

MATH R105: INTRODUCTORY STATISTICS

Originator

ptrujillo

College

Oxnard College

Discipline (CB01A)

MATH - Mathematics

Course Number (CB01B)

R105

Course Title (CB02)

Introductory Statistics

Banner/Short Title

Introductory Statistics

Credit Type

Credit

Start Term

Fall 2023

Catalog Course Description

This course covers descriptive and inferential statistics for students of social sciences, science, education, business, and engineering. Included are discussions of graphing and interpreting graphs, measures of the center and variation, probability, normal curves, binomial tests, hypothesis testing, correlation and regression, chi-square tests, t-tests, and analysis of variance. This course uses technology to analyze data sets. Credit will not be awarded for both the honors and regular versions of a course. Credit will be awarded only for the first course completed with a grade of "C" or better or "P".

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

70

Maximum Contact/In-Class Lecture Hours

70

Activity

Laboratory

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**

140

Maximum Outside-of-Class Hours

140

Total Student Learning**Total Student Learning****Total Minimum Student Learning Hours**

210

Total Maximum Student Learning Hours

140

Minimum Units (CB07)

4

Maximum Units (CB06)

4

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 in a sequence

Level of Scrutiny/Justification

Content review

Student Learning Outcomes (CSLOs)

Upon satisfactory completion of the course, students will be able to:

- | | |
|---|---|
| 1 | Students will calculate binomial probabilities. |
| 2 | Students will conduct a hypothesis test. |

Course Objectives

Upon satisfactory completion of the course, students will be able to:

- | | |
|----|---|
| 1 | Distinguish among different scales of measurement and their implications |
| 2 | Interpret data displayed in table(s) and graphically |
| 3 | Apply concepts of sample space, probability, and counting techniques |
| 4 | Calculate measure of central tendency and variation for a given data set |
| 5 | Identify the standard measures of obtaining data and identify advantages and disadvantages of each (i.e. use appropriate language) |
| 6 | Calculate the mean and variance of discrete distribution(s) |
| 7 | Calculate probability using normal and t-distributions |
| 8 | Distinguishing the difference between sample and population distributions and analyze the role played by the Central Limit Theorem |
| 9 | Construct and interpret confidence intervals |
| 10 | Determine and interpret levels of statistical significance (e.g. p-values) |
| 11 | Interpret the out of a technology-based statistical analysis |
| 12 | Identify the basic concepts of hypothesis tests involving Type I and II errors |
| 13 | Determine the appropriate hypothesis test involving samples from one and two populations, conduct the appropriate test, and interpret the results |
| 14 | Using linear regression and ANOVA analysis for estimation and inference and interpret the associated statistics |
| 15 | Use appropriate statistical techniques to analyze and interpret applications based on data from various disciplines including, but not limited to business, social science, psychology, life science, health science, and education |

Course Content**Lecture/Course Content**

1. Summarizing data graphically and numerically
 - a. Graphs for numerical data
 - b. Graphs for categorical data
 - c. Choosing an appropriate type of graph
2. Descriptive statistics
 - a. Choosing and reporting an appropriate measure of center
 - b. Choosing and reporting an appropriate measure of variation
 - c. Describing basic shapes of data
 - d. Level/scales of measure
3. Sample space and probability
 - a. Applying the basics principles of probability
 - b. Counting principals
4. Random variables and expected value
5. Sampling and sampling distribution
 - a. Differentiating between effective and non-effective sampling methods
 - b. Recognizing the difference between observational studies and experiments
 - c. Communicating the basic elements of experimental design
6. Discrete distribution
 - a. Binomial probability distribution
7. Continuous distribution
 - a. Normal probability distribution
 - b. Approximate normal to the binomial probability distribution
8. The Central Limit Theorem
9. Estimation and confidence intervals
 - a. Finding confidence intervals for sample data (for both proportions and means)
 - b. Using confidence intervals for inference
10. Hypothesis testing and inference
 - a. Performing hypothesis tests
 - b. Recognize and distinguish Type I and II errors
 - c. Using t-test

- i. For one sample
 - ii. For two samples
 - iii. For matched paired sample
 - iv. Confidence intervals
- d. Chi-Squared test
 - i. Contingency (two-way) tables
 - ii. Goodness-of-Fit
- 11. Correlation and linear regression and analysis of variance (ANOVA)
 - a. ANOVA
 - i. For comparing means of more than two groups
 - ii. Post hoc tests after ANOVA
 - b. Correlation and linear regression
 - i. Create a scatter plot
 - ii. Finding the regression line
 - iii. Using regression line to interpolate (where appropriate)
- 12. Applications using data
 - a. Problems addressing various disciplines (e.g. business, social sciences, psychology, life sciences, health sciences, and education)
- 13. Statistical analysis using technology
 - a. Inputting and analyzing data using graphing calculators
 - b. Calculating probabilities and completing hypothesis tests using graphing calculators

