BLUE RIDGE COMMUNITY COLLEGE

Department of Mathematics

Course Name:	Quantitative Reasoning
Course Number and Section:	MTH 154-V03 (37300)
Semester:	Summer Semester 2024
Course website:	https://quantitativereasoning.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:	Online

Zoom Live Sessions (Student Engagement Hours: Flipped Classroom/Questions/Concerns: Talk to me)
https://vccs.zoom.us/j/88112389186?pwd=MVhSeTRjcjdFSXJjOVZiamRhdUROQT09

Student Engagement Hours:	Fridays: 7:00 am - 8:00 am EDT
BRCC Phone Number:	(540) 453-2367 (Not Applicable for the Summer)
Google Voice Phone Number:	(256) 365-7048 (Text anytime)

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

I. COURSE DESCRIPTION

Presents topics in proportional reasoning, modeling, financial literacy and validity studies (logic and set theory). Focuses on the process of taking a real-world situation, identifying the mathematical foundation needed to address the problem, solving the problem and applying what is learned to the original situation. This is a Passport and UCGS transfer course. Lecture 3 hours. Total 3 hours per week. 3 credits.

General Course Purpose

The Quantitative Reasoning course is organized around big mathematical concepts. The course's nontraditional treatment of content will help students develop conceptual understanding by supporting them in making connections between concepts and applying previously learned material to new contexts. The course will help to prepare students for success in future courses, gain skills for the workplace, and participate as productive citizens in our society. * Encourage students to do

mathematics with real data. This includes recognizing the real world often has less than perfect data, ambiguities and multiple possible solutions. It also means equipping students to be intelligent consumers of quantitative data and reports. * Encourage students to engage in productive struggle to learn mathematics and make connections to the world in which they live.

Course Prerequisites/Corequisites

Prerequisites: Competency in MTE 1-5 as demonstrated through placement or unit completion or equivalent or Corequisite: MCR 4: Learning Support for Quantitative Reasoning.

DISTANCE LEARNING POLICY

For Asynchronous Classes: This course meets entirely online. All the links to the course content and assessments among others are available in the Canvas Learning Management System on the first day of class. Three types of assessments are required for the class:

(1.) MyLab Math (MLM) Assessments.

(2.) Applied Project.

(3.) Weekly Discussion Board (DB) Assessments.

For detailed explanations, please review: About Online Classes: Taking MTH 154 with Mr. C

II. COURSE OBJECTIVES

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

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- Communication
    - Interpret and communicate quantitative information and mathematical and statistical concepts using language appropriate to the context and intended audience.
        - Use appropriate mathematical language in oral, written and graphical forms.
        - Read and interpret real world advertisements, consumer information, government forms and news articles containing quantitative information.
        - Use quantitative information from multiple sources to make or critique an argument.
- Problem Solving

    - Share strategies to find solutions to life application problems to make sense of the mathematical content and persevere in solving them.
        - Apply strategies for solving open-ended questions requiring analysis and synthesis of multiple calculations, data summaries, and/or models.
        - Apply problem solving strategies to applications requiring multiple levels of engagement.
- Reasoning
    - Reason, model, and draw conclusions or make decisions with quantitative information.
        - Draw conclusions or make decisions in quantitatively based situations that are dependent upon multiple factors. Students will analyze how different situations would affect the decisions.
        - Present written or verbal justifications of decisions that include appropriate discussion of the mathematics involved.
        - Recognize when additional information is needed.
        - Recognize the appropriate ways to simplify a problem or its assumptions.
- Evaluation
    - Critique and evaluate quantitative arguments that utilize mathematical, statistical, and quantitative information.
        - Evaluate the validity and possible biases in arguments presented in real world contexts based on multiple sources of quantitative information - for example; advertising, internet postings, consumer information, political arguments.
- Technology
    - Use appropriate technology in a given context.
        - Use a spreadsheet to organize quantitative information and make repeated calculations using simple formulas.
        - Search for and apply internet-based tools appropriate for a given context - for example, an online tool to calculate credit card interest or a scheduling software package.
- Financial Literacy
    - Simple Interest
        - Define interest and its related terminology.

