

**GTCHS      2001 - 2002**  
**PROBABILITY AND STATISTICS**

**Instructor:** Mrs. Gay Durham  
**Room:** 117  
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**Voice Mail:** 240-3044  
**Course Web Page:** <http://schoolnotes.com/29606/durhamstatistics.html>  
**Study Sessions:** Tuesday and Thursday, 3:15 – 4:15 P. M.

**REQUIRED TEXTBOOK:** *The Basic Practice of Statistics*, 1998, by David S. Moore; Pub. W. H. Freeman and Company

**OTHER REQUIRED**

**MATERIALS:** TI-83 or TI-83 plus calculator, pocket folder with brads to be used for portfolio, ruler, pencils, pen, colored pencils, ruled paper

**COURSE DESCRIPTION:** This one semester ( $\frac{1}{2}$  credit course) explores the fundamentals of modern statistical methods, including descriptive and inferential statistics, as well as probability and sampling.

**Prerequisite:** Algebra II or Geometry (80 or better)

**COURSE STRATEGY:** Topics described in the course description will be learned through individual study, group projects, and research/reports.

**COURSE PURPOSE:** Upon successful completion of this course, in order to solve a problem, the student, using scientific methods and probability theory,

- ⇒ will clearly define the problem,
- ⇒ will collect and organize pertinent data,
- ⇒ will summarize and present these data,
- ⇒ will analyze the data, drawing valid conclusions and making reasonable decisions based upon such analysis.

**ATTENDANCE/**

**TARDINESS:** Please give special attention to the *ABSENCE* and *TARDY* policies, as outlined in your student planner. The student who misses even a few days of class puts himself/herself at a severe disadvantage. Excessive tardiness is disruptive to class and is detrimental in the same way as an absence.

**CLASSROOM/GROUP**

**PROCEDURES:** Please see attached page.

**GRADING FOR**

|                         |                  |     |
|-------------------------|------------------|-----|
| <b>EACH NINE WEEKS:</b> | TEST AVERAGE     | 40% |
|                         | PROJECT AVERAGE  | 30% |
|                         | RESEARCH REPORTS | 10% |
|                         | PORTFOLIO*       | 10% |
|                         | PARTICIPATION    | 10% |

- YOUR PORTFOLIO WILL CONSIST OF TEST PAPERS, PROJECTS, AND REPORTS, GRADED BY YOUR INSTRUCTOR, CORRECTED BY YOU, AND ORGANIZED WITH A TABLE OF CONTENTS. REMEMBER THAT YOUR PORTFOLIO IS A CHANCE FOR YOU TO CORRECT MISTAKES THAT YOU MAY HAVE MADE IN PREVIOUS ATTEMPTS. THIS PORTFOLIO WILL BE TAKEN UP THE FIRST AND SECOND NINE WEEKS PERIODS, GRADED, AND RETURNED TO YOU. AT THE END OF THE COURSE, YOU WILL TURN IN YOUR PORTFOLIO AS A RECORD OF YOUR PERFORMANCE. TAKE PRIDE IN YOUR WORK.

|                        |                                     |                    |
|------------------------|-------------------------------------|--------------------|
| <b>SEMESTER GRADE:</b> | 1 <sup>st</sup> nine weeks average: | 40% of final grade |
|                        | 2 <sup>nd</sup> nine weeks average: | 40% of final grade |
|                        | Major project <sup>2</sup>          | 10% of final grade |
|                        | Semester exam:                      | 10% of final grade |

<sup>2</sup>There will be **one major project** to be worked on throughout this course. Described in greater detail later in this syllabus, this project will involve a substantial set of **bivariate data** on which the students will apply the statistical concepts and techniques they learn as they progress through this course. At the end of both the **first** and **second** nine week marking periods, the major project will be graded as to how well the student applies the concepts and techniques applicable to that particular marking period. This **project**, along with its associated **report**, will be **due May 15, 2002**.

|                       |          |                    |   |
|-----------------------|----------|--------------------|---|
| <b>GRADING SCALE:</b> | 90 – 100 | MASTERY            | A |
|                       | 80 - 89  | PROFICIENCY        | B |
|                       | 0 - 79   | BELOW PROFICIENCY* |   |

\* YOU WILL BE ASKED TO ATTEND STUDY SESSIONS, IF YOUR AVERAGE OR A UNIT TEST GRADE IS BELOW PROFICIENCY.

