

AP Statistics
F. Dellinger
Room 614

Statistics is the study of how to organize, collect, analyze, and interpret numerical information called data. It is a math far different from other typical courses in math. Students are expected to write on a regular basis and justify/defend their choices as well as include the correct steps for the process selected. Statistics begins with methods of graphing data and concludes with tests of significance. Although assignments themselves may vary in length, **there should be daily studying in order to maximize success.** Statistics builds daily. The skill set learned on day one will still be needed on day ninety as an integral part of analyzing data. Each step is therefore crucial. Plan to carefully correct and review difficult topics/questions from assignments and assessments in order to be successful as the class continues.

The main goal of AP Statistics is to prepare students to take the AP Exam in May. Students who score a 3 or higher on the exam will, in most cases, receive a semester of college credit. (Course credit varies from institution to institution and students should check with the colleges they are applying to for specific information.) The entire exam is calculator active so most of our assignments will allow the use of a calculator.

The open-ended section of the AP Exam is graded on a rubric based on determining if each answer is an Essentially Correct response, Partially Correct response, or an Incomplete response. Throughout the course, we will practice questions using similar rubrics and discuss how to maximize points.

Mark your calendars: AP STATISTICS EXAM Tuesday, May 7, 2024

Topics Covered in AP Statistics:

Topics listed below will be covered at some point during the course. The topics will not always be presented in the order of the outline below.

- I. Exploring Data: Describing patterns and departures from patterns
Exploratory analysis of data makes use of graphical and numerical techniques to study patterns and departures from patterns. Emphasis should be placed on interpreting information from graphical and numerical displays and summaries.
 - A. Constructing and interpreting graphical displays of distributions of univariate data (dotplot, stemplot, histogram, cumulative frequency plot)
 1. Center and spread
 2. Clusters and gaps
 3. Outliers and other unusual features
 4. Shape
 - B. Summarizing distributions of univariate data
 1. Measuring center: median, mean
 2. Measuring spread: range, interquartile range, standard deviation
 3. Measuring position: quartiles, percentiles, standardized scores (z-scores)
 4. Using boxplots
 5. The effect of changing units on summary measures
 - C. Comparing distributions of univariate data (dotplots, back-to-back stemplots, parallel boxplots)
 1. Comparing center and spread: within group, between group variation
 2. Comparing clusters and gaps
 3. Comparing outliers and other unusual features
 4. Comparing shapes
 - D. Exploring bivariate data

1. Analyzing patterns in scatterplots
 2. Correlation and linearity
 3. Least-squares regression line
 4. Residual plots, outliers and influential points
 5. Transformations to achieve linearity: logarithmic and power transformations
- E. Exploring categorical data
1. Frequency tables and bar charts
 2. Marginal and joint frequencies for two-way tables
 3. Conditional relative frequencies and association
 4. Comparing distributions using bar charts
- II. Sampling and Experimentation: Planning and conducting a study
- Data must be collected according to a well-developed plan if valid information on a conjecture is to be obtained. This plan includes clarifying the question and deciding upon a method of data collection and analysis.
- A. Overview of methods of data collection
1. Census
 2. Sample survey
 3. Experiment
 4. Observational study
- B. Planning and conducting surveys
1. Characteristics of a well-designed and well-conducted survey
 2. Populations, samples and random selection
 3. Sources of bias in sampling and surveys
 4. Sampling methods, including simple random sampling, stratified random sampling and cluster sampling
- C. Planning and conducting experiments
1. Characteristics of a well-designed and well-conducted experiment
 2. Treatments, control groups, experimental units, random assignments and replication
 3. Sources of bias and confounding, including placebo effect and blinding
 4. Completely randomized design
 5. Randomized block design, including matched pairs design
- D. Generalizability of results and types of conclusions that can be drawn from observational studies, experiments and surveys
- III. Anticipating Patterns: Exploring random phenomena using probability and simulation
- Probability is the tool used for anticipating what the distribution of data should look like under a given model.
- A. Probability
1. Interpreting probability, including long-run relative frequency interpretation
 2. "Law of Large Numbers" concept
 3. Addition rule, multiplication rule, conditional probability and independence
 4. Discrete random variables and their probability distributions, including binomial and geometric
 5. Simulation of random behavior and probability distributions
 6. Mean (expected value) and standard deviation of a random variable, and linear transformation of a random variable
- B. Combining independent random variables
1. Notion of independence versus dependence
 2. Mean and standard deviation for sums and differences of independent random variables
- C. The normal distribution
1. Properties of the normal distribution