        - Develop simple interest formula.
        - Use simple interest formulas to analyze financial issues
    - Compound Interest
        - Compare and contrast compound interest and simple interest.
        - Explore the mechanics of the compound interest formula addressing items such as why the exponent and (1+r/n) is used by building the concept of compounding interest through manual computation of a savings or credit account.
        - Apply compound interest formulas to analyze financial issues
        - Create a table or graph to show the difference between compound interest and simple interest.
    - Borrowing
        - Compute payments and charges associated with loans.
        - Identify the true cost of a loan by computing APR
        - Evaluate the costs of buying items on credit
        - Compare total loan cost using varying lengths and interest rates.
    - Investing
        - Calculate the future value of an investment and analyze future value and present value of annuities (Take into consideration possible changes in rate, time, and money.)
        - Compare two stocks and justify your desire to buy, sell, or hold stock investment.
        - Explore different types of investment options and how choices may impact one's future such as in retirement.
- Perspective Matters - Number, Ratio, and Proportional Reasoning
    - Solve real-life problems that include interpretation and comparison of summaries which extend beyond simple measures, such as weighted averages, indices, or ranking and evaluate claims based on them.
    - Solve real-life problems requiring interpretation and comparison of various representations of ratios (i.e., fractions, decimals, rates, and percentages including part to part and part to whole, per capita data, growth and decay via absolute and relative change).
    - Distinguish between proportional and non-proportional situations and, when

appropriate, apply proportional reasoning leading to symbolic representation of the relationship. Recognize when proportional techniques do not apply.
    - Solve real-life problems requiring conversion of units using dimensional analysis.
    - Apply scale factors to perform indirect measurements (e.g., maps, blueprints, concentrations, dosages, and densities).
    - Order real-life data written in scientific notation. The data should include different significant digits and different magnitudes.
- Modeling
    - Observation
        - Through an examination of examples, develop an ability to study physical systems in the real world by using abstract mathematical equations or computer programs
        - Collect measurements of physical systems and relate them to the input values for functions or programs.
        - Compare the predictions of a mathematical model with actual measurements obtained
        - Quantitatively compare linear and exponential growth
        - Explore behind the scenes of familiar models encountered in daily life (such as weather models, simple physical models, population models, etc.)
    - Mathematical Modeling and Analysis
        - Collect measurements and data gathered (possibly through surveys, internet, etc.) into tables, displays, charts, and simple graphs.
        - Create graphs and charts that are well-labeled and convey the appropriate information based upon chart type.
        - Explore interpolation and extrapolation of linear and non-linear data. Determine the appropriateness of interpolation and/or extrapolation.
        - Identify and distinguish linear and non-linear data sets arrayed in graphs. Identifying when a linear or non-linear model or trend is reasonable for given data or context.
        - Correctly associate a linear equation in two variables with its graph on a numerically accurate set of axes
        - Numerically distinguish which one of a set of linear equations is modeled by a given set of (x,y) data points

        - Identify a mathematical model's boundary values and limitations (and related values and regions where the model is undefined). Identify this as the domain of an algebraic model.
        - Using measurements (or other data) gathered, and a computer program (spreadsheet or GDC) to create different regressions (linear and non-linear), determine the best model, and use the model to estimate future values.
    - Application
        - Starting with a verbally described requirement, generate an appropriate mathematical approach to creating a useful mathematical model for analysis
        - Explore the graphical solutions to systems of simultaneous linear equations, and their real world applications
        - Numerically analyze and mathematically critique the utility of specific mathematical models: instructor-provided, classmate generated, and self-generated
- Validity Studies
    - Identify logical fallacies in popular culture: political speeches, advertisements, and other attempts to persuade
    - Analyze arguments or statements from all forms of media to identify misleading information, biases, and statements of fact.
    - Develop and apply a variety of strategies for verifying numerical and statistical information found through web searches.
    - Apply the use of basic symbolic logic, truth values, and set theories to justify decisions made in real-life applications, such as if-then-else statements in spreadsheets, Venn Diagrams to organize options, truth values as related to spreadsheet and flow-chart output. (Students must have experience with both symbolic logic and basic truth tables to meet this standard.)

III. EVALUATION AND REQUIREMENTS

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

MyLab Math (MLM) Assignments	=	70%
10 Discussions @ 2% each	=	20%

Project	=	10%
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**
MLM Assignments	70	90	6300
DB 1	2	95	190
DB 2	2	90	180
DB 3	2	80	160
DB 4	2	85	170
DB 5	2	100	200
DB 6	2	70	140
DB 7	2	75	150
DB 8	2	84	168
DB 9	2	82	164
DB 10	2	93	186
Project	10	100	1000
$\Sigma Weight = 100$		$\Sigma Weighted\ Score = 9008$	
Final Grade = $\frac{Sum\ of\ Weighted\ Scores}{Sum\ of\ Weights} = \frac{9008}{100} = 90.08\% \simeq 90\% = A$			

Please Note:

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

A grade of 79.5000111% 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.

For further explanations, please review: Grades and Grades Calculators and the FAQs: Frequently Asked Questions.

B. LATE WORK POLICY/MAKE-UP POLICY

Please review the **Tentative Class Schedule** and the Pacing Guides for specific dates.

