BLUE RIDGE COMMUNITY COLLEGE

Department of Mathematics

Course Number/Section:	MTH 155-41
Name of Course:	Statistical Reasoning
Semester:	Fall Semester, 2023
Meeting Times:	Mondays and Wednesdays: 02:00 pm - 03:15 pm
Venue:	E108-Classroom
Course website:	https://statistical-reasoning.appspot.com/
Instructor's Name:	**Samuel Chukwuemeka B.Eng., A.A.T, M.Ed, M.S**
BRCC/VCCS E-Mail:	chukwuemekas@brcc.edu
Office Location:	F-105A
Office Hours:	Tuesdays and Thursdays: 12:00 pm - 5:00 pm
BRCC Phone Number:	(540) 453-2367 (On Campus: Call)
Alternate(Google Voice) Phone Number:	(256) 365-7048 (Off Campus: Text anytime)

Personal Quote: "The Joy of a Teacher is the Success of his Students." - Samuel Chukwuemeka

I. COURSE DESCRIPTION:

Presents elementary statistical methods and concepts including visual data presentation, descriptive statistics, probability, estimation, hypothesis testing, correlation and linear regression. Emphasis is placed on the development of statistical thinking, simulation, and the use of statistical software. This is a Passport and UCGS transfer course. Lecture 3 hours, Total 3 hours per week. 3 credits

General Course Purpose

Statistical Reasoning is a first course in statistics for students whose college and career paths require knowledge of the fundamentals of the collection, analysis, and interpretation of data. Emphasis is placed on the development of statistical thinking, simulation, and the use of statistical software. Students should develop an appreciation of the need for data to make good decisions and an understanding of the dangers inherent in basing decisions on anecdotal evidence rather than data. To that end, students will use appropriate data-collection methods and statistical techniques to support reasonable conclusions through the following content learning outcomes: Data Exploration, Statistical Design, Probability and Simulation, and Statistical Inference.

Course Prerequisites/Corequisites

Prerequisite: Competency in MTE 1-5 as demonstrated through placement or unit completion or equivalent or Co-requisite: MCR 5: Learning Support for Statistical Reasoning.

II. COURSE OBJECTIVES:

Upon completion of this course, the student should be able to do these measurable objectives for each topic.

- Communication
  - Interpret and communicate quantitative information and mathematical and statistical concepts using language appropriate to the context and intended audience.
    - Use appropriate statistical language in oral, written, and graphical terms.
    - Read and interpret graphs and descriptive statistics.
- Problem Solving
  - Make sense of problems, develop strategies to find solutions, and persevere in solving them.
  - Understand what statistical question is being addressed, use appropriate strategies to answer the question of interest, and state conclusions using appropriate statistical language.
- Reasoning
  - Reason, model, and draw conclusions or make decisions with quantitative information.
    - Use probability, graphical, and numerical summaries of data, confidence intervals, and hypothesis testing methods to make decisions.
    - Support conclusions by providing appropriate statistical justifications.
- Evaluation
  - Critique and evaluate quantitative arguments that utilize mathematical, statistical, and quantitative information.
    - Identify errors such as inappropriate sampling methods, sources of bias, and potentially confounding variables, in both observational and experimental studies.
    - Identify mathematical or statistical errors, inconsistencies, or missing information in arguments.

- Technology
    - Use appropriate technology in a given context.
        - Use some form of spreadsheet application to organize information and make repeated calculations using simple formulas and statistical functions.
        - Use technology to calculate descriptive statistics and test hypotheses.
- Graphical and Numerical Data Analysis
    - Identify the difference between quantitative and qualitative data
    - Identify the difference between discrete and continuous quantitative data
    - Construct and interpret graphical displays of data, including (but not limited to) box plots, line charts, histograms, and bar charts
    - Construct and interpret frequency tables
    - Compute measures of center (mean, median, mode), measures of variation, (range, interquartile range, standard deviation), and measures of position (percentiles, quartiles, standard scores)
- Sampling and Experimental Design
    - Recognize a representative sample and describe its importance
    - Identify methods of sampling
    - Explain the differences between observational studies and experiments
    - Recognize and explain the key concepts in experiments, including the selection of treatment and control groups, the placebo effect, and blinding
- Probability Concepts
    - Describe the difference between relative frequency and theoretical probabilities and use each method to calculate probabilities of events
    - Calculate probabilities of composite events using the complement rule, the addition rule, and the multiplication rule.
    - Use the normal distribution to calculate probabilities
    - Identify when the use of the normal distribution is appropriate.
    - Recognize or restate the Central Limit Theorem and use it as appropriate.
- Statistical Inference
    - Explain the difference between point and interval estimates.
    - Construct and interpret confidence intervals for population means and proportions.
    - Interpret the confidence level associated with an interval estimate.