**UNITS:**

**First Nine Weeks**

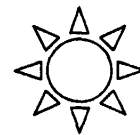
- Displaying and Describing Distributions
- The Normal Distribution
- Examining Relationships
- Producing Data

**Second Nine Weeks**

- Probability and Sampling Distributions
- Introduction to Inference
- Inference for Distributions
- Inference for Proportions

THIS IS A TENTATIVE SYLLABUS. THE INSTRUCTOR RESERVES THE RIGHT TO MAKE ADJUSTMENTS AS NECESSARY.

**IT IS HOPED THAT YOU WILL MASTER AS WELL AS ENJOY  
PROBABILITY AND STATISTICS.**





## MAJOR PROJECT

**What is a statistical project?** The American Statistical Association (ASA) answers this question very succinctly:

*A statistical project is an extremely powerful tool that integrates numerous concepts and skills presented in the classroom. A statistical project is the process of answering a research question using statistical technique and presenting the work in a written report.*

- Your **MAJOR PROJECT** will consist of your conducting a physical experiment on a topic of interest to you.
- *This is a semester-long project. At the end of the **first and second nine weeks** marking periods, this project will be graded as to how well the student applies the concepts and techniques applicable to that particular marking period. The final work for this project, along with its associated report, will be due **May 15, 2002.***
- You must collect **raw, bivariate** measurement data. Obtain the **largest** samples you can, while still fulfilling the assumptions of the required test. The object is for you to create a study that does **not** have an ostensible conclusion before you actually perform the study. However, choose two variables that you **suspect** will have some **moderate to strong relationship**. Be sure to collect **at least one data pair** that would be considered *influential in terms of regression*.
- If data is obtained from individuals, remember that their **privacy** must be respected at all times.
- **Model** your data with **linear regression**. Then, try **other** models. Choose the **most appropriate** model.
- **Interpret** your model. Complete all of the expected steps of a **Significance Test**. Calculate the **test statistic** by hand, drawing the corresponding **diagram**.
- Describe any **weaknesses** of your study.
- **Extrapolate**. Discuss **causation**.
- Discuss **sources of error** in your experiment.
- Discuss **lurking variables**.
- Consider the **Power of the Test**. Determine an appropriate **minimum sample size** needed to have **the adequate power** to make this test worth performing.
- Draw a **conclusion** based upon your statistical analysis. **Justify and defend** by referring to your data.
- Organize a complete description of your project in a **written report**. Attached is a **rubric for your statistics project report**. Your written report should be turned in no later than **May 15, 2002**, with this **rubric attached as the first page**.

## MAJOR STATISTICS PROJECT EVALUATION RUBRIC FOR REPORT

Name: \_\_\_\_\_

Date Due: December 10, 2001

| <b>Content and Organization (100 points total)</b>   | <b>Weak</b> | <b>Average</b> | <b>Good</b> | <b>Excellent</b> |
|--|-------------|----------------|-------------|------------------|
| <b>Introduction (20 points)</b> <ul style="list-style-type: none"> <li>• Statement of the problem</li> <li>• Justification for the experiment.</li> </ul>  | 14          | 16             | 18          | 20               |
| <b>Procedure (30 points)</b> <ul style="list-style-type: none"> <li>• Method of bivariate data collection</li> <li>• Organization of data. Include chart or graph. Provide reasoning for representing data in chosen format</li> <li>• Description of data. If appropriate, include measures of central tendency, measures of variation.</li> </ul>  | 24          | 26             | 28          | 30               |
| <b>Conclusion (30 points)</b> <ul style="list-style-type: none"> <li>• Numerically interpret the coefficients of your linear model as to how they relate to your experiment.</li> <li>• Comment on the Significance Test.</li> <li>• Discuss any weaknesses of your study.</li> <li>• Extrapolate. Discuss causation.</li> <li>• Describe any sources of error.</li> <li>• Comment on any possible lurking variables.</li> <li>• What is the Power of the Test?</li> <li>• What is the appropriate minimum sample size necessary to produce an adequate power?</li> <li>• What did you learn from your project?</li> <li>• Based on the data, what conjectures can you make? Justify and defend by referring to the data.</li> <li>• Is there any subsequent study that would help to corroborate your results?</li> </ul> | 24          | 26             | 28          | 30               |
| <b>Mechanics of Report</b> <ul style="list-style-type: none"> <li>• It must be word-processed.</li> <li>• Graphs and/or charts must be computer generated.</li> <li>• Define all symbols used. Symbols, equations, and formulas may be inserted by hand.</li> <li>• Include a cover page.</li> <li>• Hole-punch, and place in a folder with brads.</li> </ul>  | 14          | 16             | 18          | 20               |
|  |             |                |             |                  |