MLM Assignments: All MyLab Math (MLM) assignments are released to you on the first day of class. There are two due dates for each section of the assignment. After the initial due date, you may continue to work on any uncompleted assignment without any penalty until the final due date. You are encouraged to solve at least 20 questions (20 or more questions) of your MLM assignments daily. This will enable you to complete all work by the final due date.

Discussions: There is a Discussion Board (DB) forum assessment each week. The initial post is due on Thursday. At least one (one or more) response to the initial post of a different colleague is due on Saturday. There is no make-up work for any missed DB assessment.

Project: Only one project is required.

There are two due dates for the project draft. The project draft is not graded.

Submitting a draft is highly recommended but not required.

After the final due date for the project draft, written review will not be provided. However, verbal review during the Student Engagement Hours/Live Sessions will be provided up until the final due date for the project.

There are two due dates for the project. The project is required.

For detailed information regarding the project, please review: Projects

IV. COURSE ATTENDANCE AND PARTICIPATION POLICY

The weekly Student Engagement Hours/Live Sessions are highly recommended, but not required.

Please note that the sessions are recorded. If the day and time does not suit your schedule, please send an email to me with your available days and times.

I look forward to your active participation in the weekly discussions.

V. COURSE ETIQUETTE

It is my responsibility to promote a safe and conducive learning environment. It is my assumption 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.

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 work: discussion, project, 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. ARTIFICIAL INTELLIGENCE (AI) STATEMENT

A. **AI Procedure:** All work submitted in BRCC courses must be your own. Contributions from anyone or anything else, including AI sources, must be properly quoted and cited every time they are used. Failure to do so constitutes an academic integrity violation and the Statement on the Honor Code and Behavior Violations, and Disciplinary and Appeal Procedures will be Implemented. Students are discouraged from using AI tools UNLESS under direct instruction from your instructor to do so. Contact your instructor if you are unsure or have questions BEFORE using AI for any assignment.

B. **Course level procedure:** If the need arises, we shall discuss the ways in which students are permitted to use AI for assignments in an acceptable manner.

VIII. INSTRUCTIONAL MATERIALS/TEXT

A. REQUIRED

(1.) MyLab Math (MLM) Access for the online assignments (has the eText). The eText has 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 Math Assignments** link and follow the links/directions to access the assignments. Also, please review the eText and the Multimedia (Video and Resource) library.

(2.) The 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 (PC) or Mackintosh (Mac) with internet and email capabilities, and updated internet browsers are required.
The internet browsers should be Google Chrome or Mozilla Firefox only; not Microsoft Edge; not Safari.
The PC or Mac should be a Laptop or Desktop only; a Chromebook may only be used for MLM assignments, however, they cannot be used for the project; not a smartphone; not a tablet/iPad.
You may use the computers in the School Computer Labs., the School Library, or the Public Library.

B. RECOMMENDED

(1.) Graph Book, Ruler, other writing materials as applicable.
(2.) The multimedia resources and learning aids in the MLM environment.
(3.) Other resources provided by the instructor (Pacing Guide, Announcements, etc.)

C. NOT REQUIRED: Using and Understanding Mathematics: A Quantitative Reasoning

Approach. (8th Edition; ©2023); Jeffrey O. Bennett and William L. Briggs; Pearson. ISBN-13: 9780137575336 (The hard copy of the textbook is not required).

IX. COURSE SCHEDULE AND SEQUENCE OF INSTRUCTION:

Method of Teaching: Flipped Classroom model.

Tutoring: There are several tutoring opportunities available to you:

(1.) Student Engagement Hours/Live Sessions

(2.) Writing Assistance and Course Tutoring

(3.) Brainfuse Online Tutoring app located on the Left Hand Side of the course homepage.

Tentative Class Schedule: Summer Semester, 2024

Week	Day/Date	eText Sections	Assessments Due
1	Monday, 05/20 – Saturday, 05/25	Section 1A: Living in the Media Age Section 1E: Critical Thinking in Everyday Life	(Initial Due) Section 1A-1st Section 1A-2nd Section 1E-1st Section 1E-2nd DB 1 (Due)
Thursday / May 30 (05/30)		Last Day to Drop with Refund	
2	Sunday, 05/26 – Saturday, 06/01	Section 1B: Propositions and Truth Values Section 1D: Analyzing Arguments	(Initial Due) Section 1B-1st Section 1B-2nd Section 1B-3rd Section 1D-1st Section 1D-2nd DB 2 (Due)
3	Sunday, 06/02 – Saturday, 06/08	Section 1C: Sets and Venn Diagrams Section 2A: Understand, Solve, and Explain	(Initial Due) Section 1C-1st Section 1C-2nd Section 1C-3rd Section 2A-1st Section 2A-2nd Section 2A-3rd Project Draft

