Course Acronym:	SOCI
Course Number:	109B
Descriptive Title:	Research Methods in the Behavioral Sciences
Division:	Behavioral and Social Sciences
Department:	Sociology
Course Disciplines:	Psychology, Sociology
Catalog Description:	This course is centered on the philosophy of science in general and the scientific method in particular. Students develop individual research studies with these elements: literature review, hypothesis, design and method, data collection and analysis, and discussion, oral presentation, and manuscript preparation (APA Publication Style). *Note: Sociology 109B is the same course as Psychology 109B.*
Prerequisite:	Sociology 101 or Sociology 101H, Sociology 109A, and Mathematics 150 or Mathematics 150H with a minimum grade of C
Co-requisite:	
Recommended Preparation:	
Enrollment Limitation:	
Hours Lecture (per week):	3
Hours Laboratory (per week):	3
Outside Study Hours:	8
Total Course Hours:	108
Course Units:	4
Grading Method:	Letter Grade only
Credit Status:	Credit, degree applicable
Transfer CSU:	Yes
Effective Date:	Prior to July 1992
Transfer UC:	Yes
Effective Date:	Prior to July 1992
General Education: ECC	
Term:	
Other:	
CSU GE:	D9 - Psychology

Term:	Fall 2007
Other:	
IGETC:	
Term:	
Other:	
Student Learning Outcomes:	**SLO #1 Logic of the Scientific Method** On examination (e.g., m/c, T/F, fill-in, matching, essay), written essay, research paper, and/or oral presentation, students will be able to explain and critique essential components of the scientific method in psychological research. **SLO #2 Fundamental Principles** On examination (e.g., m/c, T/F, fill-in, matching, essay), written essay, research paper, and/or oral presentation, students will be able to explain and apply essential elements of the scientific method in psychological research. **SLO #3 Everyday Application** On examination (e.g., m/c, T/F, fill-in, matching, essay), written essay, research paper, and/or oral presentation, students will be able to evaluate both the adequacy and relevance of research in their efforts to understand everyday life experiences (e.g., choose a diet plan, decide if a treatment or product is safe and effective, vote for or against a proposition).
Course Objectives:	1. Apply basic Philosophy of Science concepts (i.e., empiricism, rationalism, objectivity, falsifiability) to (a) differentiate science, philosophy, religious and cultural traditions, intuition, and authority; (b) explain how two basic characteristics are central to science; and (c) explain differing interpretations of the goals of science. 2. Explain how research topics can come from different sources by defining and differentiating these concepts: Hypothetico-Deductive method (including theory, hypothesis, and prediction), common sense, casual observation, and practical problems. 3. Analyze different ethical issues in research (i.e., deception, informed consent, privacy, and confidentiality). 4. Explain the role of variables in research by (a) defining and differentiating these types of variables: hypothetical versus concrete, qualitative versus quantitative, predictor (independent) versus response (dependent), manipulated versus natural (subject), extraneous versus confounding and (b) explaining why psychological research is dominated by hypothetical variables and so relies upon operational definitions to remain empirical. 5. Explain the standards of variable measurement by (a) defining and differentiating these concepts: standardization, reliability (test-retest, split-half, inter-rater), and validity (face, construct, convergent, discriminant, criterion, predictive) and (b) explaining why reliability must be established before validity. 6. Explain the variety of functional relations between predictor and response variables by defining and differentiating these concepts: causal, correlational, coincidental, bidirectional, third variable. 7. Explain the issues involved in sampling participants by (a) defining and differentiating probability sampling (e.g., simple random, stratified, cluster) and

	nonprobability sampling (e.g., haphazard, quota) and (b) explaining why psychological research rarely employs random sampling. 8. Describe the strengths and limitations of various research designs by (a) defining and differentiating naturalistic, case study, archival, correlational, experimental, and quasi-experimental designs and (b) evaluating these designs in terms of internal validity and external validity (including the idea that only experimental designs support causal conclusions. 9. Elaborate upon the concepts of conclusion validity by (a) defining and differentiating various threats to internal validity (e.g., history, maturation, testing reactivity, instrument decay regression to the mean, placebo and expectancy effects), (b) defining and differentiating various designs for controlling threats to internal validity (e.g., pretest-posttest, posttest-only, Solomon 4 Group, repeated measure [including counterbalancing and Latin Square]), (c) explaining how complex designs enhance conclusion validity, including designs with 1 predictor variable but 3+ groups (e.g., dismantling studies) and factorial designs with 2+ predictor variables and 4+ groups (including main effects and interaction effects). 10. Define and differentiate nomothetic (group) and idiographic (single-subject) designs, especially in terms of statistical versus experimental control of error variability. 11. Prepare to participate in each step of the process of research in an academic setting by participating in a research group, including (a) composing and presenting research ideas, associated questions and issues and responding to the ideas, issues, and questions of others; (b) designing a research project through library research and consultation with peers and professor in the research group (and culminating in a APA-style written proposal; (c) carrying out the project by recruiting subject, collecting and statistically analyzing the data, and presenting the project in an APA-style written report.

