



MISSION STATEMENT

Felician College is an independent co-educational Catholic/Franciscan College founded and sponsored by the Felician Sisters to educate a diverse population of students within the framework of a liberal arts tradition. Its mission is to provide a full complement of learning experiences, reinforced with strong academic and student development programs designed to bring students to their highest potential and prepare them to meet the challenges of the new century with informed minds and understanding hearts. The enduring purpose of Felician College is to promote a love for learning, a desire for God, self knowledge, service to others, and respect for all creation.

DIVISION OF ARTS AND SCIENCES MISSION STATEMENT

The mission of the Division of Arts and Sciences is to implement and manifest the Mission of Felician College in the Programs of the Division; the General Education Program, the Developmental Educational Program, and the Core by providing the highest quality of instruction at both the undergraduate and graduate level, encouraging students to develop to their fullest potential, to gain skills for life-long learning, and to produce graduates well-equipped to contribute to society. The division achieves the stated mission by using processes of continual improvement, based upon assessment of student learning at all levels, as well as the assessment of the administrative processes and mechanisms.

DEPARTMENT OF MATHEMATICAL SCIENCES MISSION STATEMENT

The Department of Mathematical Sciences supports the mission of Felician College by providing the portion of students' educational experiences dealing with quantitative literacy. The Department supports the mission of Felician College to provide a strong academic program by providing rigorous mathematics courses to students in all majors at all levels. The Department supports the mission of the Division of Arts and Sciences by providing a high quality of instruction in mathematics at both the college level and the developmental level. The broad variety of courses offered by the Department of Mathematical Sciences helps bring students to their highest potential by providing theory and practice related to problem solving, logical reasoning, and analytical skills. This will help prepare Felician College students to meet future challenges with informed mathematical minds.

Course Number: Math 122

Course Level: Undergraduate

Course Title: Statistics I

Credits: 3

Prerequisite: Math 002 or equivalent

Corequisite: None

Location & Time: BH 102, WF 11:25 – 12:40

Instructor: Dr. Elizabeth B. Uptegrove, associate professor

Email: uptegrovee@felician.edu

Phone: 201 559-3195

Office: BH room 4 (basement)

Office Hours: Mondays 9:50 – 11:05 and 11:25 – 12:40; Fridays 10 – 11; other times by appointment

COURSE DESCRIPTION

This introductory course covers descriptive statistics and the fundamental concepts of inferential statistics. Topics include populations, sampling, measures of central tendency and variability, probability, binomial and normal distributions, standard scores, confidence intervals, hypothesis testing, analysis of variance, and linear regression and correlation.

COURSE CORE OBJECTIVES

Math students will demonstrate Critical Reasoning in Problem Solving and Effective Communication in oral presentation of solutions, and they will apply Quantitative and Analytical Skills to the subject matter.

COURSE OBJECTIVES

The goal of all mathematics courses is for you to learn to think mathematically. To help you reach that goal, specific goals for this course include the following. Upon completion of this course, you will be able to:

- Understand and explain basic statistical concepts, including observational and experimental data, valid sampling techniques, descriptive and inferential statistics, correlation, and regression.
- Conduct experiments and analyze data.
- Create appropriate graphs of statistical information, including charts, histograms, and scatter plots.
- Draw conclusions from statistical data. In particular, you will be able to recognize valid and invalid statistical arguments.
- Perform basic statistical calculations, including mean, median, mode, variance, standard deviation, percentiles, and z -scores.
- Understand basic concepts of probability, including addition and multiplication rules and conditional probability.
- Calculate mean, standard deviation, and expected value for probability functions.
- Understand the standard normal distribution function, the use of the z -score, and the central limit theorem.
- Calculate and use confidence intervals.

TEXT

Bluman, A. G. (2009). *Elementary Statistics: A Brief Version*, 5th edition. McGraw-Hill: Columbus, OH. This book is available at the Felician College Bookstore for \$127.50 (new). You should also have a calculator that can perform statistics functions; I recommend the TI-83, TI-83+, or TI-84, although other calculators are also acceptable. Check with me about your particular calculator.

COURSE CONTENT

Please Note: This schedule is subject to change at the discretion of the instructor.

Week	Dates	Topics	Reading	Notes
1	1/22	Introduction to descriptive and inferential statistics: types of data, observational and experimental	Chapter 1	

		studies		
2	1/27, 1/29	Valid sampling techniques, displaying data	Chapter 2	
3	2/3, 2/5	Measures of central tendency	Chapter 3	Project part 1 due
4	2/10, 2/12	Measures of variation		
5	2/17, 2/19	Measures of position		College closed 2/15; Test 1
6	2/24, 2/26	Regression analysis and correlation	Chapter 10	
7	3/3, 3/5	Counting techniques	Chapter 4	
	3/10, 3/12	<i>Spring Break</i>		College closed
8	3/17, 3/19	Probability	Chapter 5	Project part 2 due
9	3/24, 3/26	Probability distributions; mean, standard deviation, and expected value	Chapter 6	Midterm (test 2)
10	3/31	The normal distribution	Chapter 7	College closed 4/1 – 4/2
11	4/7, 4/9	The normal distribution		
12	4/14, 4/16	The central limit theorem		
13	4/21, 4/23	Confidence intervals	Chapter 8	Test 3
14	4/28, 4/30	Hypothesis testing	Chapter 9	
15	5/5, 5/7	Review		Project part 3 due
16	5/12, 5/14	Final exam week		Final exam

