# **Introductory Statistics [CMAT 1303] Syllabus**

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**Course Number and Title:** Introductory Statistics [CMAT 1303]
(From the [statewide common course information](https://regents.la.gov/wp-content/uploads/2021/11/CmnCrsCatalog-2021-22-FINAL-APPROVED.pdf).)

**Course Brief Description:** Descriptive statistics; probability; discrete and continuous (including the binomial, normal and T) distributions; sampling distributions; interval estimation; hypothesis testing; linear regression and correlation. (From the [statewide common course information](https://regents.la.gov/wp-content/uploads/2021/11/CmnCrsCatalog-2021-22-FINAL-APPROVED.pdf).)

**Credit Hours:** 3

**Prerequisite Knowledge:** To be successful in this course, students should have taken College Algebra [CMAT 1213] as a prerequisite.

**Course Goals:**

At the end of this course, students will be able to:

1. Explain and apply principles of study design and data collection.
2. Give examples of biased and random sampling techniques.
3. Construct and interpret graphical summaries of data.
4. Identify characteristics of graphs that are poor practice and may mislead an audience.
5. Compute and interpret numerical summary statistics, including central tendency and variability.
6. Construct and draw inferences from charts, tables, and graphs that summarize data from real-world graphically.
7. Analyze study design to rate the reliability of an inference.
8. Compute probabilities of events using probability and counting rules.
9. Apply the concept of a random variable to generate and interpret probability distribution including binomial, uniform, normal, and chi-square.
10. Use the Central Limit Theorem.
11. Determine point estimates, confidence intervals, and appropriate sample size.
12. Perform hypothesis testing and recommend whether the null should be rejected or not.
13. Graphically and numerically describe the relationship between two quantitative variables, including correlation coefficients, coefficients of determination, and regression formulas.

**Course Materials:**

1. This course uses a free Pressbook resource: Introductory Statistics (<https://louis.pressbooks.pub/introductorystatistics/>)
2. This course is taught with MyOpenMath, a free online assessment platform (<https://www.myopenmath.com/>)

**Instructor Contact Information:** [*Kept as a placeholder for future adopters]*

* Name:
* Email:
* Phone:
* Office:
* Office Hours:
* Communication policy:

**Course Schedule:**

| **Week** | **Topics and Concepts** | **Corresponding Course Materials**  |
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| 1 | Getting started on the course. | Welcome, Learner Support, and Getting Started Modules |
| 2 | Chapter 1: Sampling and Data* 1.1 Definitions of Statistics, Probability, and Key Terms
* 1.2 Data, Sampling, and Variation in Data and Sampling
* 1.3 Frequency, Frequency Tables, and Levels of Measurement
* 1.4 Experimental Design and Ethics
 | Module 1: Sampling and Data* Read Chapter 1 in the Pressbook
* Practice problems in Chapter 1 Practice and Homework
* Complete homework assignments for topics
* View Chapter 1 Review
* Complete Chapter 1 Project
 |
| 3 | Chapter 2: Descriptive Statistics* 2.1 Stem-and-Leaf Graphs (Stemplots), Line Graphs, and Bar Graphs
* 2.2 Histograms, Frequency Polygons, and Time Series Graphs
* 2.3 Measures of the Location of the Data
* 2.4 Box Plots
 | Module 2: Descriptive Statistics* Read Sections 2.1 – 2.4 in the Pressbook
* Practice problems in Chapter 2 Practice and Homework (for Sections 2.1 – 2.4)
* Complete homework assignments for topics
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| 4 | Chapter 2: Descriptive Statistics* 2.5 Measures of the Center of the Data
* 2.6 Skewness and the Mean, Median, and Mode
* 2.7 Measures of the Spread of the Data
 | Module 2: Descriptive Statistics* Read Sections 2.5 – 2.7 in the Pressbook
* Practice problems in Chapter 2 Practice and Homework (for Sections 2.5 – 2.7)
* Complete homework assignments for topics
* View Chapter 2 Review
* Complete Chapter 2 Project
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| 5 | Chapter 3: Probability Topics* 3.1 Terminology
* 3.2 Independent and Mutually Exclusive Events
* 3.3 Two Basic Rules of Probability
* 3.4 Contingency Tables
* 3.5 Tree and Venn Diagrams
 | Module 3: Probability Topics* Read Chapter 3 in the Pressbook
* Practice problems in Chapter 3 Practice and Homework
* Complete homework assignments for topics
* View Chapter 3 Review
* Complete Chapter 3 Project
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| 6 | Chapter 4: Discrete Random Variables* 4.1 Probability Distribution Function (PDF) for a Discrete Random Variable
* 4.2 Measures of General Discrete Random Variables
* 4.3 Binomial Distribution
 | Module 4: Discrete Random Variables* Read Sections 4.1 – 4.3 in the Pressbook
* Practice problems in Chapter 4 Practice and Homework (for Sections 4.1 – 4.3)
* Complete homework assignments for topics
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| 7 | Chapter 4: Discrete Random Variables* 4.4 Geometric Distribution
* 4.5 Hypergeometric Distribution
* 4.6 Poisson Distribution
 | Module 4: Discrete Random Variables* Read Sections 4.4 – 4.6 in the Pressbook
* Practice problems in Chapter 4 Practice and Homework (for Sections 4.4 – 4.6)
* Complete homework assignments for topics
* View Chapter 4 Review
* Complete Chapter 4 Project
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| 8 | Chapter 5: Continuous Random Variables* 5.1 Continuous Probability Functions
* 5.2 The Uniform Distribution
* 5.3 The Exponential Distribution

