

## ***EPSY 441: Methods and Techniques of Educational Research***

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### **Overview:**

EPSY 441 is a doctoral level course emphasizing theory and application of quantitative methods and techniques employed in the investigation of educational problems. The course is designed for School of Education doctoral level students with some training or experience in the use of statistical techniques (EPSY 309 and EPSY 313), and with some exposure to research design (EPSY 341 or equivalent master's level educational research course or equivalent research experience/knowledge).

Conducting educational research involves several stages: developing research questions and hypotheses, planning the research design, writing the research proposal, obtaining institutional review board approval, collecting and analyzing the data, and writing the final report. In this course, we focus on the steps necessary to write a solid research proposal. In addition, we will survey a variety of quasi-experimental and experimental research designs. We will also consider the linkages between research design and data analysis. Finally, we will emphasize the evaluation of previously conducted research studies. This course is simultaneously theoretical and applied. It is expected that by the end of the course, students will have a deep understanding of quantitative research design and theory and will be able to pose and answer a wide variety of research questions using quantitative methodology.

### **Prerequisites:**

EPSY 309 and EPSY 313

EPSY 341 or equivalent master's level educational research course or instructor consent

### **Course objectives**

- To understand theory, concepts, and terminology pertinent to conducting quantitative educational research
- To develop an in-depth understanding of a variety of experimental and quasi-experimental research designs; to be able to identify threats to validity for each of the designs and strategies to minimize possible threats to validity
- To define a research problem of interest and generate appropriate research questions and/or hypotheses; To select a quantitative research design that will permit you to examine your research questions and/or test your hypotheses and evaluate the adequacy of the design
- To write a thoughtful and synthesized literature review as a precursor to conducting research in an area
- To apply the guidelines required for the protection of human subjects in research and understand the role of the IRB in the protection of human subjects
- To present a clear, concise written research proposal following APA format .
- To evaluate and critique the results of research studies conducted by other researchers within the field of education
- To understand the concepts of effect size and power analysis

## Required Textbooks

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston: Houghton Mifflin.

## Recommended Text:

APA (2001). *Publication manual*. (5th edition). Washington: APA.

Some weblinks for APA style:

<http://www.wooster.edu/psychology/apa-crib.html>

<http://www.psychwww.com/resource/apacrib.htm>

<http://www.lib.usm.edu/~instruct/guides/apa.html>

## Required Articles:

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*, 1173-1182.

Baumeister, R. F., & Leary, M. R. (1997). Writing narrative literature reviews. *Review of General Psychology*, *1*, 311-320.

Bem, D. J. (1995). Writing a review article for Psychological Bulletin. *Psychological Bulletin*, *118*, 172-177.

Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*, 155-159.

Cudeback, G., Wilson, E., Orme, J. G., & Combs-Orme, T. (2004). Detecting and statistically correcting sample selection bias. *Journal of Social Service Research*, *30* (3), 19-33.

Larzelere, R. E., Kuhn, B. R., & Johnson, B. (2004). The intervention selection bias: An underrecognized confound in intervention research. *Psychological Bulletin*, *130*, 289-303.

Leow, C., Marcus, S., Zanutto, E., & Boruch, R. (2004). Effects of advanced coursetaking on math and science achievement: Addressing selection bias using propensity scores. *American Journal of Evaluation*, *25*, 461-478.

Messick, S. (1995). Validity of Psychological Assessment: Validation of inferences from persons' responses and performances as scientific inquiry into score meaning. *American Psychologist*, *50*, 741- 749.

Rogers, J. C., & Holloway, R. L. (1990). Assessing threats to the validity of experimental and observational designs. *Family Practice Research Journal*, *10*, 81-95.

West, S. G., Biesanz, J., & Pitts, S. C. (2000). Causal inference and generalization in field studies: Experimental and quasi-experimental designs. In H. T. Reis & C. M. Judd (Eds.) *Handbook of research methods in social and personality psychology* (pp. 40-84). New York: Cambridge University Press.

