# **PSY R103: BEGINNING STATISTICS FOR BEHAVIORAL** SCIENCE

# Originator

ptrujillo

# College

Oxnard College

Discipline (CB01A) PSY - Psychology

Course Number (CB01B) R103

**Course Title (CB02)** Beginning Statistics for Behavioral Science

Banner/Short Title Beg Stats for Behavioral Sci

Credit Type Credit

Start Term Fall 2023

#### **Catalog Course Description**

This course is designed for students majoring in psychology, sociology and anthropology. The emphasis is on the use of statistics in behavioral science research. Topics discussed include procedures in hypothesis testing, descriptive, inferential and correlational statistics.

Taxonomy of Programs (TOP) Code (CB03)

1701.00 - Mathematics, General

#### **Course Credit Status (CB04)**

D (Credit - Degree Applicable)

Course Transfer Status (CB05) (select one only)

A (Transferable to both UC and CSU)

#### Course Basic Skills Status (CB08)

N - The Course is Not a Basic Skills Course

SAM Priority Code (CB09)

E - Non-Occupational

#### Course Cooperative Work Experience Education Status (CB10)

N - Is Not Part of a Cooperative Work Experience Education Program

#### **Course Classification Status (CB11)**

Y - Credit Course

Educational Assistance Class Instruction (Approved Special Class) (CB13) N - The Course is Not an Approved Special Class

#### Course Prior to Transfer Level (CB21)

Y - Not Applicable

#### **Course Noncredit Category (CB22)**

Y - Credit Course

**Funding Agency Category (CB23)** Y - Not Applicable (Funding Not Used)

# Course Program Status (CB24)

1 - Program Applicable

# **General Education Status (CB25)**

B - Satisfies Math/Quantitative Reasoning req (CSUGE-B B4, IGETC 2, or 4-yr)

# Support Course Status (CB26)

N - Course is not a support course

#### **Field trips**

Will not be required

# Grading method

(L) Letter Graded

Does this course require an instructional materials fee? No

#### **Repeatable for Credit**

No

Is this course part of a family? No

# **Units and Hours**

Carnegie Unit Override No

# In-Class

Lecture Minimum Contact/In-Class Lecture Hours 52.5 Maximum Contact/In-Class Lecture Hours 52.5

#### Activity

Laboratory Minimum Contact/In-Class Laboratory Hours 17.5 Maximum Contact/In-Class Laboratory Hours 17.5

# **Total in-Class**

Total in-Class Total Minimum Contact/In-Class Hours 70 Total Maximum Contact/In-Class Hours 70

# **Outside-of-Class**

Internship/Cooperative Work Experience

Paid

Unpaid

# **Total Outside-of-Class**

Total Outside-of-Class Minimum Outside-of-Class Hours 105 Maximum Outside-of-Class Hours 105

# **Total Student Learning**

Total Student Learning Total Minimum Student Learning Hours 175 Total Maximum Student Learning Hours 175

Minimum Units (CB07)

3 Maximum Units (CB06)

3

Prerequisites

Course taught at the level of intermediate algebra or placement as determined by the college's multiple measures assessment process.

#### **Entrance Skills**

Entrance Skills

Algebraic fluency with expressions and equations. Understanding functions and graphs.

#### **Requisite Justification**

**Requisite Type** Prerequisite

#### Requisite

Course taught at the level of intermediate algebra or placement as determined by the college's multiple measures assessment process.

#### **Requisite Description**

Course not in a sequence

# Level of Scrutiny/Justification

Content review

Student Learning Outc	omes (CSLOs)
-----------------------	--------------

	Upon satisfactory completion of the course, students will be able to:
1	Analyze data given by using appropriate statistical technique(s).
2	Write Null and experimental hypotheses and set up appropriate level of significance as required by a statistical test.

Use appropriate statistical programs to analyze data and draw conclusion from data set
 Represent data set graphically, when needed by using statistical programs.

