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Course Outline for PSYC 25

RESEARCH METHODS

Effective: Fall 2019

I. CATALOG DESCRIPTION:
PSYC 25 — RESEARCH METHODS — 4.00 units

Introduction to the use of the scientific method in the study of human and animal behavior. Coverage of descriptive, experimental, and non-experimental methods commonly used in psychological research. Topics will include ethical principles in research, hypothesis development and testing, observational methods, survey research, the fundamentals of experimental design, basic data analysis, and the presentation of research findings.

3.00 Units Lecture 1.00 Units Lab

Prerequisite
PSYC 1 - General Psychology
with a minimum grade of C
and

MATH 40 - Statistics and Probability
with a minimum grade of C
(May be taken concurrently)

Grading Methods:
Letter or P/NP

Discipline:
- Psychology

	MIN
Lecture Hours:	54.00
Expected Outside of Class Hours:	108.00
Lab Hours:	54.00
Total Hours:	216.00

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 1

III. PREREQUISITE AND/OR ADVISORY SKILLS:

Before entering the course a student should be able to:

A. PSYC1
1. define the various theoretical perspectives that have shaped the study of psychology
2. contrast the unifying themes that underlie the field of psychology
3. distinguish between the goals of scientific psychology and common sense
4. evaluate the various psychological research methods
5. discuss the importance of ethical principles in research

B. MATH40
1. Define different types of statistics, how they are used and misused;
2. Identify the standard methods of obtaining data and identify the advantages and disadvantages of each;
3. Distinguish among different scales of measurement and their implications;
4. Distinguish between controlled experiments and observational studies, including identifying potential confounding factors, and explain why they are confounding;
5. Take real world raw data and organize it into tables, charts, and/or graphs both with and without the use of technology;
6. Interpret data displayed in tables and graphically;
7. Calculate and understand the meaning of the the measures of central tendency: mean, median, mode, and the measures of variation and position: range, variance, and standard deviation as they relate to a discrete and continuous population, sample, or distribution;
8. Apply concepts of and use linear regression and ANOVA analysis for estimation and inference, and interpret the assocatiated statistics;
9. Solve problems involving the binomial, normal, or chi-squared distribution;
10. Perform descriptive and inferential statistics, using a software package (technology).
11. Calculate probabilities using normal and t-distributions;

12. Formulating a hypothesis test by selecting the appropriate technique for testing the hypothesis and interpreting the result for one and two-populations comparisons;
13. Identify the baisic concept of hypothesis testing including Type I and II errors;
14. Determine and interpret levels of statistical significance including p-values;
15. Use appropriate statistical techniques to analyze and interpret applications based on data from disciplines including business, social sciences, psychology, life science, health science, and education.

IV. MEASURABLE OBJECTIVES:

Upon completion of this course, the student should be able to:

A. Describe the historical and philosophical roots of scientific psychology
B. Recognize the difference between psychological concepts and operational definitions
C. Discuss how historical, social, and cultural factors bias scientific investigation
D. Write up research results in APA format
E. Describe the advantages and disadvantages of various sampling procedures
F. Contrast the strengths and weaknesses of various research methods used in the behavioral sciences
G. Evaluate the types of experimental designs including between-subjects, within-subjects, single-subject, factorial designs, and quasi-experiments
H. Use descriptive and inferential statistical procedures
I. Evaluate the use of validity and reliability in the behavioral sciences
J. Discuss the ethical considerations associated with conducting human and animal research