			DB 3 (Due)
4	Sunday, 06/09 – Saturday, 06/15	Section 2B: Extending Unit Analysis Section 2C: Problem-Solving Hints	(Initial Due) Section 2B-1st Section 2B-2nd Section 2B-3rd Section 2B-4th Section 2C-1st Section 2C-2nd Project DB 4 (Due)
5	Sunday, 06/16 – Saturday, 06/22	Section 3A: Uses and Abuses of Percentages Section 3B: Putting Numbers in Perspective Section 3C: Dealing with Uncertainty	(Initial Due) Section 3A-1st Section 3A-2nd Section 3A-3rd Section 3A-4th Section 3B-1st Section 3B-2nd Section 3B-3rd Section 3C-1st Section 3C-2nd DB 5 (Due)
6	Sunday, 06/23 – Saturday, 06/29	Section 3D: Index Numbers: The CPI and Beyond Section 3E: Numerical Surprises: Polygraphs, Mammograms, and More	(Initial Due) Section 3D-1st Section 3D-2nd Section 3E DB 6 (Due)
Sunday / June 30 (06/30)		Last Day to Drop with "W"	
7	Sunday, 06/30 – Saturday, 07/06	Section 4A: Taking Control of Your Finances Section 4B: The Power of Compounding	Section 4A-1st Section 4A-2nd Section 4A-3rd Section 4B-1st Section 4B-2nd Section 4B-3rd Section 4B-4th DB 7 (Due)
8	Sunday, 07/07 – Saturday,	Section 4C: Savings Plans and Investments	(Initial Due) Section 4C-1st Section 4C-2nd

	07/13	Section 4D: Loan Payments, Credit Cards, and Mortgages Section 4E: Personal Income Taxes	Section 4D-1st Section 4D-2nd Section 4E-1st Section 4E-2nd (Final Due) Project Draft DB 8 (Due)
9	Sunday, 07/14 – Saturday, 07/20	Section 5A: Fundamentals of Statistics Section 5B: Should You Believe a Statistical Study? Section 5C: Statistical Tables and Graphs	(Initial Due) Section 5A-1st Section 5A-2nd Section 5A-3rd Section 5B-1st Section 5B-2nd Section 5C-1st Section 5C-2nd (Final Due) Project DB 9 (Due)
10	Sunday, 07/21 – Saturday, 07/27	Section 5D: Graphics in the Media Section 5E: Correlation and Causality …….. *Assigned but Not Graded:* Section 8A: Growth: Linear versus Exponential Section 9A: Functions: The Building Blocks of Mathematical Models Section 9B: Linear Modeling *Section 9C: Exponential Modeling*	(Initial Due) Section 5D-1st Section 5D-2nd Section 5E-1st Section 5E-2nd DB 10 (Due) ……... *Assigned but Not Graded:* Section 8A Section 9A-1st Section 9A-2nd Section 9B-1st Section 9B-2nd Section 9C-1st *Section 9C-2nd*
(Final Due) All MyLab Math (MLM) Assignments: Tuesday, 07/29; 11:59 pm EDT			

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 Class.

May you please review?

(1.) Do not procrastinate. Procrastination is inimical to time. Begin your MyLab Math assignments immediately. Complete at least 20 questions daily. Do not wait until the section is assigned to you. Work ahead. MyLab Math has learning aids that you can use right away. Ask questions on any concept that you do not understand.

(2.) Flipped Classroom Model: Review all the resources for each section provided for you prior to attending the Student Engagement Hours/Live Sessions. Please ask questions.

(3.) Attend Student Engagement Hours/Live Sessions. Use the tutoring opportunities provided for you. Submit your project draft for review and make corrections as applicable. Abide by the due dates.

(4.) Review the Discussion Board (DB) requirements. Participate actively in the weekly discussions.

(5.) This course will require a lot of your time. **You will do a lot of work on your own.** 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.

(6.) Review all the information provided for you on the course website.

(7.) Review all the information provided for you on the Canvas course management system.

X. STUDENT END-OF-SEMESTER COURSE EVALUATIONS

Blue Ridge Community College values the feedback students provide about teaching and learning in college courses. The end-of-semester course evaluations, which are anonymous, are a helpful form of feedback and can be valuable in assisting professors for improving and refining teaching so students can understand the material. Student feedback has the additional benefit of allowing students to share their success and challenges regarding mastering the course material.

XI. REQUIRED SUPPLEMENTS TO SYLLABUS

In addition to what is outlined on this syllabus, more required policies and procedures are found here: www.brcc.edu/syllabus.