#### **Course Objectives**

	Upon satisfactory completion of the course, students will be able to:
1	Distinguish between the concepts of Population and Sample
2	Identify major sampling techniques
3	Identify the basic methods of data collection and their appropriateness; identify advantages and disadvantages of each
4	Interpret data displayed graphically and in tables
5	Explain the shape of a data set and scales of measurement and their implications; distributions of data sets [Normal and Binomial]
6	Calculate measures of central tendency (as appropriate to the nature of a sample) and variation for a data set; location of various central tendency in skewed and normal distribution
7	Apply concepts of sample space and probability
8	Calculate mean, variance and standard deviation of a sample and population [parameter and statistic]
9	Explain Central limit Theorem and compute Z-scores and use appropriate tables to interpret outcomes
10	Construct and interpret confidence intervals, and determine and interpret levels of statistical significance including p-values
11	Formulate hypothesis tests involving samples from one and two populations
12	Calculate probabilities using normal and t-distributions
13	Calculate difference of two sample means and its significance using t-distribution and Z-testing
14	Select the appropriate technique for testing a hypothesis and interpret the result
15	Apply the techniques of hypothesis testing and determine Type I and Type II errors including one-tail test and two-tail test and interpret confidence intervals (p-values)
16	Calculate Pearson-r (product–moment correlation coefficient between two variables) and Spearman-Rho [for rank order data], including regression analysis
17	Use linear regression and ANOVA analysis for estimation and inference, and interpret the associated statistics
18	State the concepts involving Analysis of Variance [ANOVA]
19	Apply the computational steps for obtaining value of F and obtain level of significance for F
20	Explain inferential testing between at least three (3) groups with one independent variable and at least one dependent variable
21	Compute Chi-square statistic and use Tests for Goodness of fit and independence
22	Use statistical programs to analyze assigned data set, generate appropriate graph(s) and table(s) which will facilitate the process of interpretation. Data used for statistical analysis will include all social sciences, such as business, social sciences, psychology, life science, health science, and education

# **Course Content**

#### Lecture/Course Content

- 1. Concept of Population and Parameter; characteristic of Population.
- 2. Concept of Samples and probability. Types of Samples: (a) Random (b) Stratified.
- 3. Graphical representation of data: (a) Scattered plot (b) Frequency polygon (c) Histogram and their interpretation.
- 4. Scales of measurement and types of data: (a) Nominal (b) Ordinal (c) Ratio; Discrete and Continuous variables.
- 5. Shapes and nature of distributions of data sets.
- 6. Measures of Central tendency (expected values) and location of various central tendency in Normal and Skewed distributions, including relative position of the central tendency in various distributions.
- 7. Calculation of Mean, Variance and Standard deviation of a sample and Population [Normal and Binomial]. Distinction between Parameter and Statistic.
- 8. Central Limit Theorem; computation of Z-scores and application in Social sciences.
- 9. Difference between two sample means and the significance of the difference using t-distribution and Z-testing [using single sample and population means].
- 10. Hypothesis testing [Null and Experimental]; Type I and Type II errors; One-tail and Two- tail testing for significance; Degrees of freedom as pertinent to Hypothesis testing; estimation and confidence intervals.

- 11. Concept of Correlation; Computation of Pearson -r; Condition essential for Pearson -r and interpretation of Pearson -r; linear regression. Computation and interpretation for Spearman-Rho.
- 12. Concepts involving Analysis of Variance (ANOVA). Computational steps for obtaining value of "F-ratio". And obtain level of significance for F; Concept of degrees of freedom.
- 13. Inferential testing between at least three (3) groups with one independent variable and at least one dependent variable.
- 14. Basic concept of non-parametric statistic; Chi-square statistic and use of Goodness of fit and independence.
- 15. Use appropriate statistical programs to analyze data in computer laboratory under the guidance of the instructor. Applications using data from disciplines including business, social sciences, psychology, life science, health science, and education.

#### Laboratory or Activity Content

1. Use appropriate statistical programs to analyze data in computer laboratory under the guidance of the instructor. Applications using data from disciplines including business, social sciences, psychology, life science, health science, and education.

#### **Methods of Evaluation**

Which of these methods will students use to demonstrate proficiency in the subject matter of this course? (Check all that apply): Problem solving exercises

Methods of Evaluation may include, but are not limited to, the following typical classroom assessment techniques/required assignments (check as many as are deemed appropriate):

Computational homework Journals Laboratory reports Objective exams Problem-solving exams Quizzes Research papers Essays Problem-Solving Assignments

# Instructional Methodology

#### Specify the methods of instruction that may be employed in this course

Class activities Distance Education Instructor-guided interpretation and analysis Instructor-guided use of technology Internet research Lecture

#### Describe specific examples of the methods the instructor will use:

1. The instructor will explain the American Psychological Association (APA) formatting and citing procedures for writing a literature review for class.