2. Using tables of the normal distribution
 3. The normal distribution as a model for measurements
- D. Sampling distributions
1. Sampling distribution of a sample proportion
 2. Sampling distribution of a sample mean
 3. Central Limit Theorem
 4. Sampling distribution of a difference between two independent sample proportions
 5. Sampling distribution of a difference between two independent sample means
 6. Simulation of sampling distributions
 7. t-distribution
 8. Chi-square distribution
- IV. Statistical Inference: Estimating population parameters and testing hypotheses
Statistical inference guides the selection of appropriate models.
- A. Estimation (point estimators and confidence intervals)
1. Estimating population parameters and margins of error
 2. Properties of point estimators, including unbiasedness and variability
 3. Logic of confidence intervals, meaning of confidence level and confidence intervals, and properties of confidence intervals
 4. Large sample confidence interval for a proportion
 5. Large sample confidence interval for a difference between two proportions
 6. Confidence interval for a mean
 7. Confidence interval for a difference between two means (unpaired and paired)
 8. Confidence interval for the slope of a least-squares regression line
- B. Tests of significance
1. Logic of significance testing, null and alternative hypotheses; p-values; one- and two-sided tests; concepts of Type I and Type II errors; concept of power
 2. Large sample test for a proportion
 3. Large sample test for a difference between two proportions
 4. Test for a mean
 5. Test for a difference between two means (unpaired and paired)
 6. Chi-square test for goodness of fit, homogeneity of proportions, and independence (one- and two-way tables)
 7. Test for the slope of a least-squares regression line

Class Expectations:

Attendance in class is an essential component for student success.

Make-up Work:

In the event of an absence, the following policies apply.

It is the *student's* responsibility to get the assignments after an absence. If any copies are needed ask Mrs. Dellinger. Most topics will have videos in Canvas. **Students have THREE DAYS in which to complete work missed UPON RETURNING.**

Tardy Policy:

1 st Tardy	Warning
2 nd Tardy	Parent Contact
3rd Tardy and Beyond – Office Referral	

Class Rules and Consequences:

1. Follow all school rules and policies.
2. Be prepared for class; bring all necessary materials.
3. Be respectful of others.
4. Be in assigned seat when the tardy bell rings.

Note: Consequences for misbehavior will follow those outlined in the student handbook. With the exception of severe offenses, after school detention will be assigned before a student is referred to the office.

Electronic Device Policy:

Only school-issued Chromebooks are allowed in class. NO CELL PHONES!!

Food and Drink Policy:

Only water is allowed in the classroom. No eating/snacks.

Calculators:

The TI-83 or TI-84 plus calculator will be used throughout the semester. We have a limited number of calculators that may be assigned to a specific student for use during their assigned class period. Students must understand that they are responsible for the calculator while it is in the student's possession.

NLHS Mission Statement:

The mission of North Lincoln High School is to activate student dreams and opportunities through excellence in academics, altruism, arts, and athletics.

NLHS Math Department Mission Statement:

The North Lincoln Math Department will encourage all students to achieve their full mathematical potential and to use the math and analytical skills acquired to become life-long learners and contributing citizens.

Grading Policies and Procedures:

Grading:

Homework/ Classwork	15%
Quizzes	25%
Tests	60%

I will enter grades into PowerSchool within 10 days of the assignment collection/submission date.

This course has a teacher-made final exam that counts as 20% of the final course grade. Students may exempt the final exam by meeting the criteria outlined in the student handbook.

Homework/Classwork:

Homework is assigned on a regular basis. Completion is essential to success. Statistics requires work and practice. Therefore, most classwork grades will be entered based upon completion. A good faith attempt at all assigned problems will earn a grade of 100. Any missing problems will result in a lowered classwork grade for that assignment. As outlined in the student handbook, late papers will have 10 points deducted per day late. Assignments turned in following an absence are

not counted as late unless they are not turned in within three days following the return from an absence. If a classwork grade will be determined based on accuracy, I will notify you.

Quizzes:

Quizzes will be administered on a regular basis. Quizzes often cover review material as well as the topic of the previous day. As a quiz, the grade is determined based on the correctness of the answers. Some quizzes will be in AP format. These will be graded using AP rubrics and will be on review material.

Tests:

Tests are always announced, usually no fewer than two days before the test. As with quizzes, it is common for the tests to contain some review items. In addition, many of the tests will contain questions in AP format. There will be no partial credit on multiple choice sections. AP open ended questions will be graded on a rubric like that used on the AP exam. A conversion will then be made to the standard 100-point scale.

In the event of a poor test performance, ***students may elect to retake one and only one test per grading period.*** If a test is retaken, the average of the two tests will replace the old test grade.

Materials:

1. Paper/notebook
2. Pen or dark pencil
3. Graphing calculator – TI-83+, 84, or 84+ highly recommended

Contact Me:

I can be reached by e-mail at fdellinger@lincoln.k12.nc.us. I can also be reached by phone at North Lincoln High School 704-736-1969 between 3:15 and 3:30pm or during my planning period. I will make every effort to reply to messages left during the work week within 24 hours of receiving the message.