

EDUCATIONAL STATISTICS -- EDP 557-- Fall 1999

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Office: # 13 Dickey Hall (Basement)
Office Hours: Wednesday 1 - 3
Thursday 2 - 3:30

Immediately after class: T-Th @ 5:15; and by appointment

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I. Nature of the course:

The principle aim of EDP 557 is to enhance each student's understanding and effective use of basic statistical techniques employed in research in education and the social sciences generally. The course is not designed to produce the sophistication in statistics, computer programming, or psychometric applications needed by a producer of research. Rather it is an introductory course intended to develop students' competence in the application of the basic statistical techniques used in summarizing and analyzing research data.

II. Competency goals of the course:

1. An understanding of the concepts, methods and symbols of elementary statistics;
2. The ability to read, understand and critique research statistics;
3. The ability to plan and carry out simple statistical analyses; and
4. A beginning understanding of some of the assumptions, limitations and abuses of statistics.

III. Course activities:

1. Read and study the textbook and assigned readings;
2. Do homework and computer assignments and be prepared to discuss in class;
3. Work out the problems in Mastery Tests at the end of each chapter and keep in a Notebook to be turned in at the time of each test and at final exam.
4. Take two tests and a final examination.

IV. Grading: A = 90 and above, B = 83 - 89, C = 76 - 82, D = 70 - 75

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| 1. Tests I and II @ 15% each | - 30% |
| 2. Final examination (cumulative) | - 40% |
| 3. Homework (4 assignments - 2 points each) * | - 8% |
| 4. Mastery Test Notebook * | - 12% |
| 5. Computer Activities* | - 10% |

*** Points will be deducted for late or incomplete work**

One-half point will be subtracted from your final grade for each Absence.

Note: The use of a calculator is encouraged - in class, for homework and for exams.

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V. Required Text: Glass, G. V. and Hopkins, K. D. (1996). Statistical methods in education and psychology (3rd ed.). Boston: Allyn and Bacon.
Other readings as assigned

VI. Course outline:

Introduction, preview of the course/syllabus; and Summation Notation Handout

Homework I

	<u>Text</u>
Variables, Measurement, Scales (Mastery Test 2: all)	Chapters 1 & 2
Frequency Distributions and Visual Displays of Data (Mastery Test 3: skip 13-16))	Chapter 3
Measures of Central Tendency (Mastery Test 4: all)	Chapter 4
Measures of Variability (Mastery Test 5: all)	Chapter 5

Test I -- Approximate Date -- September 30

The Normal Distribution & Standard Scores (Mastery Test 6: 1 thru 21, Ans. # 12 = 71.675)	Chapter 6
Correlation: Measurement of Relationship Between Two Variables Homework II (Mastery Test 7: 1-22)	Chapter 7
Regression and Prediction (thru 8.11) (Mastery Test 8: 1-21)	Chapter 8
Probability - Homework III (Mastery Test 9: all)	Chapter 9

Test II -- Approximate Date -- October 28

Statistical Inference: Sampling and Interval Estimation (Mastery Test 10: 1-27)	Chapter 10
Introduction to Hypothesis Testing Homework IV (Mastery Test 11: 1-33)	Chapter 11
Inferences about the Differences between means (Mastery Test 12: 1 thru 23)	Chapter 12
Statistics for Categorical Dependent Variables....	Chapter 13

Catch-up and Review for Final

**FINAL EXAM For Tuesday/Thursday at 12:30 -- Tuesday 12/14/99 @ 10:30 am as per exam schedule
For Tuesday/Thursday at 4:00 -- Monday 12/13/99 @ 3:30 pm as per exam schedule**

"READ MORE ABOUT IT"

Extra Summation Notation

For those who want more/extra practice in doing summation notation problems, an extra set of problems similar to Homework I. (Two pages plus the answers on the third page.)

Chapters 2 to 5 and 9

* Arney, W.R. (1990). Understanding statistics in the social sciences. New York: W. H. Freeman and Company. A textbook for a beginning statistics course. Chapters 1 through 4 use a somewhat different approach to cover the material covered in chapters 1 through 5 of our text. Arney's approach to probability, chapters 5 and 6, is very different from the approach in Glass and Hopkins, chapter 9.

* Velleman, P.F., & Hoaglin, D.C. (1981) Applications, basics, and computing of exploratory data analysis. Boston, MA: Duxbury Press.

Short Title: The ABC's OF EDA. The authors provide a foundation for understanding Tukey's exploratory data analysis techniques with applications to real data. In addition, the book includes computer programs in FORTRAN and BASIC. (For those interested in the history of EDA)

Chapter 7

Paulos, J.A. (1988). Innumeracy. New York: Hill and Wang.

What we never learned about mathematics in school. Much of the book deals with probability and Paulos provides more context for the material in Chapter 7. An easy read. Made the Best Seller List.

* Smith, M.A. (1989). Why is Pythagoras following me? Phi Delta Kappan 70, 446-454.

Why we should not have more mathematics in the K-12 curriculum. A counter-point to much of what we hear and read today.

Chapter 10

* Mason, E.J., & Bramble, W.J. (1997, 3rd ed.; 1989, 2nd ed.). Understanding and conducting research/Applications in education and the behavioral sciences. New York: McGraw-Hill.

An excellent resource book on research design and methods. A good discussion of experimental and quasi-experimental designs with explanations of threats to internal and external validity. The chapters on quantitative tools provide a review of the data analysis techniques learned in 557.

Chapters 11 and 12

* Cohen, Jacob (1990). Things I have learned (so far). American Psychologist, 45, 1304-1312.

* Cohen, Jacob (1994). The Earth is round ($p < .05$). American Psychologist, 49 997-1003.

A reinforcement of what we have studied so far. Provides context and refinement of concepts contained in Chapters 11 and 12. (However, your instructor disagrees with author's idea of reporting numbers using fewer decimal places. Your instructor argues for reporting numbers with four decimal places.)

* On Reserve in the Education Library