
Code: MATH 131

Title: STATISTICS

Institute: STEM

Department: MATHEMATICS

Course Description: This course begins with descriptive statistics, including graphical representations of data and measures of central tendency, position and variation. Basic probability concepts lead to the study of the binomial and normal probability distributions. The course continues with the Central Limit Theorem and its use in the development of estimation through confidence intervals and hypothesis testing. The course concludes with Chi Square tests and linear correlation and regression. Computer software will be used in class to gain a greater understanding of underlying concepts.

Prerequisites: MATH 021 or MATH 025 or satisfactory completion of the college's foundational studies requirement in algebra.

Credits: 4

Lecture Hours: 4

Lab: 0

REQUIRED TEXTBOOK/MATERIALS:

See your instructor addendum for a complete list of required materials for your section.

- 1. Textbook:** The Brookdale Mathematics Department: MATH 131 Statistics. This ebook is available for free online in your Canvas course.
- 2. A WebAssign (WA) access code** is required for online homework. The access code can be purchased directly from the publisher or at the College bookstore.
Note: For textbook information in online and hybrid sections, see Instructor Addendum.
- 3. Calculator:** You will need a scientific calculator (such as the TI 30x Multiview) for this course.

ADDITIONAL TIME REQUIREMENTS:

OTHER TIME COMMITMENTS:

- In addition to the regular class hours, you will need to set aside time each week for homework. The weekly time will vary by topic and level of difficulty, but as an estimate, you should expect two homework hours for *each* class hour per week. For example, if your class meets for four hours per week, you should expect to spend about **eight** hours per week on homework.
- You may need to allow time on campus to do homework problems that require the use of computer software.
- If you are having any difficulty with the course material, you may need to allow time to see your instructor during office hours or to get help in the Math Lab.

COURSE LEARNING OUTCOMES:

Upon completion of this course, students will be able to:

- Demonstrate the mathematical/statistical skills appropriate to this course. (M)
- Analyze and solve real world problems using statistical concepts, theories and skills. (M)
- Communicate solutions to problems using appropriate statistical language and tools. (M)
- Use statistical software and calculators to explore concepts and/or solve problems. (M)

Learning Outcome(s) support the following General Education Knowledge Areas:

- (M) Mathematics

GRADING STANDARD

In this course, you will be evaluated by means of tests, a course project, class activities and other graded assignments specified by your instructor.

A. TESTS

There will be four tests, one after each unit. All supporting work must be shown on tests in order for your instructor to properly assess your understanding of the material. The tests will be given in class and it is expected that you will be in class to take the test on the day it is given. If you are very ill (verifiable with a doctor's note) or you have some other emergency, you *must* contact your instructor immediately.

Note: For testing information in online and hybrid sections, see Instructor Addendum.

B. PROJECT

There is a semester-long project in this course that consists of seven "laboratory exercises" which provide hands-on experience in collecting and analyzing data. These labs must be handed in on time in a folder so that all prior labs are submitted with each new lab. Points will be deducted for late labs.

GRADING

Your final grade will be computed as follows:

Test 1	20%
Test 2	15%
Test 3	20%
Test 4	20%
Course Project, Class Activities/Homework, Quizzes	25%

FINAL GRADE

Your final grade is determined as follows:

If your final course average is	Your final grade is
90 – 100	A
88 – 89	A-
86 – 87	B+
80 – 85	B
78 – 79	B-
76 – 77	C+
70 – 75	C
60 – 69	D**
Below 60	F

** To use this course as a prerequisite for another mathematics course, you must have a grade of C or better.

Incomplete

INC is only given at the discretion of your instructor. This may occur in documented cases of hardship or emergency. In this case, you must meet with the instructor to discuss the work that must be completed to earn a grade in the course. All work must be completed within 21 days after the end of the term, exclusive of official college closings.

Withdrawal

You may withdraw from the course, without penalty, up to a date set by the College. If you do not withdraw from the course but stop attending, your grade at the end of the semester will be F.

COURSE CONTENT: (TEXT SECTION)

Unit 1: In this unit, you will study basic concepts of descriptive statistics, including graphical representations of data and measures of central tendency, position and dispersion.

Unit 1 Outcomes: You will:

- Know the difference between a population and a sample. (1.1)
- Classify data by type. (1.1)
- Design a statistical study using a sampling plan. (1.2)
- Present the results of the study design and data collection in the first lab of the course project.
- Construct frequency distributions from data sets. (2.1 & 2.2)
- Construct histograms and polygons from frequency distributions. (2.2)
- Construct pie and Pareto charts. (2.1)

- Present and explain graphs for the project data. This is the second lab of the course project.
- Find the mean, median and mode for data sets. (3.1)
- Find and interpret standard deviation. (3.2)
- Apply Chebyshev's Theorem. (3.2)
- Find quartiles and the interquartile range. (3.3)
- Interpret percentiles. (3.3)
- Construct Box-and-Whisker Plots. (3.3)
- Compute and interpret standard scores. (3.2)
- Find, present, and explain basic statistics for the project data. This is the third lab of the course project.

Unit 2: In this unit, you will study basic concepts of probability leading to the study of the binomial probability distribution.

Unit 2 Outcomes: You will:

- Identify the sample space of a probability experiment. (4.1)
- Identify simple events. (4.1)
- Find classical and empirical probabilities. (4.1)
- Know the Law of Large Numbers. (4.1)
- Find conditional probabilities. (4.2)
- Understand concepts of independent, dependent and mutually exclusive events. (4.2 & 4.3)
- Use the Multiplication and Addition Rules for finding probabilities. (4.2 & 4.3)
- Use the Fundamental Counting Principle (4.4)
- Find permutations and combinations. (4.4)
- Apply counting principles to finding probabilities. (4.4)
- Construct and graph discrete probability distributions. (5.1)
- Find the mean for discrete probability distributions. (5.1)
- Find binomial probabilities using the formula and a table. (5.2)
- Find, present, and interpret binomial probabilities for the project data. This is the fourth lab of the course project.

