SW 891-201: Research Methods & Statistics

I. NUMBER OF CREDITS: 3

II. PREREQUISITES:
Completion of University Mathematics Requirement: MTH 104 or MTH 132 or MTH 110 or MTH 201 or MTH 116 or STT 200 or MTH 124 or MTH 120 or STT 201 or MTH 152H or equivalent.

III. COURSE DESCRIPTION
This course is designed to provide foundation knowledge of research methods used in social work for incoming MSW students who have not taken the undergraduate research requirement. This course will cover research processes employing quantitative and qualitative methods.

IV. TEXTS AND OTHER MATERIALS
A. Required


Calculator: At a minimum, the calculator should be able to carry out basic arithmetic, square root, and power functions. You will find it useful if the calculator can also compute basic statistical functions (mean, variance, and standard deviation).

CoursePack: Available on line at class Web site:
http://www.msu.edu/course/sw/891/stocks/

Adobe Acrobat Reader: Freeware available on line at
IV. TEXTS AND OTHER MATERIALS (continued)

B. Recommended (strongly)
   
   

V. COURSE OBJECTIVES

This course is designed to provide foundation knowledge of quantitative and qualitative research methods used in social work.

A student who successfully completes this course should be able to demonstrate the following:

A. knowledge and skills needed to measure social work and other social science concepts;
B. understanding of diversity issues as they interact with the research process;
C. understanding of the use of survey, field, and qualitative research techniques to develop practice knowledge;
D. describe univariate distributions in terms of shape, center, and spread including the ability to construct visual displays of data (charting, graphing);
E. an understanding of and ability to use the basic principles of probability theory for statistical inference;
F. ability to use data analytic techniques such as contingency tables, linear regression, and statistical hypothesis tests to investigate practical and theoretical issues related to social work practice;
G. the ability to reason inductively and to apply this skill to one’s practice and to the evaluation of the professional literature in social work and related disciplines.

VI. COURSE FORMAT

Skills and knowledge will be imparted via assigned readings and exercises, lecture, class discussion, and problem analysis. There may be material presented in class that will not be covered in the assigned readings. Similarly, there may be material presented in the assigned readings that will not be discussed in class.

You will be responsible for all material presented.
VII. ASSIGNMENTS AND BASIS FOR GRADING

How well you fulfill the course objectives will be evaluated by your performance on class quizzes, assignments, and study questions/homework. Other behavior in class will also contribute to performance evaluation.

A. Requirements, Expectations & Weights

5%  1. ATTENDANCE
    A sign in sheet will be provided.

25% 2. STUDY QUESTIONS/HOMWORK
    When assigned, these will be due at the beginning of the following class session.

20% 3. ASSIGNMENTS
    Some of these will involve using *SPSS for Windows* (the program is on the computers in the MSU Microcomputer Labs).

10% 4. CLASS PARTICIPATION
    Some of this grade will derive from your participation in the internet discussion group - TIMTWO - set up for this class.

20% 4. First Quiz

20% 5. Second Quiz

B. Grade Assignment

Final grades for this course will be assigned as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percent</th>
<th>Grade</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0</td>
<td>93</td>
<td>2.0</td>
<td>65 - &lt;72</td>
</tr>
<tr>
<td>3.5</td>
<td>86 - &lt;93</td>
<td>1.5</td>
<td>58 - &lt;65</td>
</tr>
<tr>
<td>3.0</td>
<td>79 - &lt;86</td>
<td>1.0</td>
<td>51 - &lt;58</td>
</tr>
<tr>
<td>2.5</td>
<td>72 - &lt;79</td>
<td>0.0</td>
<td>0 - &lt;51</td>
</tr>
</tbody>
</table>

*GRADES ARE FINAL.* The exception to this is instructor error in grading and/or instructor error in computation of grades. There will be no “rounding up.” You are encouraged to make copies of class work before you hand it in and to hold on to all returned class work until after you have received your grade report from the University.

C. Posting of Grades

Students who wish to have their grades posted by a random identification number should fill out and turn in the *Permission to Post Grades* form enclosed by a single line box on the last page of this syllabus. If you do NOT wish to have your grades posted, please fill out the *Refusal* form enclosed by a double line box on the last page.
VIII. TOPICAL OUTLINE

There will be some modifications to the reading assignments made over the course of the semester.

SESSION 1: JULY 3  
Course Overview / Reasoning and Semantics / Research Approaches / Research Ethics

SESSION 2: JULY 8  
Research Ethics / Data Collection in Qualitative Research

Required Reading:
Reserve: The Philosophy of Inquiry - Overview  
The Philosophy of Inquiry – Logical Argument
Grinnell:  
1. Introduction to Research  
2. Science, Society, and Research  
Unrau, Krysik, & Grinnell:  
3. Research Contexts  
4. Research Ethics  
5. Formulating Research Questions  
6. Research Approaches  
7. Utilization of Research Approaches  
10. Designing Measuring Instruments  
13. Case Research Designs

SESSION 3: JULY 10  
Observation, Interviews, and Surveys

Required Reading:
Grinnell:  
10. Designing Measuring Instruments  
13. Case Research Designs  
Unrau, Krysik, & Grinnell:  
14. Participant Observation  
15. Survey Research  
19. Selecting a Data Collection Method and Data Source