2. The instructor will create and administer quizzes inquiring the explanation of measures of central tendency: mean, median and mode.

3. The instructor will present objective questions regarding the definitions of different scales of measurement and types of data/ scales such as: nominal, ordinal, ratio/interval and disadvantages of ANOVA and Chi Square

#### **Representative Course Assignments**

#### Writing Assignments

- 1. Psychology research paper explaining sample and population concepts using American Psychological Association procedures.
- 2. Assignment describing the appropriate statistics for a particular research such as Spearman Rho using American Psychological Association Procedures
- 3. Assignment describing the appropriate statistics for a particular experiment such as MANOVA using American Psychological Association Procedures
- 4. Presentation describing the pros and cons of the various statistical models such as Chi square and Pearson Product Moment Correlation using American Psychological Association procedures.

#### **Critical Thinking Assignments**

- 1. A research paper/literature review requiring explanation of measurements of probability using American Psychological Association citation procedures.
- 2. Class presentation of methods of measurement used in a particular research study such as Zimbardo's Prison Study.

#### **Reading Assignments**

- 1. Chapters from the designated textbook, for example, on defining the standard error of the mean
- 2. Other assigned readings, e.g. current research from Psychology periodicals such as <u>Journal of Orthopsychiatry</u> on psychological effects of quarantine in a Pandemic
- 3. Reading/reviewing assignments which use statistics of frequency, correlation and inference

#### Problem-Solving and Other Assignments (if applicable)

1. Data analysis applications in statistical software.

#### **Outside Assignments**

#### **Representative Outside Assignments**

- 1. Locating research studies using the various statistical computations studied in class and analysis of same such a Pearson Product Moment Correlations or ANOVA.
- 2. Weekly preparation for regular assessments in class such as read chapter on Chi Square and appropriate studies where this would be employed

# Articulation

# C-ID Descriptor Number

MATH 110

#### Status

Approved

#### Comparable Courses within the VCCCD

PSY V04 - Introductory Statistics for the Social and Behavioral Sciences

#### **Equivalent Courses at other CCCs**

College	Course ID	Course Title	Units
Pierce College	STAT 101	Statistics for the Social Sciences	
College of the Canyons	PSYCH 104	Statistics for the Behavioral Sciences	
Santa Barbara City College	PSY 150	Statistics for the Behavioral Sciences	
LA Valley College	STAT 101	Statistics for the Social Sciences	

# **District General Education**

# **A. Natural Sciences**

- **B. Social and Behavioral Sciences**
- **C. Humanities**

# D. Language and Rationality

D2. Communication/Analytical Thinking Approved

# E. Health and Physical Education/Kinesiology

# F. Ethnic Studies/Gender Studies

Course is CSU transferable Yes

**CSU Baccalaureate List effective term:** Fall 1995

# **CSU GE-Breadth**

# Area A: English Language Communication and Critical Thinking

# Area B: Scientific Inquiry and Quantitative Reasoning

**B4 Mathematical/Quantitative Reasoning** Approved

Area C: Arts and Humanities

**Area D: Social Sciences** 

D Social Sciences Approved

# Area E: Lifelong Learning and Self-Development

Area F: Ethnic Studies

# CSU Graduation Requirement in U.S. History, Constitution and American Ideals:

# UC TCA

UC TCA Approved

# IGETC

Area 1: English Communication

# Area 2A: Mathematical Concepts & Quantitative Reasoning

Area 2A: Mathematical Concepts & Quantitative Reasoning Approved

# Area 3: Arts and Humanities

Area 4: Social and Behavioral Sciences

**Area 5: Physical and Biological Sciences** 

Area 6: Languages Other than English (LOTE)

Textbooks and Lab Manuals Resource Type Textbook

#### Description

Gravetter, F. J. & Wallnau, L. B. and Forzano, L. B. (2017). *Statistics for the Behavioral Sciences*. (9th or Latest edition) Cengage Publishing.