Major Topics:	**I. Approaches to Knowledge (3 hours, lecture)**
	
	    A. Intuition
	    B. Authority
	    C. Empirical
	    D. Scientific
	       1. Goals
	          a) Description
	          b) Prediction
	          c) Control
	          d) Explanation
	       2. Defining Characteristics
	          a) Objectivity
	          b) Testability
	
	II. Types of Behavioral Research (3 hours, lecture)
	
	    A. Sources of Research Ideas
	    B. Null and Research Hypotheses
	    C. Mainstream Hypothetico-Deductive Research
	
	III. Ethics in Research (3 hours, lecture)

A. Infamous Psychological Studies
   1. Milgram's *Obedience* Study (1962)
   2. Zimbardo's *Stanford Prison Experiment* (1971)
B. Medical Studies Sparking Public Outrage
   1. Tuskegee *Syphilis* Study (1932-1972)
   2. Guatemala *Syphilis* Study (1946-1948)
C. The Belmont Report (1979)
   1. Beneficence
   2. Autonomy
   3. Justice
D. *APA Ethics Code*
   1. Informed Consent
   2. Deception
   3. Debriefing
E. Three Central and Separate Concepts
   1. Privacy
   2. Confidentiality
   3. Anonymity
F. Institutional Review Boards
   1. Risk/Benefit Analysis
   2. Exempt (No Risk) Research
   3. Minimal (Everyday Life) Risk Research
   4. Greater than Minimal Risk Research
G. Fraud
H. Plagiarism (Including Self-Plagiarism)
I. Nonhuman Animal Research
   1. Humane Care
   2. Unnecessary Pain (Cruelty)
   3. *Institutional Animal Care and Use Committee (IACUC)*
   4. *APA Guidelines for Ethical Conduct in the Care and Use of Nonhuman Animals*

IV. Operational Definitions (3 hours, lecture)

A. Mainstream Operationism (Logical Positivism)
B. Nonmainstream Operationism (Phenomenological and Pragmatic)
C. Criteria of Variable Measurement
   1. Reliability
   2. Validity
   3. Assessment Techniques

V. Variables (3 hours, lecture)

A. Validity
   1. Internal Validity (Cause and Effect Conclusions)
   2. External Validity (Generalizability to Other Research Setting and "The Real World)"
   3. Construct Validity (Operational Definitions)
B. Relationships Between Variables
   1. Correlational
      a) Bidirectionality
      b) Third Variables
   2. Causal

a) Random Assignment
b) Manipulation of Independent Variable

VI. Fundamental Methodological Issues (3 hours, lecture)

    A.   Sampling Techniques
    B.   Techniques of Survey Construction
    C.   Methods of Independent Variable Manipulation
    D.   Types of Sensitivity of Dependent Variable Measures

VII. Descriptive Research Methods (6 hours, lecture)

    A.   Naturalistic Observation
    B.   Systematic Observation
    C.   Case Studies
    D.   Archival Research
    E.   Survey Research

VIII. Experimental Designs (6 hours, lecture)

    A.   Threats to Internal Validity: Confounds
        1. History
        2. Maturation
        3. Reactivity
        4. Instrument Decay
        5. Statistical Regression
        6. Demand Characteristics
        7. Placebo Effects
        8. Expectancy Effects

IX. Spectrum of Designs (7 hours, lecture)

    A.   Posttest-Only
    B.   Pretest-Posttest
    C.   Independent Groups
    D.   Repeated Measure

X. Specific Methods (8 hours, lecture)

    A.   Random Assignment
    B.   Counterbalancing
    C.   Latin Squares and Randomized Blocks
    D.   Debugging Techniques
    E.   Pilot Studies
    F.   Manipulation Checks

XI. Complex Experimental Designs: Factorial Designs (6 hours, lecture)

    A.   Main Effects and Interactions
    B.   Advantages of Factorial Designs

XII. Single-Subject Designs (3 hours, lecture)

XIII. The Process of Research in an Academic Setting (18 hours, lab)

    A. Participating in a Research Team
    B. Developing and Proposing a Research Project

XIV. Data Collection and Analysis (24 hours, lab)

    A. Levels of Measurement
       1. Nominal (Qualitative)
       2. Ordinal
       3. Interval
       4. Ratio
    B. Parametric Tests (Interval, Ratio Levels of Measurement)
       1. Two Group *t*-test
          a) Independent Groups
          b) Dependent Groups (e.g., Repeated Measures, Matched Groups)
       2. Analysis of Variance (ANOVA)
          a) Single Factor (One Way) ANOVA
          b) 2+ Factor (Factorial) ANOVA
       3. Pearson Product-Movement Correlation (Pearson r)
       4. Regression Analysis
    C. Nonparametric Test (Nominal, Ordinal Levels of Measurement)
       1. Chi-Square Goodness of Fit
       2. Mann-Whitney U Test
       3. Spearman's r

