Course Materials: All course materials are available on-line at: http://psych.unl.edu/psycrs/index.html

Objectives: The major intent of this course is, along with Psyc941, to prepare you to participate in collaborative research with faculty and other graduate students and to conduct your Master's research project (or its equivalent). The topics for this course are chosen based on an ongoing review of recent Master's Theses, the research being conducted by the faculty in your departments, and attention to both the "standards" and the "hot topics" in research design and statistics.

Emphasis: With respect to design issues, special attention will be paid to the "rules of evidence" for the analysis of cause-and-effect relationships and the important differences between experimental, quasi-experimental, and concomitant measurement designs. With respect to data analytic issues, primary attention will be given to the family of ordinary least-squares techniques that includes analysis of variance, multiple linear regression and linear discriminant function analysis. Emphasis will be on the pragmatics of hypothesis testing, data analysis and the communication of findings, at a level that is more like "driver's education" and less like "mechanical engineering."

Activities: How we will be spending our time this semester reflects the three "kinds of things" I want you to be able to do with these research/statistical techniques: 1) Be able to talk/write about them using either the proper jargon or "plain English" (assessed by the Short Answer portion of the quizzes and the final); 2) Be able to start with a research hypothesis or question and a data set and to complete and report an appropriate data analysis (assessed by the homework); and 3) Be able to "think on your feet" about the theory and application of these techniques (assessed by the Story Problem portion of the quizzes).

Course Topics: (see "Planned Topics and Timing" below for more details)
- Factorial Designs and Analysis
- Regression, ANCOVA, and the General Linear Model with Interactions
- Correlations to Path Analyses: How it All Fits Together
- Linear Discriminant Function Analysis and Cluster Analysis

Time and Effort: Most graduate courses in this department meet weekly. Because of the workload, this course has multiple weekly meetings in order to allow you to "spread out" the considerable amount of reading, studying and homework (this is intended as a kindness, honest). Don't thwart the system by procrastinating! **Things you should be doing between class meetings include ...**

1) **review your notes and the handouts from the previous lecture**
   - Determine what part of your notes relate to each of the study questions
   - Determine if there is anything you would like to have clarified
   - Identify difficulties early gives us more of a chance of painless remediation

2) **do the homework**
   - The EDU exercises allow you to practice working with the language, techniques and procedures
   - The computational homework is your best chance to learn what you do and don't understand. Some are shorter, some longer, but all represent what you will do with real research data and most can be completed in 3-4 hours

3) **prepare for the next class**
   - Look over the study questions and materials that will be covered next
   - Preview the next lecture using the web site
   - The better prepared you are the "better" the lecture will be!

Homework: There are two kinds of homework in this class.

**MTA assignments** are online exercises designed to give you practice with the language, identifications, discriminations and decision making that are central to the course topics. These assignments are all conducted using a single-event mastery format. Each assignment has one or more topics and the online software will present you with items (questions and feedback) until you have gotten the criterion number of items correct in each topic. You are expected to complete each EDU assignment before the class meeting following its assignment. These assignments
are worth 5 points each if completed on time, -5 points if completed late and -10 points if not completed before you take the related quiz.

**Computation assignments** usually involve statistical analysis and presentation of the results in a prescribed format and style. There is a website at which you can check your computational results and many of your decisions and interpretations before completing the write-up and handing in the assignment. Be sure to print out the completed online check and hand it in with your assignment. A computation assignment is “on time” if it is completed online and handed in during the class meeting after it is assigned. A computation assignment is “acceptably late” if it is handed in during the second class meeting after it is assigned. A computation assignment is late if it is handed in after the second class meeting after it is assigned. These definitions provide for “the 15 minute rule” which states, “Whenever you can't make something work in 15 minutes of effort, find help!!” Often the problem is one of mistake or misunderstanding (yours, mine, the documentation, etc.) and additional effort will not help. Just bring your question to office hours or the next class meeting and you'll still have time to get the assignment done on time or acceptably late. **The whole system works better if you don't procrastinate.** Computation assignments are graded on a 10-point scale. Assignments that are on time or acceptably late can earn up to 10 points and can be rewritten to improve your score (and must be rewritten if your score is less than 90%). Assignments that are late may not be rewritten to improve your score. Any assignment not handed in before you take the related quiz will be scored -10 points.

**Quizzes:**

The **Short Answer** portion of each quiz will ask you to respond to a selection of the study questions. There will be some choices, but don't get brave. Your answers should be complete yet concise and must take "sentence and paragraph" form (no lists, phrases, or dependence upon figures, except where specified). All of the questions can be answered in 4-5 sentences (though some take more care to do this). Overly long answers will be carefully perused and richly punished for repetition, wondering off topic, and other trickery designed to prevent me from noticing that you don't really know the answer.