Wilkinson, L., & the Task Force on Statistical Inference. (1999). Statistical methods in psychology journals: Guidelines and explanations. *American Psychologist*, *54*, 594-604.

## Schedule of Classes, Readings, and Assignments

\*\*\*Please complete all readings by the date indicated on the syllabus

Date	Topic	Assignment
8/31	Introduction to Research; Research Questions; Research hypotheses; Brief Intro to Ethics and the IRB	
9/7	Literature Review and APA	<i>Bem</i> article- Writing for Psych Bulletin <i>Baumeister &amp; Leary</i> - Writing Lit Reviews
9/14	Intro to experiments and generalized causal inference; Statistical conclusion Validity; Measurement Validity	SCC, pages 1-52 Messick- Validity of Psychological Assessment
9/21	Internal Validity and Construct Validity	SCC, pages 53-81 <i>Rogers &amp; Holloway</i> article
9/28	Sampling and External Validity; Overview of research designs for experimental and quasi-experimental studies	SCC, pages 83-105 Shadish article <b>Research Question assignment due</b>
10/5	Research designs for experimental and quasi-experimental studies; Dealing with non-equivalence	SCC, pages 106-160 West, pages 40-58 (first par.) <i>Leow</i> article
10/12	Quasi-experimental studies (cont); Regression Discontinuity Design	SCC, pages 207-242 <i>West</i> , p. 58-62 <b>IRB Assignment due</b>
10/19	Interrupted Time Series Designs, Single Subject Designs	<i>SCC</i> , pages 171-206 <i>West</i> , p. 62-68
10/26	Randomized Experiments: Rationale, Designs and Conducive Conditions; ANCOVA vs. RM ANOVA	SCC, pages 246-277 <i>West</i> , p. 68-78
11/2	Practical Problems: Recruitment, Assignment, Implementation, Fidelity, and Attrition, Missing Data; Selection Bias	SCC, pages 279-340 <i>Larzelere</i> article <i>Cuddeback et al.</i> article <b>Review of Literature Due</b>
11/9	Generalized Causal Inference- Methods for a single study; Mediators and Moderators; Non-experimental studies	SCC, pages 341-415 <i>Baron &amp; Kenny</i> article <i>West</i> article to end
11/16	Causal Inferences from multiple studies; Replication; Effect size; Meta-analysis	SCC, 417-454 <b>Preliminary Design Due</b>
11/23	Thanksgiving Break	
11/30	Power Analysis and sample size considerations	<i>Cohen</i> - Power Primer <i>Wilkinson &amp; APA Task Force</i> – Stat methods <b>Article Critique Due</b>
12/7	Cluster randomized designs; Writing and reporting your research; Final Thoughts	<b>Final project due</b> <i>SCC</i> , pages 456-504
12/14	<b>FINAL EXAM</b>	



## *Assignments and Grades*

### **1. Statement of Research Question (5%) – Due 9/28/05**

Propose a research question that you intend to use for your proposal. This will be returned with comments and suggestions. In your paper for this assignment, identify the research questions and or hypotheses, the independent and dependent variables, and provide a very brief, skeletal description of your possible methodology. **1-2 double spaced pages.**

### **2. IRB Assignment (10%)- Due 10/26/05-** For this assignment, you must complete the citi IRB modules and exams. This assignment will take approximately 6 hours. You must register with the citiprogram and complete all modules and quizzes and score at least 80% on all required modules. To demonstrate completion of this activity, print the gradebook page and turn it in.