Laboratory or Activity Content

None

Methods of Evaluation

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

Written expression
 Problem solving exercises
 Skills demonstrations

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
 Group projects
 Individual projects
 Problem-solving exams
 Quizzes
 Essays
 Problem-Solving Assignments

Instructional Methodology

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

Audio-visual presentations
 Class activities
 Class discussions
 Collaborative group work
 Computer-aided presentations
 Distance Education
 Instructor-guided interpretation and analysis
 Instructor-guided use of technology
 Lecture

Describe specific examples of the methods the instructor will use:

The instructor will deliver content on statistical concepts and practice, and supervise guided activities where students can master skills and ask questions.

Representative Course Assignments

Writing Assignments

1. Students do research projects and write up the results in a standard research format.
2. Students typically turn in two written assignments per week on which they are graded. The assignments include making graphs, choosing numbers to describe data, and using inference with chi-square tests, ANOVA, and t-tests.

Critical Thinking Assignments

1. Students should be able to analyze a set of numerical or categorical data and make inferences about the relevant population.
2. Students should be able to create and run hypothesis tests, based on context and provided data.

Reading Assignments

1. Students read textbook selections that present statistical terminology and theorems as well as techniques in graphing, describing data numerically, hypothesis testing, and how to apply an appropriate statistical test, given sample data.

Skills Demonstrations

1. Students should be able to correctly calculate probabilities in different statistical contexts (binomial, normal, or sampling distributions).

Problem-Solving and Other Assignments (if applicable)

1. Students will be required to learn how to input and analyze data on a graphing calculator and statistical software.

Outside Assignments

Representative Outside Assignments

1. Students do research projects and write up the results in a standard research format.
2. Students typically turn in two written assignments per week on which they are graded. The assignments include making graphs, choosing numbers to describe data, and using inference with chi-square tests, ANOVA, and t-tests.

Articulation

C-ID Descriptor Number

MATH 110

Status

Approved

Comparable Courses within the VCCCD

MATH M15H - Honors: Introductory Statistics
MATH R105H - Honors: Introductory Statistics
MATH V44 - Elementary Statistics
MATH M15 - Introductory Statistics

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****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****Area E: Lifelong Learning and Self-Development****Area F: Ethnic Studies****CSU Graduation Requirement in U.S. History, Constitution and American Ideals:****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

DescriptionSullivan, Michael (2021). *Informed Decisions Using Data, 6th Edition*. New York, Pearson.**Resource Type**

Other Resource Type

Description

TI graphing calculators (TI-83 or TI-84).

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)	Students will post a discussion board topic on data collection and analysis, and they will respond to other classmates with the intent of dialogue.
Other DE (e.g., recorded lectures)	Students will watch recorded, video lectures.
E-mail	Responses to specific email questions.
Video Conferencing	Video tools such as ConferZoom may 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. Student-to-student group meetings will also be encouraged.

Hybrid (51%–99% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Other DE (e.g., recorded lectures)	Students will watch recorded, video lectures.
Asynchronous Dialog (e.g., discussion board)	Students will post a discussion board topic on data collection and analysis, and they will respond to other classmates with the intent of dialogue.
E-mail	Responses to specific email questions.
Video Conferencing	Video tools such as ConferZoom may 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. Student-to-student group meetings will also be encouraged.

100% online Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Other DE (e.g., recorded lectures)	Students will watch recorded, video lectures.
Asynchronous Dialog (e.g., discussion board)	Students will post a discussion board topic on data collection and analysis, and they will respond to other classmates with the intent of dialogue.

E-mail
Video Conferencing

Responses to specific email questions.

Video tools such as ConferZoom may 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. Student-to-student group meetings will also be encouraged.

Examinations

Hybrid (1%–50% online) Modality

On campus
Online

Hybrid (51%–99% online) Modality

On campus
Online

Primary Minimum Qualification

MATHEMATICS

Review and Approval Dates

Department Chair

05/09/2023

Dean

05/09/2023

Technical Review

05/10/2023

Curriculum Committee

05/10/2023

DTRW-I

MM/DD/YYYY

Curriculum Committee

MM/DD/YYYY

Board

MM/DD/YYYY

CCCCO

MM/DD/YYYY

Control Number

CCC000330359

DOE/accreditation approval date

MM/DD/YYYY