

Rutgers University – Department of Public Administration
Analytical Methods

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Course Description

The purpose of this course is to introduce the student to the use of quantitative methods of examination in the analysis of public policy questions. As an example, if the course is successful, at its conclusion the student should be able to provide numerical evidence as to whether a new program to reduce infant mortality has been successful.

The course will outline the basic concepts of analysis and will teach the student how statistics and probability can be used as analytical tools. The course will expose the class to both manual analysis performed by hand with a calculator, and computerized analysis performed with the aid of current statistical software.

The class will be conducted as a combination of lecture, recitation and laboratory components. In a typical class, there will be a keynote lecture related to assigned readings, an in class discussion of concepts with interactive solutions of sample problems and the explanation of a homework assignment due at the next class. Use of software for analysis will be used in selected sessions.

Some work may be assigned to be done in small groups. Such assignments will include in-class presentations, computer assignments and major case analyses. Homework and examinations must be done on an individual basis however. Homework will be due at the start of each class following the class at which it was assigned. Exams must be taken in person at the scheduled time. No make-up exams will be offered.

There will be two examinations during the semester, with the final exam to be comprehensive. The exam given in the 7th week shall be limited to the material covered in the time preceding the exam.

The tentative weight to be given to each graded element shall be as follows:

Homework	25%
Class participation	15%
Mid-Term	30%
Final Exam	30%

Required Texts:

Statistics for People Who (Think They) Hate Statistics, Neil J. Salkind, Sage Publications, 2004

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Weekly Syllabus

Week 1 – Course Overview and Introduction to Analysis

This class will be divided into two parts. The first segment will explain the structure of the course, the work expected of the student, the nature of the graded exercises and the basic rules to be followed for the semester. The second segment will provide a general introduction to the substance of the course, focusing on the basic concepts of planning and analysis.

Readings: Salkind, Chapters 1-3

Week 2 – Research Design and Measurement

In this session, the class will examine how theories are formed, the concepts of independent and dependant variables and relationships between variables. The class will also consider methods of measurement and the concepts of reliability and validity.

Readings: Salkind, Chapters 4-5

Week 3 – Central Tendency

This class will begins the discussion of descriptive statistics, which are numbers that characterize a set of data. Key issues to be discussed will include frequency distributions, means, modes and medians.

Readings: Salkind, Chapter 6

Week 4 – Dispersion

This class will continue the discussion of descriptive statistics into the area of measures of dispersion, which essential measure how closely the set of data is grouped around the center of the set. Concepts such as standard deviation, various shapes of distribution, and skewness.

Readings: Salkind, Chapter 7

Week 5 – Probability

This class will begin the consideration of measures of likelihood of occurrence or probability. Issues to be discussed include the logic of probability, the rules of probability, the concept of probability distributions and the most common of those distributions, the normal distribution.

Readings: Salkind, Chapter 8

Week 6 –Other Probability Distributions

This session will look at other types of probability distributions, including the binomial, the Poisson and others. The concepts of combinations and permutations will also be discussed.

Readings: Salkind, Review Chapters 1-8 for exam.

Week 7 – Mid-Term

Readings: Salkind, Chapters 9-10

Week 8 – Inference, Part 1

This class will begins the discussion of inferential statistics, which are numbers that allow us to generalize from a small sample to a larger group, called a population. This week will include examination of the concept of sampling, and of standard errors, standard deviations, confidence limits, hypotheses and the testing of hypotheses.

Readings: Salkind, Chapters 11-12

Week 9 – Inference, Part 2

This week continues the discussion of inferential statistics with consideration of the issues of sample size, proportionality, decision rules and difference of means testing.

Readings: Salkind, Chapter 13

Week 10 – Correlation Coefficients

In this session, the class continues the consideration of analytical tools that are useful in the use of inference. This week will focus on the use of correlation coefficients as a test statistic. Explanation will be provided on the significance of a correlation coefficient and how to interpret results.

Readings: Salkind, Chapter 14

Week 11 – Linear Regression

This class continues the explanation of analytical methods by focusing on the use of Linear Regression. Class will include instruction on how to calculate a regression, how it can be used for predicting future events and how to interpret the accuracy of predictions

Readings: Salkind, Chapter 15

Week 12 – Nonparametric Tests

This session will introduce the concept of nonparametric statistics and some of the analytical tools that can be used in interpreting them. Primary focus will be on the calculation and use of the Chi-Square Test.

Readings: Salkind, Chapters 16-17

Week 13 – Reliability, Validity and Review

In this session the class will expand our understanding of reliability, validity, significance and meaningfulness, which govern what we should actually do with our statistical results. The second half of the class will be a brief review of the material to be covered in the final exam.

Readings: Salkind, Review Chapters 1-17 for exam.

Week 14 – Final Exam

***** NOTE: Homework assignments, case studies, supplemental readings and group projects will be provided in class as necessary.**