The **Story Problem** portion of each quiz will involve identifications, calculations, written interpretations, comments about “someone else’s” interpretations, etc. For the Story Problem portion of each quiz you should bring a calculator. I'll provide whatever computators, tables, etc. are necessary.

Quizzes and retakes will be scheduled in the Testing Center in Burnett Hall – be sure to check the testing dates and the times when the Testing Center is open! You may retake any particular quiz once to improve your score (and must retake it if your score is less than 90%). Different quizzes have different constructions and each has a specific retake policy that will be discussed during the preparation for that quiz.

**Research Proposal:**

Most of you will be completing some sort of master's level research project (variously called a ROTT - research other than thesis, or MERP – master's equivalency research project, etc.). This proposal will be your “first pass” at a proposal for that research project. The emphases of the proposal are the research hypotheses, data collection methodology and data analyses. You will be expected to have an introduction, but it should be a brief entrée to the topic – just enough so that I can tell that your research hypotheses were derived from the related literature. The design of the project must be a factorial design. Enough detail should be provided in the methods section that you could hand it and the stimulus materials to a research assistant and reasonably expect they will complete the data collection as intended. The results section will include tables and/or figures detailing the expected results and exactly what portions of the analyses will be used to test which of the specific research hypotheses. You should enlist the aid of whoever will be supervising your masters research as you prepare this proposal -- modifications in the requirements that will increase the “fit” of this proposal assignment to your actual research needs should be discussed with me as soon as possible.

If you have already completed your Master's and will be having it serve as your master's level research here, your proposal should be written as the follow-up study. Please see me as soon as possible if you will be writing this sort of a proposal.

**Grades:** Your grade for this course will be based upon performance on quizzes (60% - 15% for each of four), homework (30%), and the Research Proposal (10%). Attendance and participation in lecture will be noted and used in the assignment of the final grades, especially decisions about “borderline” grades. Letter grades will generally be assigned using the % ranges: A+ 97-100%; A 92-96%; A- 90-91%; B+ 87-89%; B 82-86%; B- 80-81%; C+ 77-89%; C 72-76%; C- 70-71%; D 60-69%; F <60%

**Academic Honesty:** Students often "gang-up" on the study questions and the homework assignments. This is encouraged, within the following guidelines. When preparing "your share" of the study questions, don't try to write the perfect 5-minute answer. Rather, assemble the pertinent information from your notes and the readings, organize it into meaningful subtopics (often information will have to be drawn from more than one day's lecture, for example), and...
indicate those portions of the information that are most “central”. This will allow each of you to compose your own best answer. This process is often improved by having two persons working on each question (instead of one). Evidence of “sharing” during the exam will result in a failing grade for the exam and possibly for the course, and presentation of the occurrence of the incident to the Graduate Committee, etc. When working on homework, it is a really good idea to brainstorm the issues and procedures of each question, and perhaps even to develop the necessary SPSS code and necessary interpretations. However: 1) The output must result from your computer work; and 2) The written portions of homework assignments (interpretations, formal presentations of the results, etc.) must be in your (unique) own words. You’ll have an opportunity to redo the first set of homework that does not meet both of these requirements; further occurrences will be scored zero (and can not be redone).

Accommodating Persons with Disabilities:
Students with disabilities are encouraged to contact the instructor for a confidential discussion of their individual needs for academic accommodation. It is the policy of UNL to provide flexible and individualized accommodation to students with documented disabilities that may affect their ability to fully participate in course activities or to meet course requirements. To receive accommodation services, students must be registered with the Services for Students with Disabilities (SSD) office, 132 Canfield Administration, 472-3787 voice or TTY.

Planned Topics and Timing

Factorial Designs and Analysis
Week 1 2x2 Factorial Designs and ANOVA
Week 2 kxk Between Groups Factorial Designs and ANOVA
Week 3 kxk Mixed and Within-groups Factorial Designs and ANOVA
Week 4 3-way Factorial Designs and ANOVA

Regression, ANCOVA and the General Linear Model with Interactions
Weeks 5-6 Regression, ANOVA, ANCOVA and the General Linear Model with Interactions
Weeks 7-8 2xQ, KxQ and QxQ designs using the General Linear Model

Correlations to Path Analyses: How it All Fits Together
Week 9 Varieties of Research Hypotheses and Statistical Control
Week 10 Predictive Modeling
Week 11 Path Analyses and Mediation

Linear Discriminant Function Analysis and Cluster Analysis
Week 12 Bivariate/Multivariate Classification and Introduction to Linear Discriminant Function
Week 13 k-group Linear Discriminant Function Models and Alternative Follow-up Analyses
Week 14 Research Hypothesis Testing with Linear Discriminant Function Models
Week 15 Introduction to Cluster Analysis