PSYC (Psychology) 2205 Introduction to Research Methods in the Social Sciences (4 Units) CSU: UC

Prerequisite:  Successful completion of Psychology 1500 and Psychology 2200 or Statistics 1510 with grades of 'C' or better

Advisory: Eligibility for English 1500 or 1501 strongly recommended.

Prerequisite knowledge/skills: Before entering the course, the student should be able to:

1. Demonstrate familiarity with the major concepts, theoretical perspectives, research methods, core empirical findings, and historic trends in psychology.
2. Explain (including advantages and disadvantages) and compare major theoretical perspectives of psychology (e.g., behavioral, biological, cognitive, evolutionary, humanistic,
3. psychodynamic and socio-cultural);
4. Demonstrate knowledge and understanding of the following nine general domains: (1) biological bases of behavior and mental processes, (2) sensation and perception, (3) learning
5. and memory (4) cognition, consciousness, (5) individual differences, psychometrics/measurement, personality, (6) social processes (including those related to
6. socio-cultural and international dimensions), (7) developmental changes in behavior and mental processes that occur across the lifespan, (8) psychological disorders, and (9) emotion
7. and motivation;
8. Describe and demonstrate an understanding of applied areas of psychology (e.g., clinical, counseling, forensic, community, organizational, school, health);
9. Draw the distinction between scientific and non-scientific methods of understanding and analysis.
10. Recognize and understand the impact of diversity on psychological research, theory and application, including (but not limited to): age, race, ethnicity, culture, gender, socioeconomic status, disability, and sexual orientation.
11. Understand and apply psychological principles to personal experience and social and organizational settings.
12. Demonstrate critical thinking skills and information competence as applied to psychological topics.
13. determine level/scale of data (nominal, ordinal, interval, ratio),
14. describe populations and samples using descriptive statistics,
15. organize data using descriptive statistics,
16. develop and interpret frequency tables and histograms,
17. transform raw data into z-scores,
18. interpret z-scores in relation to research question,
19. estimate probability of occurrence for a range of scores using standardized tables,
20. calculate and interpret 95% and 99% confidence intervals in relation to research question,
21. calculate measures of dispersion,
22. compare and contrast measures of dispersion,

23. calculate measures of central tendency,
24. compare and contrast measures of central tendency,
25. discuss types of kurtosis, factors influencing kurtosis, and impact of kurtosis on validity of inferences,
26. explain central tendency theory in the context of normal population distributions,
27. explain central limits theory in the context of sample size,
28. compare and contrast descriptive and inferential statistics,
29. compare and contrast parametric and non-parametric hypothesis tests,
30. explain and apply basic assumptions underlying hypothesis testing,
31. explain use of critical scores and $\square$ level in hypothesis testing,
32. perform a statistical analysis,
33. apply the rules of probability to descriptive and inferential data,
34. identify independent and dependent variables in a research question,
35. determine the appropriate hypothesis test based on research question and level of data,
36. perform the appropriate hypothesis test based on research question and level of data,
37. use central tendency theory to explain $\square$, $\square$, and power of hypothesis test, sample size effects, and changes in standard deviation,
38. appropriately interpret the results of hypothesis tests,
39. appropriately relate results of hypothesis test to the research question,
40. calculate and interpret directional and non-directional t-tests on one and two sample means,
41. calculate and interpret One-way and Two-way ANOVA,
42. discuss main effects and interaction effects of Two-way ANOVA,
43. perform and interpret Pearson's Product Moment Correlation,
44. perform and interpret chi square tests of independence,
45. perform and interpret chi square tests of goodness of fit,
46. discuss post hoc, a priori, and non-parametric alternatives to t-tests, ANOVAs, and Pearson's Correlation,
47. write a statistical results section for an APA format research paper,
48. demonstrate familiarity with statistical analysis using a software program such as Excel, SPSS, SAS, Minitab, etc,
49. interpret data displayed in tables and graphically,
50. apply concepts of sample space and probability,
51. calculate measures of central tendency and variation for a given data set,
52. identify the standard methods of obtaining data and identify advantages and disadvantages of each,
53. calculate the mean and variance of a discrete distribution,
54. calculate probabilities using normal and t-distributions,
55. distinguish the difference between sample and population distributions and analyze the role played by the Central Limit Theorem,
56. construct and interpret confidence intervals,
57. determine and interpret levels of statistical significance including p-values,
58. interpret the output of a technology-based statistical analysis,
59. identify the basic concept of hypothesis testing including Type I and II errors,
60. formulate hypothesis tests involving samples from one and two populations,
61. select the appropriate technique for testing a hypothesis and interpret the result,
62. use regression lines and ANOVA for estimation and inference, and interpret the associated statistics, and