- Conduct hypothesis tests for population means and proportions.
- Interpret the meaning of both rejecting and failing to reject the null hypothesis.
- Use a p-value to reach a conclusion in a hypothesis test.
- Identify the difference between practical significance and statistical significance.

- Correlation and Regression
  - Analyze scatterplots for patterns, linearity, and influential points
  - Determine the equation of a least-squares regression line and interpret its slope and intercept.
  - Calculate and interpret the correlation coefficient and the coefficient of determination.
- Categorical Data Analysis
  - Conduct a chi-squared test for independence between rows and columns of a two-way contingency table.

III. EVALUATION AND REQUIREMENTS:

A. **Grade Determination**: Student evaluation will be based on performance on the following assessments:

MyLab Statistics Assignments	= 70%
3 Tests @ 5% each	= 15%
Project	= 10%
Final exam	= 5%
…….	
TOTAL	= 100%

Method of Grading: The Weighted Average method is used to compute your grades. Grades will be posted in the Canvas course management system.

Grades: Letter grades are assigned using this scale:

[90, 100]	[80, 90)	[70, 80)	[60, 70)	[0, 60)
A	B	C	D	F

Here is an example to calculate the final grade**:**

Assessments	Weight (%)	Your Score (%)	Weighted Score
MyLab Statistics Assignments	70	90	6300
Test 1	5	95	475
Test 2	5	85	425
Test 3	5	80	400
Project	10	100	1000
Final Exam	5	70	350
$\Sigma Weight = 100$		$\Sigma Weighted\ Score = 8950$	
Final Grade $= \frac{Sum\ of\ Weighted\ Scores}{Sum\ of\ Weights} = \frac{8950}{100} = 89.5\% \simeq 90\% = A$			

Please NOTE:

(1.) The final grade is rounded to the nearest integer only one time.

A grade of 79.5000001% is rounded to an 80% which is a B, while a grade of 79.499999 is rounded to a 79% which is a C.

(2.) At least a final grade of 70% (C) is required to pass the course.

(3.) There is no extra credit or bonus point or curving grades for the course.

B. LATE WORK/MAKE UP POLICY:

Please review the Tentative Class Schedule for specific dates.

MyLab Statistics (MLS) Assignments: All MLS assignments were released to you on the first day of class. There are two due dates for each section of the assignment as noted in the Tentative Class Schedule. After the first due date, you may continue to work on any section you did not complete, up until the final due date without any penalty. After the final due date, no MLS assignment may be done.

Tests: Make-up tests are given for any missed test up until the date noted in the Tentative Class Schedule at the Testing Center. You are required to meet me during Office Hours before that date/day to discuss your make-up test. After that date, there will not be any make-up for any missed test. Please note that the tests taken in the class will have a

Choose-and-Answer format for the sections/chapters. The make-up test will not have that option. Hence, it is highly recommended to take the tests at the scheduled dates.

Project: You are encouraged to submit a draft for the project. Then review and do the corrections based on my feedback and keep working with me until I give you the "*green light*" for the main submission. Draft submissions/reviews/corrections should be done by the final due date for draft submissions. Even if you do not submit your draft for review, please make sure you submit your project in the Canvas course by the final due date for project submissions. After the final due date, no project is accepted.

Final Exam: The final exam will be given on Monday of the final week, in the class. If you know that you may miss the final exam, please come and see me during office hours so we can arrange for you to take it earlier. If you miss the final exam, you are required to meet me before Wednesday of that week, to discuss your make-up exam in order for you to take it on Wednesday at the Testing Center..

IV. COURSE ATTENDANCE AND PARTICIPATION POLICY:

Attendance will be taken for every class session. It is important you attend class. But please note that attending class will not give you any point. Not attending class will not deduct any point from you. Remember that I do not believe in extra credit or bonus points. I believe in giving all my students a lot of opportunities to succeed.