# **Distance Education Addendum**

# Definitions

**Distance Education Modalities** 

Hybrid (1%–50% online) Hybrid (51%–99% online) 100% online

# **Faculty Certifications**

Faculty assigned to teach Hybrid or Fully Online sections of this course will receive training in how to satisfy the Federal and state regulations governing regular effective/substantive contact for distance education. The training will include common elements in the district-supported learning management system (LMS), online teaching methods, regular effective/substantive contact, and best practices.

Yes

Faculty assigned to teach Hybrid or Fully Online sections of this course will meet with the EAC Alternate Media Specialist to ensure that the course content meets the required Federal and state accessibility standards for access by students with disabilities. Common areas for discussion include accessibility of PDF files, images, captioning of videos, Power Point presentations, math and scientific notation, and ensuring the use of style mark-up in Word documents.

Yes

# **Regular Effective/Substantive Contact**

#### Hybrid (1%-50% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	<ol> <li>Students will post on a discussion board regarding appropriate statistical procedures to use for a particular research study</li> <li>And respond to another student in the discussion adding substantive commentary to increase learning</li> <li>Students will watch online video of a particular study that was conducted in the past and and a peer review of that study and respond in a synchronous dialogue with their classmates</li> </ol>
Hybrid (51%–99% online) Modality:	
Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	The student will repond to a discussion board on the appropriate measurement when conducting research on student choice of major and post substantively to a classmate
Face to Face (by student request; cannot be required)	The student will view a video on the Zimbardo prison study and critique the study, than responding substantively to a classmate.
Video Conferencing	The student will attend all zoom sessions in which the instructor may lecture on measures of probability

100% online Modality:	
Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Regular use of asynchronous discussion boards encourages various types of interaction and critical thinking skills among all course participants. Questions and topics posed will allow students to discuss, compare and contrast, identify, and analyze elements of the course outcomes. Students will be required to respond to one another with substantive comments with the intent of creating a dialog. Other discussion boards may be used for Q&A and general class discussion by students and instructor to facilitate student success and strengthen student learning outcomes.
E-mail	E-mail, class announcements and various learning management system tools such as "Message Students Who" and "Assignment Comments", will be used to regularly communicate with all students on matters such as clarification of class content, reminders of upcoming assignments and/or course responsibilities, to provide prompt feedback to students on coursework to facilitate student learning outcomes, or to increase the role of an individual educator in the academic lives of a student. Students will be given multiple ways to email instructor through both the learning management system inbox and faculty provided email accounts.
Face to Face (by student request; cannot be required)	The instructor will hold weekly, scheduled office hours either in person or via-web conferencing, for students to be able to meet and discuss course materials or individual progress. Students can request additional in-person or web conferencing meetings with faculty member as needed. Faculty may encourage online students to form "study groups" in person or online.
Other DE (e.g., recorded lectures)	Faculty will use a variety of ADA compliant tools and media integrated within the learning management system to help students reach SLO competency. Tools may include: • Recorded Lectures, Narrated Slides, Screencasts • Instructor created content • OC Online Library Resources • Canvas Peer Review Tool • Canvas Student Groups (Assignments, Discussions) • 3rd Party (Publisher) Tools (MyOpenMath) • Websites and Blogs • Multimedia (YouTube, Films on Demand, 3CMedia, Khan Academy, etc.)
Synchronous Dialog (e.g., online chat)	Instructor will provide a set time each week where they will be available for synchronous chat and be available in the discussion board and can answer questions in live time.
Video Conferencing	Video tools such as ConferZoom can be used to provide live synchronous or asynchronous sessions with students. ADA compliance will be upheld with Closed Captioning during the session or of the recorded session. Recordings of all live sessions will be made available within the LMS. Video Conferences will be used to facilitate SLOs and student-to-student group meetings will also be encouraged.
Telephone	Students can request for instructor to call or vice versa in order to answer one-on-one questions about course material or student progress.
Examinations	
<b>Hybrid (1%–50% online) Modality</b> On campus Online	
<b>Hybrid (51%–99% online) Modality</b> On campus Online	

**Primary Minimum Qualification** PSYCHOLOGY

# **Review and Approval Dates**

Department Chair 05/10/2023

**Dean** 05/10/2023

Technical Review 05/10/2023

Curriculum Committee 05/10/2023

Curriculum Committee MM/DD/YYYY

Board MM/DD/YYYY

CCCCO MM/DD/YYYY

Control Number CCC000562592

**DOE/accreditation approval date** MM/DD/YYYY