63. use appropriate statistical techniques to analyze and interpret applications based on data from at least four of the following disciplines: business, economics, social science, psychology, political science, administration of justice, life science, physical science, health science, information technology, and education.
64. perform a statistical experiment,
65. present data in a variety of ways,
66. do descriptive analysis on single and bivariate data,
67. apply the rules of probability,
68. perform hypothesis tests,
69. calculate confidence intervals,
70. test inferences involving one and two populations,
71. perform chi-square tests and analysis of variance,
72. perform linear regression analysis, and
73. perform selected nonparametric statistical tests.
74. Distinguish among different scales of measurement and their implications;
75. Interpret data displayed in tables and graphically;
76. Apply concepts of sample space and probability;
77. Calculate measures of central tendency and variation for a given data set;
78. Identify the standard methods of obtaining data and identify advantages and disadvantages of each;
79. Calculate the mean and variance of a discrete distribution;
80. Calculate probabilities using normal and student's t-distributions;
81. Distinguish the difference between sample and population distributions and analyze the role played by the Central Limit Theorem;
82. Construct and interpret confidence intervals;
83. Determine and interpret levels of statistical significance including p-values;
84. Interpret the output of a technology-based statistical analysis;
85. Identify the basic concept of hypothesis testing including Type I and II errors;
86. Formulate hypothesis tests involving samples from one and two populations;
87. Select the appropriate technique for testing a hypothesis and interpret the result;
88. Use linear regression and ANOVA analysis for estimation and inference, and interpret the associated statistics; and
89. Use appropriate statistical techniques to analyze and interpret applications based on data from disciplines including business, social sciences, psychology, life science, health
90. science, and education.

Hours and Units Calculations:
48 hours lecture. 96 Outside of class hours. 48 hours Lab (192 Total Student Learning Hours) 4 Units

Catalog Description: This course surveys various psychological research methods with an emphasis on research design, experimental procedures, descriptive methods, instrumentation, and the collection, analysis, interpretation, and reporting of research data. Research design and methodology will be examined through a review of research in a variety of the subdisciplines of psychology. In laboratory sessions students will conduct experimental and non-experimental research in a variety of areas of psychology. Actual data collected from research conducted during laboratory sessions will be analyzed with statistical software.

Type of Class/Course: Degree Credit

Text such as:

Shaugnessy, John J., Eugene B. Zechmeister, and Jeanne S. Zechmeister. *Research Methods in Psychology,* 10th ed. New York: McGraw-Hill, 2015.

Price, P.C., Jhangiani, R.S., Chiang, I-C.A., Leighton, D.C., & Cuttler, C. *Research Methods in Psychology,* 3rd ed. PressBooks, 2017. Online with PDF option:
https://opentext.wsu.edu/carriecuttler/

Dudley, M. *Research Methods in Psychology,* 2019. Online:
https://www.oercommons.org/authoring/51456-research-methods-in-psychology/1/view

Required Text: *Publication Manual of the American Psychological Association.* 7th ed. Washington, DC: APA, 2010.

Additional Instructional Materials: None.

Course Objectives:

By the end of the course, a successful student will be able to:

1. Explain the basic principles of the scientific method.
2. Critically evaluate research reports.
3. Synthesize a body of research findings.
4. Develop testable hypotheses.
5. Demonstrate knowledge of general research designs, experimental and non-experimental methods, and standard research practices.
6. Select appropriate research designs to test hypotheses.
7. Explain the ethical treatment of human and animal participants in research and the institutional requirements for conducting research.
8. Assess the generalizability of study results.
9. Demonstrate proficiency in APA Style

Laboratory objectives:
1. Conduct scientific research in psychology.
2. Conduct analyses of the data collected in this research using statistical software.
3. Interpret the results of these analyses.
4. Communicate these research findings using APA style.