Midterm Exam | Module 5: Continuous Random Variables* Read Chapter 5 in the Pressbook
* Practice problems in Chapter 5 Practice and Homework
* Complete homework assignments for topics
* View Chapter 5 Review
* Complete Chapter 5 Project

Midterm Assessment Module |
| 9 | Chapter 6: The Normal Distribution and The Central Limit Theorem* 6.1 The Standard Normal Distribution
* 6.2 Using the Normal Distribution
* 6.3 The Central Limit Theorem for Sample Means (Averages)
* 6.4 The Central Limit Theorem for Sums
* 6.5 The Normal Approximation to the Binomial
 | Module 6: The Normal Distribution* Read Sections 6.1 & 6.2 in the Pressbook
* Practice problems in Chapter 6 Practice and Homework (for Sections 6.1 & 6.2)
* Complete homework assignments for topics
* Complete Chapter 6 Project I

Module 7: The Central Limit Theorem* Read Sections 6.3 – 6.5 in the Pressbook
* Practice problems in Chapter 6 Practice and Homework (for Sections 6.3 – 6.5)
* Complete homework assignments for topics
* View Chapter 6 Review
* Complete Chapter 6 Project II
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| 10 | Chapter 7: Confidence Intervals* 7.1 A Single Population Mean using the Normal Distribution
* 7.2 A Single Population Mean using the Student t Distribution
* 7.3 A Population Proportion
 | Module 8: Confidence Intervals* Read Chapter 7 in the Pressbook
* Practice problems in Chapter 7 Practice and Homework
* Complete homework assignments for topics
* View Chapter 7 Review
* Complete Chapter 7 Project
 |
| 11 | Chapter 8: Hypothesis Testing with One Sample* 8.1 Null and Alternative Hypotheses
* 8.2 Outcomes and the Type I and Type II Errors
* 8.3 Distribution Needed for Hypothesis Testing
* 8.4 Rare Events, the Sample, Decision and Conclusion
* 8.5 Additional Information and Full Hypothesis Test Examples
 | Module 9: Hypothesis Testing with One Sample* Read Chapter 8 in the Pressbook
* Practice problems in Chapter 8 Practice and Homework
* Complete homework assignments for topics
* View Chapter 8 Review
* Complete Chapter 8 Project
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| 12 | Chapter 9: Hypothesis Testing with Two Samples* 9.1 Two Population Means with Unknown Standard Deviations
* 9.2 Two Population Means with Known Standard Deviations
* 9.3 Comparing Two Independent Population Proportions
* 9.4 Matched or Paired Samples
 | Module 10: Hypothesis Testing with Two Samples* Read Chapter 9 in the Pressbook
* Practice problems in Chapter 9 Practice and Homework
* Complete homework assignments for topics
* View Chapter 9 Review
* Complete Chapter 9 Project
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| 13 | Chapter 10: Linear Regression and Correlation* 10.1 Linear Equations
* 10.2 Scatter Plots
* 10.3 The Regression Equation
* 10.4 Testing the Significance of the Correlation Coefficient
* 10.5 Prediction
* 10.6 Outliers
 | Module 11: Linear Regression and Correlation* Read Chapter 10 in the Pressbook
* Practice problems in Chapter 10 Practice and Homework
* Complete homework assignments for topics
* View Chapter 10 Review
* Complete Chapter 10 Project
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| 14 | Chapter 11: The Chi-Square Distribution* 11.1 Facts About the Chi-Square Distribution
* 11.2 Goodness-of-Fit Test
* 11.3 Test of Independence
 | Module 12: The Chi-Square Distribution* Read Chapter 11 in the Pressbook
* Practice problems in Chapter 11 Practice and Homework (for Sections 11.1 – 11.3)
* Complete homework assignments for topics
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| 15 | Chapter 11: The Chi-Square Distribution* 11.4 Test for Homogeneity
* 11.5 Comparison of the Chi-Square Tests
* 11.6 Test of a Single Variance

