I. **Nature of the Course**

The goal of this course is to enhance each student’s understanding and effective use of the techniques used to describe and analyze data in the social sciences and particularly education. The course is not intended to produce the sophistication in statistics, computer programming, or psychometric applications needed to develop and carry out major research projects. Rather, it is an introductory level course intended to develop students’ competence in the application of the basic statistical techniques used to explore, describe, and analyze information for research or evaluation purposes.

II. **Course Procedures**

Class sessions for the course will be divided into two parts. The first part is a lecture-discussion session in which we will meet to discuss the topics and ideas assigned for that week. Reading assignments and other homework should be completed prior to these meetings so that class discussions can be meaningful. The second part of the class will involve a laboratory session focusing on the use of technology to describe and analyze various forms of data. During this part of the class students will have opportunities to use computers to conduct descriptive and analytical tasks with actual research data. Laboratory sessions will be closely coordinated with class discussions and will involve applications of the ideas and techniques described in class presentations.

At regular intervals throughout the semester, diagnostic progress or **formative assessments** will be administered. These assessments will include multiple-choice and short-answer questions, but they will not be counted as part of the course grade. They are designed to provide students with individualized feedback about what concepts are well understood and in what areas more study time is needed. With each question on the formative assessment are suggestions for **corrective** procedures if review and additional study are needed. The instructor will specify what should be done in completing corrective work in order to meet the criterion of mastery for that unit. If for any reason a student is absent on the day a formative assessment is administered, it may be made up immediately before the next class session only.

In addition to the formative assessments, students also will be administered a midterm and final examination. These **summative** examinations will be similar in form and difficulty to the formative assessments, and will constitute a major portion of students’ course grade. Questions on the summative examinations and formative assessments will be drawn from (a) class lectures and discussions, (b) course textbooks, (c) class handouts, (d) laboratory sessions and assignments, and (e) outside reading assignments.
III. Required Texts


Optional Texts


IV. Specific Requirements

In addition to regular participation in the lecture-discussion and laboratory sessions, each student is expected to:

1. Carefully read the assigned material before the class session at which it will be discussed.

2. Take each of the formative assessments and follow-up with the specified corrective procedures to ensure mastery of each unit.

3. Turn in regularly assigned homework activities. These activities will be due one week after the class session at which they are assigned and will count as part of students' course grade. Some of these activities will involve work on the computer and will be discussed during laboratory class sessions.

4. Take the midterm and final examinations. The midterm will be administered during approximately the eighth week of the semester. The final examination will be administered during final examination week.

V. Course Content


2. Reliability (Precision, Stability, & Homogeneity) Handouts

3. Validity (Content, Criterion-related, & Construct) Handouts

4. Visual Displays and Quantitative Indicators G & H, Ch. 3
   (Graphs & Charts, Frequency Distributions, Histograms
   Dot Plots, Stem-and-Leaf Plots, Skewness & Kurtosis)
**Course Content (continued)**

5. Measures of Central Tendency and Variability  
   (Mode, Median, & Mean; Variance & Standard Deviation;  
   Quartiles & Percentiles, Box & Whisker Plots)  
   G & H, Chs. 4-5

6. Exploratory Data Analysis and the Normal Distribution  
   (Changing Metrics: Standard Scores; Changing Shapes:  
   Normalization)  
   G & H, Ch. 6

7. Measures of Relationship: Correlation  
   (Scatter Plots; Letter Value Plots;  
   Other Measures of Relationship)  
   G & H, Ch. 7

8. Linear & Multiple Regression  
   (Generalized Least Squares; Robust Estimation;  
   Multiple Independent Variables)  
   G & H, Ch. 8

9. Drawing Inferences  
   (Batches, Samples, & Populations; Point & Interval  
   Estimation; Sampling Distributions)  
   G & H, Chs. 9-10

10. Hypothesis Testing  
    (Logic of Statistical Tests; t-tests;  
    Variances & Proportions)  
    G & H, Chs. 11-14

11. Practical Examples  
    (Tables & Testing Hypotheses; Median Polishing;  
    Hypotheses About Groups; Hypotheses About Relationships)  
    G & H, Chs. 11-14

**VI. Grading**

Grades for the course will be based upon the following criteria:

1. Scores on the midterm and final examination (In-class & Take-home) (70%)

2. Scores on assigned homework activities from classwork and laboratory sessions (30%)

**VII. Availability of Course Instructor**

The course instructor will be available for conferences with students on Monday and Tuesday mornings, and at other times by appointment. Conferences can be scheduled by phone or by leaving word with the secretary in the Department of Educational Policy Studies and Evaluation, 145 Taylor Education Building.