrete or continuous.
4. construct a grouped-data table for a set of data.
5. construct (by hand or using a graphing calculator, MINITAB or EXCEL, as appropriate) the following graphical representations of data sets: frequency histogram, relative frequency histogram, dotplot, stem-and-leaf diagram, box-and-whisker diagram, bar graph, pie chart, scatterplot.
6. classify the shape of a statistical graph as symmetric, skewed left, skewed right, or bimodal.
7. correctly use summation notation ( $\Sigma$ ) to represent summed data.
8. calculate (by hand or using a graphing calculator, MINITAB or EXCEL, as appropriate) the measures of central tendency (mean, mode, median) and spread (range, variance standard deviation of a data set).
9. calculate the sample z-score of an observation in a data set.
10. calculate (by hand or using a graphing calculator, MINITAB or EXCEL, as appropriate) the five-number summary of a large data set.
11. calculate regression and correlation coefficients between two variables of a bivariate data set.
12. calculate the probabilities of outcomes and events in a sample space using the “f/N” rule.
13. list the outcomes in the unions, intersections, and complements of given events.
14. determine whether or not two or more events are mutually exclusive.
15. construct, read, and interpret numerical information contained in contingency (two-way) tables.
16. calculate probabilities using special addition rule and general addition rule.
17. use the standard normal probability table, graphing calculator or MINITAB software and the principle of standardization to calculate normal percentiles and probabilities.
18. calculate the point estimate of the population mean.
19. calculate the confidence intervals using normal and t distributions.
20. perform two-tailed tests of statistical hypotheses.

**Evaluation Strategies:** Objective, graphing, and quantitative (calculation) problems on written assignments and chapter tests; **MINITAB** computer assignments.

## Abilities

1. assess the type of grouping technique that is needed to appropriately group a set of data.
2. choose an appropriate technique to create a meaningful graphical representation of a set of data.
3. critically examine statistical graphs and recognize the ways in which they can sometimes be misleading.
4. choose an appropriate set of descriptive measures (measure of center and spread) of a set of data, given information about the distribution of the data.
5. compare and contrast the relative standing of observations in different data sets with z-scores.
6. correctly interpret the value of the linear correlation and use the linear regression equation to summarize the appearance of the related scatter diagram and make predictions.
7. choose the appropriate probability rule(s) to find the probability of a given event in a sample space, using one’s knowledge of probability rules and one’s ability to express verbal descriptions of events in symbolic form.
8. select an appropriate probability distribution (normal or t) to construct the confidence intervals and perform the hypotheses test for the population mean.
9. critically examine statistical calculations and assess their accuracy and reasonableness.

**Evaluation Strategy:** Objective problems on written assignments and chapter tests.

**Academic Honesty and Cheating:** The University policies on academic honesty and cheating are stated in the **VSU Undergraduate Catalog** and **VSU Student Handbook**.

## Grading Standards:

Explanations of the various grading symbols are given in the **VSU Undergraduate Catalog**. Midterm and final letter grades will be assigned on a point basis (based a scale of 100 points) as follows:

90 – 100 = A, 80 – 89 = B, 70 – 79 = C, 60 – 69 = D, Below 60 = F.

**Final Grade** = 20% homework average + 60% test average + 20% final examination.

**Course Bibliography:**

Triola, M. F. (1995). *Elementary Statistics* (9<sup>th</sup> Edition). Reading, MA: Addison-Wesley.

Johnson, Robert & Kuby, Patricia (2004). *Elementary Statistics* (9<sup>th</sup> Edition). Belmont, CA: Thomson Learning.

Weiss, Neil (2008). Elementary Statistics (7<sup>th</sup> Edition). Reading, MA: Addison-Wesley

**Topical Outline: (Topics listed as OMIT may be assigned for extra credit.)**

Selected topics from sections 1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 9.1, and 9.2 are to be completed by midterm. The midterm examination will be a cumulative test of these topics.

Course Outline Overview and *MyMathLab* Instruction

----- 1 Class Hour

Chapter 1: 1.1 An Overview of Statistics, 1.2 Data Classification (OMIT Levels of Measurement)

----- 4 Class Hours

Chapter 2: 2.1. Frequency Distributions and Their Graphs (OMIT Cumulative Frequency and Ogive), 2.2 More Graphs and Displays, 2.3 Measures of Central Tendency (OMIT Weighted Mean and Grouped Data), 2.4 Measures of Variation (OMIT Chebyshev's Theorem and Standard deviation for Grouped Data), 2.5 Measures of Position and Test 1 Review

----- 8 Class Hours

Chapter 7: 7.1 Introduction to Hypothesis Testing (OMIT Types of Errors and Levels of Significance, Statistical Tests and P-values, Making a Decision and Interpreting the Decision and Strategies for Hypothesis Testing)

----- 2 Class Hours

Chapter 9: 9.1 Correlation (OMIT Using a Table to test a Population Correlation  $\rho$ , Hypothesis testing for a Population Correlation Coefficient  $\rho$ ), 9.2 Linear regression and Test 2 Review

----- 6 Class Hours

MIDTERM -----

Chapter 3: 3.1 Basic Concepts of Probability, 3.2 Conditional Probability (OMIT Independent and Dependent Events and the Multiplication Rule)

----- 3 Class Hours

Chapter 4: 4.1 Probability Distributions – Random Variable and Discrete vs. Continuous only (OMIT Discrete Probability Distributions; Mean, Variance and Standard Deviation and Expected Value)

----- 1 Class Hour

Chapter 5: 5.1 Introduction to Normal Distribution, 5.2 Normal Distributions: Finding Probabilities, 5.3 Normal Distributions: Finding Values, 5.4 Central Limit Theorem (OMIT Sampling Distributions and Probability and the Central Limit Theorem) and Test 3 Review

----- 9 Class Hours

Chapter 6: 6.1 Confidence Intervals (Large Samples) (OMIT Sample Size), 6.2 Confidence Intervals (Small Samples)

----- 4 Class Hours

Chapter 8 (Optional): 8.1 Hypothesis testing with Two (Large) Samples (NOTE: Use two-tailed test at  $p < .05$  only) and Test 4 Review

----- 4 Class Hours

Final Examination Review - 1 Class Hour

**Final Examination:**

----- Maximum time - 2 Hours

The final examination is cumulative of the entire course and MUST be administered in accordance with the VSU final examination schedule. Any exceptions must be approved by the Chair of the Mathematics Department.