XV. Preparing the APA-Style Manuscript (12 hours, lab)

    A. Review and Analysis of Relevant Research
       1. Quality of Methodology (e.g., Controlling Confounding Variables)
       2. Proper Data Analysis (e.g., Confirming Statistical Assumption Are Met)
       3. Justifiable Conclusions (e.g., Avoiding Causal Inferences from Correlational Designs)
       4. Synthesizing Analysis to Form Testable Hypothesis
    B. Designing Methodology Necessary to Test Hypothesis
    C. Selecting Statistical Techniques Appropriate to Data
    D. Forming Conclusions Supported by Methodology and Statistical Analysis

Total Lecture Hours:	54
Total Laboratory Hours:	54
Total Hours:	108
Primary Method of Evaluation:	1) Substantial writing assignments
Typical Assignment Using Primary Method of Evaluation:	Based upon readings from your textbook on causal inference in scientific research, write a two-page essay in which you design a study of the effects of sleep deprivation on academic performance that maximizes the strength of the conclusions (in terms of both

	internal and external validity) while identifying and addressing potential ethical and pragmatic issues.
Critical Thinking Assignment 1:	Research and demonstrate a positive correlation between exposure to pornography and sex-offensive behavior. In a two- to three-page essay, describe the conclusion that many laypersons are likely to form and then critique this conclusion. Include in your answer alternative conclusions based upon your knowledge of logical relationships between scientific variables.
Critical Thinking Assignment 2:	In a two- to three-page essay, compare the strengths and limitations of nomothetic (group) designs and idiographic (single-subject) designs. Include considerations of both internal and external validity.
Other Evaluation Methods:	Essay Exams, Fieldwork, Laboratory Reports, Multiple Choice, Reading Reports, Term or Other Papers, True/False, Written Homework
Instructional Methods:	Discussion, Lab, Lecture, Multimedia presentations
If other:	
Work Outside of Class:	Required reading, Skill practice, Study, Written work (such as essay/composition/report/analysis/research)
If Other:	
Up-To-Date Representative Textbooks:	Paul Cozby, Scott Bates. Methods in Behavioral Research. McGraw-Hill Education, 2017. (Discipline Standard)
Alternative Textbooks:	
Required Supplementary Readings:	
Other Required Materials:	
Requisite:	Prerequisite
Category:	sequential
Requisite course(s): List both prerequisites and corequisites in this box.	Sociology 109A or Psychology 109A ; Mathematics 150 or Mathematics 150H with a minimum grade of C
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	**Ability to apply knowledge about basic research design to more in depth analysis of issues pertaining to the planning, design, execution, and analysis of a research study.** SOCI 109A - Define and differentiate one- and two-tailed probabilities and explain how they are related to directional and nondirectional hypotheses. SOCI 109A - Identify Null and Alternative Hypotheses for various research questions and express them mathematically in the form of linear models. SOCI 109A - Determine statistical significance by defining and differentiating alpha levels, p values, Type I and Type II errors and applying these concepts to decisions regarding statistical hypotheses. SOCI 109A - Calculate and interpret the following: (a) single sample cases when population parameters are known (z-tests) and unknown (t-tests); (b) two sample cases

when the samples are independent and dependent (independent and correlated t-tests); (c) multi-sample (3 or more) independent cases with a single predictor variable (one-way ANOVA) and 2+ predictor variables (two-way ANOVA).

SOCI 109A - Conduct statistical tests by calculating and interpreting estimates of effect size, statistical power, degree of association, homogeneity of variance, and (for ANOVA) a posteriori comparisons (e.g., Tukey's HSD, Fischer's LSD).

SOCI 109A - Analyze and explain the advantages of multigroup and factorial research designs in comparison to single factor and two-group designs.

Ability to apply knowledge about basic research design to more in depth analysis of issues pertaining to the planning, design, execution, and analysis of a research study.

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Ability to apply knowledge about basic research design to more in depth analysis of issues pertaining to the planning, design, execution, and analysis of a research study.

MATH 150 - Identify, compare and contrast various types of data and sampling techniques.

MATH 150H - Identify, compare and contrast various types of data and sampling techniques.

MATH 150 - Perform parametric and non-parametric hypothesis tests including t-tests for single and two population means and Chi-square tests. Interpret these results in context and justify the choice of test by demonstrating that the necessary criteria are met.

MATH 150H - Perform parametric and non-parametric hypothesis tests including t-tests for single and two population means and Chi-square tests. Interpret these results in

	context and justify the choice of test by demonstrating that the necessary criteria are met.
Requisite Skill:	
Requisite Skill and Matching Skill(s): Bold the requisite skill(s). If applicable	
Requisite course:	
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	
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Enrollment Limitations and Category:	
Enrollment Limitations Impact:	
Course Created by:	Richard Mascolo
Date:	09/29/2016
Original Board Approval Date:	08/21/2017
Last Reviewed and/or Revised by:	Kassia Wosick
Date:	03/02/2023
Last Board Approval Date:	07/17/2023