V. CONTENT:

A. The role of scientific inquiry in psychology
    1. Non-scientific approaches to studying behavior: a historical overview
    2. Philosophical roots of scientific method: rise of empiricism and rationalism
    3. Understanding the scientific method
        a. Theories and hypotheses in science
        b. Measuring psychology: concepts and operational definitions
        c. Multimethod approach to science
        d. Cumulative nature of science
    4. Historical, social, and cultural context in science
        a. Ethnocentrism
        b. Anthropocentricism
B. Scientific writing and presentations
    1. Literature searches and determining source quality
    2. Writing a literature review
        a. Meta-analysis
    3. APA format for research reports
    4. Peer review processes in science
C. Descriptive statistics
    1. Measurement scales
    2. Measures of central tendency
    3. Measures of variability
D. Sampling
    1. Populations and samples
    2. Representative samples based on age, SES, ethnicity/race, religion, sexuality, disability, and other factors
    3. Probability and nonprobability sampling
E. Behavioral observation
    1. Types of behaviors in human and nonhuman animals
        a. Participant reactivity
    2. Validity and reliability in behavioral observations
    3. Naturalistic observation
    4. Participant observation
    5. Field experiments
F. Survey and interview methods
    1. Types of survey and interview questions
    2. Validity and reliability in survey research
    3. Types of collection techniques (print, telephone, Internet)
    4. Demand characteristics and response bias
    5. Longitudinal and cross-sectional research
G. Indirect measures
    1. Physical trace techniques
    2. Archival and content analysis
H. Hypothesis testing
    1. Non-experimental (correlational) methods
        a. Testing the results of correlation studies
        b. Correlation coefficients and chi-squared procedures
        c. Correlation and causality
    2. Experimental method
        a. Internal Validity: Requirements for determining causation
        b. Independent, dependent, and confounding variables
        c. Control, randomization, and counterbalancing in experiments
    3. Designing an experiment
        a. Between-groups designs
        b. Within-groups designs
        c. Factorial designs
    4. Data organization and analysis
        a. The null hypothesis
        b. Statistical significance, effect sizes, and power analysis
        c. t-test and one-way ANOVA procedures
        d. Statistical main effects and interactions
    5. Other research designs
        a. Program evaluation
        b. Case studies and single-case designs
        c. Quasi-experimental designs
I. Ethical aspects of research
    1. Duty of care
    2. Informed consent

3. Confidentiality
4. Deception and debriefing
5. Protocols for human and animal research
    a. Institutional Review Board (IRB)
    b. Institutional Animal Care and Use Committee (IACUC)

VI. METHODS OF INSTRUCTION:

A. **Written exercises and case studies** - Written assignments
B. **Student Presentations** - Students will be expected to present the research studies.
C. **Lab** - - Conduct studies using observational, survey, interview, and/or unobtrusive methods. Data will be analyzed and discussed in the lab.
D. **Discussion** - Discussion and problem solving of significant or controversial issues
E. Readings from texts, supplementary materials, primary source materials
F. **Lecture** - Lectures on major themes and concepts
G. **Audio-visual Activity** - Use of multimedia to illustrate major course concepts.

VII. TYPICAL ASSIGNMENTS:

A. Reading:
    1. Read chapter five from “Doing Psychological Experiments” and prepare a concept map of the steps in conducting an experiment. Include the necessary evaluations by an Institutional Review Board to insure ethical procedures.
B. Writing:
    1. Write a critique of a published research article. Keep in mind the criteria for evaluating research presented in class and in the text.
    2. Write-up the results of the observational study of human behavior or the survey project in APA format. The paper must include all parts of a research paper, including title page, abstract, introduction, methods, results, and references.
C. Project (emphasis on problem solving and critical thinking):
    1. Working in a group, develop a hypothesis and design an experiment using the techniques and concepts introduced in class and in the text. Identify the threats to validity that might be encountered in doing the experiment and how they can be overcome.
    2. Given a research problem, formulate at least two approaches that could be used to carry out research on the problem. Discuss the strengths and weaknesses associated with each approach identified.
D. Laboratory:
    1. Participate the two-group maze experiment using the Online Psychology Laboratory (OPL), analyze the class results using descriptive and inferential statistics, create graphs to show the results, and discuss your conclusions based on the analysis.
    2. Generate a detailed description of a few behaviors your group wants to examine. Conduct eight 5-min observations of human behavior. Generate a graph that shows the mean and standard deviation of each behavior.

VIII. EVALUATION:

Methods/Frequency

A. Exams/Tests
    3-6 times per semester
B. Research Projects
    2-4 times per semester
C. Papers
    2-4 times per semester
D. Oral Presentation
    1 per semester
E. Class Participation
    Weekly
F. Lab Activities
    Weekly

IX. TYPICAL TEXTS:

1. Crozby, Paul, and Scott Bates. *Methods in Behavioral Research.* 13th ed., McGraw-Hill, 2018.
2. American Psychological Association *Publication Manual of the American Psychological Association.* 6 ed., American Psychological Association, 2009.
3. Morling, Beth. *Research Methods in Psychology.* 3rd ed., WW Norton, 2018.
4. American Psychological Association. Mastering APA Style: Student's Workbook and Training Guide (6th ed.). American Psychological Association , 2009.

X. OTHER MATERIALS REQUIRED OF STUDENTS: