



**SYNONYMOUS COURSES:**

(a) replaces     N/A      
                  (course #)

(b) cannot take     N/A     for further credit  
                  (course #)

**SUPPLIES/MATERIALS:**

**TEXTBOOKS, REFERENCES, MATERIALS (List reading resources elsewhere)**

TEXT: Craft, John L., Statistics and Data Analysis for Social Workers (2<sup>nd</sup> edition). F.E. Peacock Publishers.

**OBJECTIVES:**

The students in this course are motivated graduate students. The course is composed as an overview of the statistical methods of which they will be expected to be consumers. The course is designed to enable the students to:

1. be familiar with the basic statistical nomenclature;
2. understand the inherent variation in all types of measurement, response and prediction;
3. appreciate the limitations of data gathering methods, and the inferences that may be drawn;
4. consider the effects of measurement errors in the independent variables and the notions of replicability and reliability;
5. assemble experimental and observational responses into an appropriate flat software file for statistical analysis;
6. use statistical software to perform customary statistical analyses;
7. have some understanding of the output of the statistical software.

**METHODS:**

**STUDENT EVALUATION PROCEDURE:**

Assignments	60%
Final examination	40%

**COURSE CONTENT**

Data: Nominal, ordinal, interval, ratio data; appropriate graphical representation, bar charts, pie charts, histograms, frequency diagram, relative cumulative frequency diagrams. Mode, modal interval, median, quartiles, percentiles, percentile ranks, average, grouped average. Range, interquartile range, variance, standard deviation (SD).

Sampling designs: Discussion of the following topics for consumers of statistics: population and sampling frames; probability and non-probability sampling; simple random sampling with and without replacement; stratification; cluster sampling; ratio estimation. Mean/proportion estimates and SDs for simple situations.

Two-way tables: Cross-classification. Marginal, joint and conditional proportions/probabilities. Independence.

The normal distribution: The standard normal probability distribution. Standardisation. Change of means and SDs. The implications of the Central Limit Theorem.

Regression and correlation: Covariance and correlation. Regression. Correlation as the slope of linear regression on standardised variables. Simulation of given correlations. Association versus causal effects. Means, SDs, covariances and correlations for linear combinations.

Measures of association: Cohen's Kappa, Odds ratio, Yule's colligation. Spearman's rank correlation.

Sampling proportions and rates: Sampling variation, Pearson's chi-square measure of discrepancy. Hypothesis testing, confidence intervals. The P-value. Two-way tests of independence and equality of rates.

Sampling means: Large sample and small sample inference for means. Student's t distribution. Directional alternate hypotheses, one-tailed and two-tailed tests. Type I and II errors.

Multiple regression: Comparison of treatments by multiple regression. The ANOVA table.

Experimental design: Experimental versus observational situations. Randomization. Reliability and reproducibility; Cronbach's alpha; attenuation. N of 1 designs. Discussion of blocking versus covariate analysis.