TEACHING/LEARNING STRATEGIES

- Class lectures, demonstrations, and discussions
- Small group work and discussions
- Study and homework groups
- Individual problem solving
- Math Lab (Rutherford) or Center for Learning (Lodi) for help with homework or studying

GRADING POLICIES

- Homework will be assigned every week, selected from the section problems and the end-of-chapter problems. Some problems will be for your own use, and others will be to hand in, but I will assume that you are able to do all the problems if you do not have questions about them. It is your responsibility to ask for help if you have difficulty with homework and it is your responsibility to arrange to make up any work that you miss if you are absent. Full credit will be given only for homework submitted on time. Partial credit will be given for late homework.
- Classwork and class discussions are an essential component of this class. You will find it very difficult to pass this class if you accrue too many absences.
- There are no extra credit assignments and no makeup tests except in case of extreme emergency. There will be frequent unannounced open-book quizzes.
- You will be required to do a three-part project as part of this course. A description of the project is given at the end of this document, along with a grading rubric.

- Please see me or send me an email if you are having difficulties or if you have questions about the work. Do not wait to ask for help!

GRADING RUBRICS

- Tests, quizzes, and final exam: You will receive full credit for completely correct answers, with work shown. If you show your work, you will be eligible for partial credit.
- Homework: You will receive full credit for homework completed on time. You will receive half credit for homework that is up to one week late. You will receive no credit for homework that is more than one week late. You will receive credit for attempted homework, even if the answer is not correct, if you show work.
- Classwork: Your classwork grade depends on attendance and participation. You receive no classwork credit for unexcused absences. If you have an excused absence, you will receive credit after you have completed all classwork exercises on your own time, within two weeks after the absence. It is *your responsibility* to find out and complete the classwork you missed. If you are in attendance but do not participate in classwork and class discussions, you will receive half credit for the day's class.
- Project: See the last section of this document for details.

Your final grade will be based upon the following:

Homework	10%
Classwork	10%
Tests and quizzes	30%
Final project	20%
Final exam	30%

Your letter grade in this course is determined as follows:

Numerical Grade	Letter
95-100	A
90-94	A-
87-89	B+
83-86	B
80-82	B-
77-79	C+
70-76	C
65-69	D
64 or below	F

COURSE POLICIES

- You should be engaged in mathematical thinking for the entire class period for every class. You should be courteous to your fellow students. Therefore:
 - Please do not carry on side conversations with other students. Inattentiveness and disruptiveness are grounds for dismissal from this class.
 - Please do not use cell phones or any other electronic devices (except calculators) during class; please silence cell phones before class begins. Use of a cell phone is grounds for dismissal from this class.

- Regular *on-time* attendance is expected. Please notify me in advance of any excused absence or lateness.
- Honor Code procedures as outlined in the Felician College Catalog will be followed in this course. You are expected to do your own work unless I state that students may work together. Representing the work of someone else as your own work (plagiarism) is a violation of the Honor Code. If I determine that you have violated the Honor Code, you will get no credit for the applicable work, and the violation will be reported to the honor council.
- Refer to the college catalog for college-wide policies.

DISCLAIMER

This syllabus is subject to change according to the needs of the class as deemed appropriate by the instructor. In case of minor changes, students will be notified in class; in case of major changes, a new syllabus will be distributed.

PROJECT

The statistics project consists of the following tasks:

PART I

1. Designate the population.
2. Submit three questions on which you will collect data (one qualitative and two quantitative). For each quantitative variable, tell whether it is continuous or discrete. Do not proceed to Part II (data collection) until I approve your selection of variables.

PART II

3. Collect the data using a convenience sample. Explain why this does not give data that is representative of the population and tell how you would have to select a sample in order to collect data that is representative of the population.
4. For each quantitative variable:
 - a. Calculate mean, median, mode, variance, and standard deviation.
 - b. Give the five-number summary.
 - c. Tell if any of the data points are outliers. Explain how you know whether there are outliers.
5. For the qualitative variable:
6. Generate a frequency distribution.
7. Generate either a bar chart or a pie chart. Explain why you selected the chart of your choice.

PART III

8. For two-variable statistics:
 - a. Designate one of the quantitative variables as the independent variable and the other as the dependent variable. Explain why you made this choice.
 - b. Make a scatter plot of the two quantitative variables.
 - c. Calculate the correlation coefficient for the two quantitative variables. Tell whether there is a correlation between them.
 - d. If there is no correlation, explain why you need not perform linear regression.
 - e. If there is a correlation:
 - i. Give the linear equation of best fit, and plot that line on the scatter plot.

- ii. Use the regression equation to predict the associated y value for some x value of your choice.

PROJECT RUBRIC

Component	Number of Points
Correct identification of the population	4
Correct identification of quantitative variables (continuous or discrete)	4 (2 for each variable)
Correct explanation about representative sampling	5
Correct calculation of mean, median, mode, variance, and standard deviation	20 (10 for each variable; 2 for each calculation)
Correct five-number summary	20 (10 for each variable; 2 for each component)
Correct identification and description of outliers	8 (4 for each variable)
Correct frequency distribution	8 (4 for each variable)
Sensible choice of chart with explanation	5
Sensible designation of independent/dependent variables	5
Correct scatter plot	5
Correct correlation coefficient, with explanation of result	5
If regression performed, correct equation and plot; correct predicted value; or	5
If regression not performed, correct explanation of why it was not done.	
Appearance: project must be legible, with correct grammar, punctuation, and spelling.	8
Total:	100