Be it as it may, it is very important that you attend class regularly. If you are absent for any class session for any reason, please note that you are completely responsible for everything that was covered in your absence. You are required to review the MyLab Statistics eBook resources and the instructor's resources. You are always welcome to meet me during Office Hours and ask questions regarding what you have reviewed.

V. COURSE ETIQUETTE:

It is my responsibility to promote a safe and conducive learning environment. I assume that you know what is right and what is wrong. In that regard, I ask that you behave accordingly and be respectful at all times. The use of cell phones and other applicable electronic equipment besides computers should be done outside the classroom. Please note that cell phones and other applicable equipment will not be allowed during tests/exams. Students are expected to uphold

the core values of academic integrity which include honesty, trust, fairness, respect and responsibility. These core values, combined with finding one's purpose and passion and applying them in and out of classroom learning, produce students who become extraordinary citizens.

VI. INSTRUCTOR SPECIFIC HONESTY/PLAGIARISM POLICY:

As a BRCC student, it is your responsibility to be informed about what constitutes academic misconduct, how to avoid it and what happens if you decide to engage in it.

Examples of academic misconduct include (but are not limited to):

- plagiarism (turning in work of another person and not giving them credit)
- stealing an exam or course materials
- copying another student's homework, paper, exam
- cheating on an exam (copying from another student, etc.)
- falsifying academic documents

Please note that violations of academic misconduct may result in a failing grade in the assessment, a failing grade in the course, and/or a report to the college administration among others.

VII. INSTRUCTIONAL MATERIALS/TEXT:

A. REQUIRED

(1.) MyLab Statistics Access for the online assignments (has the eBook). The eBook has the Pearson Statcrunch statistical software, notes, videos, audiovisual resources and several learning aids. This is required.

Please log into the Canvas course, click the **Modules** link on the Left Hand Side (LHS) of the course homepage. Then click the **MyLab Statistics All Assignments** link and follow the links/directions to access the assignments. Also, please review the eText and the Multimedia (Video and Resource) library.

(2.) Course website is required.

(3.) Pens, Graphing Calculator (TI-83 Plus or TI-84 Plus or TI-84 Plus CE or TI-Nspire CX II only). The use of any other calculator requires my approval. These are required.

(4.) Access to a Personal Computer or Mackintosh or any electronic device with internet

and email capabilities, and updated internet browsers are required. You may use the computers in the School Computer Labs., School Library, or the Public Library.

B. RECOMMENDED

(1.) Graph Book, Ruler, Pencils.

(2.) The audiovisual resources and learning aids in the MyLab Statistics Access.

(3.) Other resources that may be provided by the instructor.

C. NOT REQUIRED: Introductory STATISTICS: exploring the world through data (3rd Edition; ©2020); Robert Gould, Rebecca Wong, Colleen Ryan; PEARSON ISBN-13: 978-0136880882 (The hard copy of the textbook is not required).

VIII. COURSE SCHEDULE AND SEQUENCE OF INSTRUCTION:

Method of Teaching: Synchronous (Lecture). I do, You do, We do, Y'all do.

Tutoring: Please attend tutoring at either or all of these sites:

(1.) During office hours at my office

(2.) The Center for Academic Vision and Excellence (The CAVE)

Tentative Class Schedule: Fall Semester, 2023

Class Session	Day/Date	Sections(Textbook)/ Topics (Instructor)	Assessments Due
1	Monday / August 21	Course Syllabus Section 1.1	(Initial Due) Section 1.1
2	Wednesday / August 23	Section 1.2 Section 1.3	(Initial Due) Section 1.2 Section 1.3
3	Monday / August 28	Section 1.4 Section 1.5	(Initial Due) Section 1.4 Section 1.5
4	Wednesday / August 30	Sections 2.1-2.2	(Initial Due) Section 2.1-2.2: 1st Section 2.1-2.2: 2nd
5	Monday / September 04	Sections 2.3-2.4 Section 2.5	(Initial Due) Sections 2.3-2.4 Section 2.5