Unit 3: In this unit, you will study basic concepts of the normal probability distribution and confidence intervals for means and proportions.

Unit 3 Outcomes: You will:

- Understand the properties of the normal distribution. (6.2)
- Use the standard normal table to find probabilities. (6.3)
- Use the standard normal table to find data values. (6.4)
- Find, present, and interpret normal probabilities for the project data. This is the fifth lab of the course project.
- Understand and use the Central Limit Theorem. (6.5)
- Construct confidence intervals for means (known sigma). (7.3)
- Construct confidence intervals for means (sigma unknown). (7.4)
- Construct confidence intervals for population proportions. (7.2)
- Find and explain confidence intervals for the project data. This is the sixth lab of the course project.

Unit 4: In this unit, you will study hypothesis tests for means; Chi Square tests and linear correlation and regression.

Unit 4 Outcomes: You will:

- Perform hypothesis tests for means (sigma known). (8.2 & 8.3)
- Perform hypothesis tests for means (sigma unknown). (8.2 & 8.3)
- Construct a scatter plot for bivariate data. (10.1)
- Find the linear correlation coefficient, using software (10.1)
- Test the linear correlation coefficient for significance. (10.1)
- Find the equation of a regression line, using software (10.2)
- Predict y values using regression equations. (10.2)
- Explain the results of linear correlation and regression for the project data. This is the seventh lab of the course project.
- Perform Chi Square Goodness-of-Fit tests. (9.1)
- Perform Chi Square tests for Independence. (9.2)

DEPARTMENT POLICIES:

The Math Department wants you to be successful in this course. Because of this, we have compiled a list of strategies and behaviors.

Attendance and class participation

- If you want to be successful in this course, attend every class.
- Come to class on time, and stay for the entire class period. If you are late or leave during class, you will miss important class material and you will also distract your classmates and your instructor. (See the Student Conduct Code)
- Turn off your cell phone during class. You and your classmates need to be free from distractions. (See the Student Conduct Code)
- Bring your calculator to every class.
- Respect your classmates and your instructor. Listen carefully to questions asked and answers given. Treat all questions with respect.
- Participate fully in class. Volunteer answers, work problems, take careful notes, and engage in discussions about the material. Use computers only for designated work. Above all, stay on task.
- Do your own work on tests and quizzes. Cheating will not be tolerated. (See the Academic Integrity Code.)

Homework

- Homework is the way you practice the ideas and skills that are introduced in class. To be successful on the tests, you must do the homework. Homework may be collected and homework questions may be included on quizzes or tests. All the homework assignments are listed on WebAssign (see Required Materials).
- When you do the homework, write down all supporting work. Using the correct process is at least as important as getting the correct answer, so your work and steps are very important.
- Remember to check your answers.
- If there are questions you can't get or don't understand, ask about them at the beginning of the next class. If you have trouble with more than a few problems, try starting your homework in the Math Lab, where help is available.

Absence

- If you are sick and an absence is unavoidable, please call or email your instructor. You are still responsible for all material that was covered during your absence. You are expected to read the textbook and do the homework.
- Make time to see your instructor when you return so that you can get any papers you missed.
- Remember that you are expected to be in class for the tests and quizzes.

Getting Help

After you have tried the homework, there are ways to get help:

- Look in your text and your class notes for examples similar to the problems you are finding difficult.
- See your instructor during office hours or make an appointment. Bring the work you have done.
- Go to the **Math Lab** to get extra help on your homework or simply go and do your homework there. Someone will be there if you get stuck. You don't need an appointment to use the Math Lab.
- Form a **study group** with other class members. Working with other students can be a great way to learn. If you have a group to work with, consider meeting and working together in the Math Lab.
- You can use the computers in the computer lab within the Math Lab to do work related to your math course.
- In the Math Lab, you can get help on how to use your calculator.

Visit the [Math Lab website](#) to view hours and other useful information about the Math Lab.

COLLEGE POLICIES:

As an academic institution, Brookdale facilitates the free exchange of ideas, upholds the virtues of civil discourse, and honors diverse perspectives informed by credible sources. Our College values all students and strives for inclusion and safety regardless of a student's disability, age, sex, gender identity, sexual orientation, race, ethnicity, country of origin, immigration status, religious affiliation, political orientation, socioeconomic standing, and veteran status. For additional information, support services, and engagement opportunities, please visit www.brookdalecc.edu/support.

For information regarding:

- ◆ Brookdale's Academic Integrity Code
- ◆ Student Conduct Code
- ◆ Student Grade Appeal Process

Please refer to the [BCC STUDENT HANDBOOK](#) AND [BCC CATALOG](#).

NOTIFICATION FOR STUDENTS WITH DISABILITIES:

Brookdale Community College offers reasonable accommodations and/or services to persons with disabilities. Students with disabilities who wish to self-identify must contact the Disabilities Services Office at 732-224-2730 (voice) or 732-842-4211 (TTY) to provide appropriate documentation of the disability, and request specific accommodations or services. If a student qualifies, reasonable accommodations and/or services, which are appropriate for the college level and are recommended in the documentation, can be approved.

MENTAL HEALTH:

- Mental Health Crisis Support: From a campus phone, dial 5555 or 732-224-2329 from an external line; off-hours calls will be forwarded to BCC police (2222 from a campus phone)
- Psychological Counseling Services: 732-224-2986 (to schedule an appointment during regular hours)