SESSION 4: JULY 15  
Data Coding / Analysis of Quantitative Data / Secondary Data Analysis

Required Reading:
Grinnell:  
16. Secondary Analysis  
18. Content Analysis  
Unrau, Krysik, & Grinnell:  

SESSION 5: JULY 17  
**Levels of Measurement / Univariate**
**Descriptive Statistics: Frequency, Percentage**
& **Cumulative Distributions / Graphing / Types of Distributions**

**Required Reading:**

*Pyrczak:*
1. Descriptive Versus Inferential Statistics
2. Scales of Measurement
3. Frequencies, Percentages, and Proportions
4. Introduction to Frequency Distributions
5. Frequency Distributions for Grouped Data
6. Cumulative Frequencies, Cumulative Percentages, & Percentile Ranks
7. Histograms
8. Frequency Polygons
9. Shapes of Distributions
10. Computation of the Precise Median

SESSION 6: JULY 22  
**Sampling / Probability Theory / Univariate**
**Descriptive Statistics: Measures of Central Tendency / Measures of Variability / The Normal Distribution / Standard Scores**

**Required Reading:**

*Grinnell:*
11. Sampling

*Unrau, Krysik, & Grinnell:*

*Pyrczak:*
10. The Mean: An Average
11. Mean, Median, & Mode
12. Variability: The Range and Interquartile Range
13. Variability: Introduction to the Standard Deviation
15. Another Look at the Standard Deviation
16. Standard Scores
17. Transformed Standard Scores
18. Standard Scores & the Normal Curve
19. Introduction to Sampling
20. A Closer Look at Sampling
21. Introduction to Probability
22. Probability and the Normal Curve
23. Standard Error of the Mean
24. Confidence Interval for the Mean
25. Confidence Interval for the Mean: Small Samples
SESSION 7: JULY 24  
Correlation/ Linear Regression / Pearson r / Spearman Rho / Phi Coefficient / Point-Biserial Correlation / Proportion of Variance Explained (r²) and Effect Size / Prediction and Error/ Measurement Reliability and Validity

Required Reading:
Pyrczak:  
19. Conceptual Introduction to Correlation  
20. Scattergrams  
21. Introduction to Pearson r  
22. Computation of the Pearson r  
23. Coefficient of Determination  
24. Multiple Correlation  
25. Introduction to Linear Regression  
26. Computations for Linear Regression  
B. Notes on Interpreting Pearson r  
D. Spearman's rho  
E. Standard Error of Estimate
Grinnell:  
8. Measuring Variables  
9. Measuring Instruments  
Unrau, Krysik, & Grinnell:  
10. Designing Measurement Instruments

SESSION 8: JULY 29  
First Hourly Quiz  
Internal and External Validity/ Questionnaire Construction / Parameters and Statistics / Probability Distributions / Null And Alternative Hypotheses / Effect Size / α level, β level, and Power / Type I and Type II Errors / Directional and Nondirectional Tests

Required Reading:
Grinnell:  
12. Group Research Designs  
23. Single-System Designs
Unrau, Krysik, & Grinnell:  

Pyrczak:  
31. Standard Error of the Mean  
32. Confidence Interval for the Mean  
33. Introduction to the Null Hypothesis  
34. Decisions About the Null Hypothesis  
35. z Test for One Sample  
36. One-Tailed vs. Two-Tailed Tests
SESSION 10: JULY 31  
Goodness of Fit Chi Square / Kolmogorov-Smirnov Test / One-Sample t Test  
**Required Reading:**  
*Pyrczak:*  
35. z Test for One Sample  
36. One-Tailed vs. Two-Tailed Tests  
37. Introduction to the t Test  
48. Introduction to Chi Square  
49. Computations for a One-Way Chi Square  

SESSION 11: AUGUST 5  
The McNemar Change Test / The Wilcoxon Matched-Pair Signed Rank Test / Dependent (Correlated) t Test / Effect Size  
**Required Reading:**  
*Pyrczak:*  
37. Introduction to the t Test  
40. Computation of t for Dependent Data  
54. Wilcoxon's Matched-Pairs Test  

SESSION 12: AUGUST 7  
Chi-Square Test of Independence / The Wilcoxon/Mann-Whitney Test / Independent t Test / Effect Size  
**Required Reading:**  
*Pyrczak:*  
37. Introduction to the t Test  
38. Computation of t for Independent Data  
39. Reporting the Results of t Tests  
46. Significance of the Difference Between Variances  
47. Significance of a Pearson r  
50. Computations for a Two-Way Chi Square  
51. Cramér’s Phi  
53. Mann-Whitney U Test  

SESSION 13: AUGUST 12  
Chi-Square Test of Independence / Kruskal-Wallis Test / One-Way ANOVA / Effect Size  
**Required Reading:**  
*Pyrczak:*  
41. Introduction to Analysis of Variance  
42. Computations for a One-Way ANOVA  
43. Tukey's HSD Test  
44. Scheffé's Test  

SESSION 14: AUGUST 14  
Final Quiz