6	Wednesday / September 06	Section 3.1	(Initial Due) Section 3.1-1st Section 3.1-2nd
Thursday: September 07: Last Day to Drop with Refund			
7	Monday / September 11	Section 3.2	(Initial Due) Section 3.2
8	Wednesday / September 13	Section 3.3 Section 3.4	(Initial Due) Section 3.3 Section 3.4
9	Monday / September 18	Section 3.4	(Initial Due) Section 3.4
10	Wednesday / September 20	Section 3.5	(Initial Due) Section 3.5 Project Draft
11	Monday / September 25	**Test 1**: Chapters 1, 2, and 3 Project	**Test 1**: Chapters 1, 2, and 3 (Initial Due): Project
12	Wednesday / September 27	Section 4.1 Section 4.2	(Initial Due) Section 4.1 Section 4.2
13	Monday / October 02	Section 4.3	(Initial Due) Section 4.3
14	Wednesday / October 04	Section 4.4 Section 5.1	(Initial Due) Section 4.4 Section 5.1
15	Monday / October 09	Section 5.2	(Initial Due) Section 5.2-1st Section 5.2-2nd
16	Wednesday / October 11	Section 5.3 Section 5.4	(Initial Due) Section 5.3 Section 5.4
17	Monday / October 16	Section 6.1 Section 6.2-1st	(Initial Due) Section 6.1 Section 6.2-1st
18	Wednesday / October 18	Section 6.2-2nd	(Initial Due) Section 6.2-2nd
19	Monday / October 23	**Test 2**: Chapters 4, 5, and 6	**Test 2**: Chapters 4, 5, and 6

20	Wednesday / October 25	Section 7.1	Last Day to Withdraw with "W" (Initial Due) Section 7.1-1st Section 7.1-2nd
21	Monday / October 30	Section 7.2 Section 7.3	(Initial Due) Section 7.2 Section 7.3
22	Wednesday / November 01	Section 7.4	(Initial Due) Section 7.4
23	Monday / November 06	Section 8.1 Section 8.2	(Initial Due) Section 8.1 Section 8.2
24	Wednesday / November 08	Section 8.3	(Initial Due) Section 8.3
25	Monday / November 13	Section 9.1 Section 9.2	(Initial Due) Section 9.1 Section 9.2
26	Wednesday / November 15	Section 9.3	(Initial Due) Section 9.3
Sunday / November 19 - Saturday / November 25		Fall Break THANKSGIVING Week	(Final Due) Project Draft Complete all outstanding assessments
27	Monday / November 27	Section 9.4	(Initial Due) Section 9.4
28	Wednesday / November 29	Section 10.1	(Initial Due) Section 10.1
29	Monday / December 04	**Test 3**: Chapters 7, 8, and 9	**Test 3**: Chapters 7, 8, and 9
30	Wednesday / December 06	Section 10.2	(Initial Due) Section 10.2 (Final Due) Test 1 Make-up Test 2 Make-up Test 3 Make-up Project

31	Monday / December 11	**Comprehensive Final Exam** (Chapters 1 - 9)	**Comprehensive Final Exam** (Chapters 1 - 9)
32	Wednesday / December 13 Saturday/ December 16	Make-up for the Comprehensive Final Exam (Chapters 1 - 10)	Make-up for the Comprehensive Final Exam (Chapters 1 - 10) (Final Due) All MyMathLab Assignments

BRCC Student Resources: https://learn.vccs.edu/courses/161353

Email Policy: Please use your school email address (…@brcc.edu) for all communications relating to this course.

Legal Name: Please **use only your registered names (First Name and Last Name in the Canvas course)** for **all work done in this course**.

Rights to change: I reserve the right to change the information contained in this syllabus with notice. The institution reserves the right to do so, with or without notice.

Tips to Succeed in the Course.

Please:

- Do not procrastinate. Procrastination is inimical to time. Begin your MyLab Statistics assignments immediately. Complete at least 20 questions daily. Do not wait until the section is covered in the class before you complete it. MyLab Statistics has learning aids that you can use right away. Ask questions on any concept you do not understand.

- Flipped Classroom Learning: Review each topic to be taught in the Instructor's Resources, and in your textbook (eBook), the videos and other multimedia resources in your MyLab Statistics software prior to coming to class. Please ask questions.

- Attend class sessions regularly. Participate in the review sessions.

- This course will require a lot of your time. You will do a lot of work. Please be determined to work very hard. The good thing is that I am here to help you. Please ask questions. I am here to help you.

- Other information will be provided and/or discussed as applicable. (Tutoring, Peer Learning, Everyday Math Learning, etc.)

Required Supplement to Syllabus

In addition to what's outlined on this syllabus, the policies and procedures addressed at www.brcc.edu/syllabus are included as an addendum to this document.