“Nationwide, universities are requiring training as part of their Human Subjects Protection Programs. The UConn Storrs Institutional Review Board (IRB) recommended that the University of Connecticut launch an investigator-training program. Effective October 3, 2005, the Storrs and regional campuses are requiring that faculty and non-faculty members who will need to make an IRB submission (new protocol, amendment, request for re-approval) complete the appropriate course on the CITI website ([www.citiprogram.org](http://www.citiprogram.org)) before protocols for such research can be reviewed by the IRB. The training requirement applies to ALL individuals involved in the research, including PIs and any individuals who assist in the data collection process, whether these individuals appear on the protocol submitted for IRB review or are added at a later point. We hope this will be a valuable training exercise for graduate students and new staff and facilitate compliance with sometimes "difficult" federal regulations.” (UCONN IRB email, July 2005)

### **3. Literature Review (15%) – Due 11/02/05**

The purpose of the literature review is to prepare a thoughtful synthesis of research in a particular area as a precursor to designing a study to further the research in that area. The literature review should be 7-10 pages in length. The literature review needs to review EMPIRICAL research on the chosen topic. Ideally, the literature review should be the pre-cursor to the research proposal that you will complete. Therefore, I anticipate that you will use the edited version of your literature review for your final research proposal. The rubric attached to the syllabus outlines the criteria for the literature review.

### **3. Preliminary Design for Proposal- Due 11/16/05 (10%)** This should be an abbreviated draft of the design and methodology section of your final proposal. You should include the research questions and or hypotheses, the independent and dependent variables, a description of the sample, instrumentation, procedures, and analyses. **3-5 double spaced pages.**

### **4. Article Critique (15%) - Due 11/30/05**

A critical review of a published research article which will be supplied by the instructor 3 weeks prior to the due date.

### **5. Research Proposal (including IRB form) 20%- Due 12/07/05**

A 10-15 page research proposal for a **quantitative** research study plus a completed IRB form including any necessary consent forms. The basic outline for the research proposal is contained below. More details about the format of the research proposal will be discussed in class.

- I. Statement of the Problem
- II. Review of the Literature
- III. Purpose/Research Questions Hypotheses
- IV. Methods

- A. Sample

(A power analysis would be nice to justify sample size!)

**Power Analysis Sites:**

G Power <http://www.psych.uni-duesseldorf.de/aap/projects/gpower/index.html>

PS <http://www.mc.vanderbilt.edu/prevmed/ps/index.htm>

- B. Instrumentation
    - C. Procedures
    - D. Analyses
- V. Limitations
- VI. Conclusion
- VII. Appendix
  - A. IRB Proposal <http://www.irb.uconn.edu/>
  - B. Consent Form or Information Form: Templates available from <http://www.irb.uconn.edu/forms.html#templates>

## 6. Final Exam (25%) – 12/14/05

The final exam will cover all of the content covered within the course. The final will be 12/14 from 6:30-9:00 in our regular classroom.

\*\*\* **Note!!!!!!** All assignments must be **typed**. It is expected that all requirements will be completed **on time**. All assignments are due on the day specified in the syllabus. Late assignments will be penalized 4% per day. Any requirements not handed in by the last class meeting will be given 0 points. Incomplete grades will be allowed only under **highly extraordinary** circumstances.

For the final course grade:

A+ is 99-100

A is 93-98

A- is 90-92

B+ is 87-89

B is 83-86

B- is 80-82

C+ is 77-79, etc.

## Special Needs/ Accommodations:

Please see me individually within the first two weeks of class if you have any special needs or require any special accommodations as the result of a documented disability.

***Final Proposal Rubric***  
***EPSY 441***

- \_\_\_\_\_ Statement of the Problem (1 point)
- \_\_\_\_\_ Literature Review (3 Points)
- \_\_\_\_\_ Purpose/Research Questions/ Hypotheses (2 points)
- \_\_\_\_\_ Methods (8 points)
  - \_\_\_\_\_ Sample (2)
  - \_\_\_\_\_ Instrumentation (2)
  - \_\_\_\_\_ Procedures (3)
  - \_\_\_\_\_ Analyses (2)
- \_\_\_\_\_ Limitations and Conclusion (1 points)
- \_\_\_\_\_ IRB Proposal and Consent Form (2 points)
- \_\_\_\_\_ APA and refs are correct (1 point)
- \_\_\_\_\_ Grammar/Tone/Writing (1 point)