Course Scope and Content (Lecture):

Unit    I    Introduction to social research

        A. Foundations and history of social science research
           1. scientific and nonscientific approaches to knowledge
        B. Steps in the research process
           1. scientific method and its goals
        C. Purposes of research
           1. Exploration
           2. Description
           3. Explanation
        D. Literature review
           1. Evaluating peer reviewed literature

Unit   II      Theory and research methodology

     A.   Theories, research questions, hypotheses
     B.   Theoretical and operational definitions
     C.   Measurements (choosing and methodology)
     D.   dependent and independent variables
     E.   validity and reliability
     F.   causal and correlational relationships
     G.   samples and sampling methods

Unit   III     Ethics in social research

     A.   Professional guidelines
     B.   Power relations
     C.   Ethical issues involving research participants
         1.   APA ethical standards
         2.   risk/benefit ratio of research
         3.   use of deception in research
         4.   human and animal subject use
     D.   Ethics and the scientific community
     E.   Ethics and the sponsors of research
     F.   Institutional Research Review Board
     G.   Politics of research

Unit V         Experimental methods

     A.   Independent group designs
     B.   Repeated measures designs
     C.   Reasons to use and limitations of experimental methods
     D.   Counterbalancing and practice effects
     E.   Main effects and interaction effects using both table and graph methods

Unit VI        Other research designs

     A.   Single-case research design
     B.   Quasi-experimental designs
         1. Characteristics to true experiments and quasi-experiments

Unit VII       Conducting quantitative research

     A.   Hypothesis formation and research variables
     B.   Defining measurement
     C.   Operationalization
     D.   Reliability and validity
     E.   Analysis of quantitative data
         a.   Selection of appropriate statistical test (chi-square, correlation, $t$-test, ANOVA)
     F.

Unit VIII      Conducting survey research

     A.   Observational techniques and rationale

B.  Reactivity, demand characteristics, observer bias, expectancy effects, and other biases
C.  Sampling
E.  Types of surveys
F.  Questionnaire construction
G.  Survey interviewing
F.  Interpretation and limits of correlational data
G.  Levels of measurement

Unit   IX      Measures of behavior – obtrusive and unobtrusive

A.  Overview of qualitative methods
B.  Participant observation/ethnographic methods
C.  Focus groups
D.  Case studies
E.  Content analysis
F.  Physical trace methods
G.  Archival research methods

Unit   X       Writing a research report

A.  APA Style
B. Organization
C. Using existing research
D. Using your own data
E. Citing sources

Learning Activities Required Outside of Class:

The students in this class will spend a minimum of 6 hours per week outside of the regular class time doing the following:
1.      Completing required reading
2.      Performing approved data collection and analysis
3.      Writing a research paper based on data collection and analysis
4.      Reading and summarizing empirical research articles

Suggested Methods of Instruction:
1.      Lecture
2.      Group discussion
3.      Instructor demonstrated problem solving
4.      Instructor led problem solving
5.      Individual problem solving with instructor guidance
6.      Group problem solving with peer guidance
7.      Individual problem solving
8.      Individual statistical culminating project paper
9.      Critical analysis of published research

Methods of Evaluation Options:
1.      Exams, tests, or quizzes homework problems
        a.      peer review/observation
        b.      instructor review/observation
        c.      Research project paper

d.      Writing assignments

Laboratory Category: Extensive Laboratory
Pre delivery criteria: All of the following criteria are met by this lab.
1. Curriculum development for each lab.
2. Published schedule of individual laboratory activities.
3. Published laboratory activity objectives.
4. Published methods of evaluation.
5. Supervision of equipment maintenance, laboratory setup, and acquisition of lab materials and supplies.

During laboratory activity of the laboratory: All of the following criteria are met by this lab.
1. Instructor is physically present in lab when students are performing lab activities.
2. Instructor is responsible for active facilitation of laboratory learning.
3. Instructor is responsible for active delivery of curriculum.
4. Instructor is required for safety and mentoring of lab activities.
5. Instructor is responsible for presentation of significant evaluation.

Post laboratory activity of the laboratory: All of the following criteria are met by this lab.
1. Instructor is responsible for personal evaluation of significant student outcomes (lab exercises, exams, practicals, notebooks, portfolios, etc.) that become a component of the student grade that cover the majority of lab exercises performed during the course.
2. Instructor is responsible for supervision of laboratory clean up of equipment and materials.

Supplemental Data:

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| TOP Code: | 200100 Psychology, General |
| SAM Priority Code: | E: Non-Occupational |
| Funding Agency: | Y: Not Applicable |
| Program Status: | 1: Program Applicable |
| Noncredit Category: | Y: Not Applicable |
| Special Class Status: | N: Course is not a special class |
| Basic Skills Status: | Not Applicable |
| Prior to College Level: | Y: No Applicable |
| Cooperative Work Experience: | N: Course is not a part of a cooperative education program |

| Eligible for Credit by Exam: | Yes |
|---|---|
| Eligible for Pass/No Pass: | No |
| Discipline | Psychology or Sociology |