Final Exam | Module 11: The Chi-Square Distribution* Read Chapter 11 in the Pressbook
* Practice problems in Chapter 11 Practice and Homework (for Sections 1141 – 11.6)
* Complete homework assignments for topics
* View Chapter 11 Review
* Complete Chapter 11 Project

Final Exam Module |

**Course Policies:**

**Technology Requirements**

You will need regular computer access, preferably a home computer with broadband Internet access. You should also have an alternative plan to complete online assignments in the event of computer or internet failure. This course is delivered via Moodle and MyOpenMath (integrated in Moodle).

**Computer Skills**

To be successful in this course, you should be comfortable with the following:

* using computer access with broadband internet
* using email for communication, especially sending an email attachment
* using Moodle
* using a calculator
* using a webcam (making sure it is connected and works properly)

**Evaluation of Learning**

* Assessments: The student will be assessed and graded using all the following assessment tools:

20% Homework

20% Discussion Forums

30% Midterm Exam

30% Final Exam

Homework is designed to give you practice on the learning objectives. Don't wait until last minute to start these! They will be given for each topic/section covered and students should work on them to reinforce the material in the course. No homework assignments will be accepted after the last day of the semester and after the Final Exam. No low or missing homework assignment grades will be dropped at the end of the semester.

Discussion Forums are designed for you to illustrate your knowledge of concepts covered, help your classmates learn something they struggle with in the course, and keep active participation between the course, your classmates, and the instructor. Specific directions for what to post in each forum are provided in the actual discussion. No graded discussion forum will be dropped at the end of the semester.

Exams are designed to demonstrate that you learned the material in the course and can apply it. These are the ultimate guide and indication of concepts learned in the course. The Midterm Exam and Final Exam will be given at the midway point and end of the semester, respectively. No low Exams scores will be dropped at the end of the semester. Exams will only be extended or made-up dependent on the student’s reason for missing or needing an extension.

* Activities:
	1. In the Moodle course there are links to the sections of the textbook and videos provided from YouTube. These should be used for learning the material in the course.
	2. In the Pressbook you will find H5P content (interactive activities with feedback). These should be used for self-practice – they are not part of the grade in the course.

**Grading Policy**

* Grading Scale:

|  |  |
| --- | --- |
| 90 – 100 | A |
| 80 – 89 | B |
| 70 – 79 | C |
| 60 – 69 | D |
| 0 – 59 | F |

* Late Policy for Homework: Homework assignments can be completed late with a penalty, using the MyOpenMath LatePass. The following is the LatePass policy for the course:
1. Any homework assignments completed during the LatePass period will have a X%-point deduction. This is better than a zero though!
2. You can use a LatePass on each individual Section Assignment and you can only ask for a LatePass once per assignment.
3. Using a LatePass will extend the due date of the homework assignment until the end of the semester. No homework assignments will be accepted after the last day of the semester and after the Final Exam.
* Late Policy for Other Assessments: No other assessments will be accepted submitted late.

**University Policies and Support:** [*Kept as a placeholder for future adopters]*

* **Code of Conduct**
* **Online Etiquette**
* **Academic Integrity**
* **Diversity Statement**
* **Accessibility and Disability Services**
* **Technology Support**
* **Academic Support Services**