Master Course Syllabus

For additional course information, including prerequisites, corequisites, and course fees, please refer to the Catalog: https://catalog.uvu.edu/

Semester: Spring
Year: 2025
Course Prefix: MAT
Course and Section #: 1030-012
Course Title: Quantitative Reasoning QL
Credits: 3

Course Description

This course may be an appropriate culminating mathematics course for the general studies or liberal arts student majoring in humanities or other non-science programs. The focus of the course is on the development of problem-solving skills through the application of various mathematical concepts to real life problems. Mathematics 1035 requires students to use advanced mathematical concepts to make decisions and communicate ideas within five domains: statistics, logic, probability, mathematical modeling, and financial management. The course necessitates students to reason abstractly and quantitatively to make decisions about situations and then communicate their decisions using a mathematical argument. Further, students will use appropriate tools, including technology, to model their mathematical thinking, and use structure and regularity to describe mathematical situations and solve problems. The ultimate goal is that students leave the course with a fundamental ability to apply mathematical reasoning to a variety of contexts they are likely to experience in the future.

Course Attributes

This course has the following attributes:
☒ General Education Requirements
☐ Global/Intercultural Graduation Requirements
☐ Writing Enriched Graduation Requirements
☐ Discipline Core Requirements in Program
☐ Elective Core Requirements in Program
☐ Open Elective
Other: *Click here to enter text.*

Instructor Information

Instructor Name: Suda Satcunasingam

Student Learning Outcomes

Upon successful completion of this course, students should be able to:

- The student is able to apply mathematics-based skills used in college and career, including reasoning, planning and communication, to make decisions and solve problems in applied situations.
- The student is able to analyze numerical data using a variety of quantitative measures (tables, graphs, statistics) and numerical processes.
- The student analyzes and evaluates risk and return in the context of everyday situations, making decisions based on understanding, analysis and critique of statistical information.
- The student can communicate methods and results in statistical studies and reports.
- The student can model data in a variety of ways, generate predictions and evaluate their validity.
- The student uses mathematical models to represent, analyze and solve problems involving change.
- The student uses mathematical models and analyses to make decisions related to earning, investing and borrowing.
- The student can generate network models to organize data, make decisions and solve problems.

Course Materials and Texts

REQUIRED SOFTWARE LICENSE: In this class, it is required to have a software license for Hawkes.

- You can purchase the textbook through Hawkes Learning.
- UVU has currently changed to online purchases only, so you can purchase the Hawkes Learning module through the bookstore online.

Besides the homework, there are several additional resources available to you in Hawkes. With every section there are practice problems, animations of problem-solving methods, and videos of the textbook's author. These are a great resource to help you truly learn and understand the course material. Please take some time to familiarize yourself with these resources. You are paying for them; you might as well benefit from them.

TEXTBOOK (Optional): *Viewing Life Mathematically: A Pathway to Quantitative Reasoning Plus Integrated Review*; Denley and Hall

A **scientific** calculator is needed for homework and exams, **NO GRAPHING CALCULATORS ALLOWED ON ANY EXAM**. We will use DESMOS (an online app) in class to demonstrate some calculations and graphs.

Course Requirements

Course Assignments, Assessments, and Grading Policy

Homework

Home work will be assigned in HAWKES! Homework is worth 20% of the total grade.

Projects/Activities

There are **five** projects to be completed by you or in groups. These projects must be turned in via CANVAS by each individual student. It will be specified in class. Every student must use his own CANVAS account to submit each and every project. The projects are worth 20% of the total grade.

Group Quizzes & Open-Book Exams

This percentage includes pop quizzes and open-book, open-note group tests. The score is worth 15% of your overall grade.

Mid-Term Exam

The mid-term exam will be given in-class .Look at the schedule. There are no retakes on the mid-term exam. If you are not able to take the Mid-Term exam during the available time, please inform me ahead of time to make other arrangements, if you have valid reasons such as medical emegencies the documentation should be submitted to take the makeup exam.

On the mid-term exam, NO note cards, formulas, or books are allowed on the exam. You are allowed to use a scientific calculator and scratch paper. For partial credit complete work must be shown and turned in with the exam.

Final Exam

The final exam (UVU Policy) is comprehensive (Developmental Math Department policy). The final exam is worth 25% of the total grade. The final exam will be given in class.Links to an external site. On the final exam, NO note cards, formulas, or books are allowed on any exam (math department policy). You are allowed to use a scientific calculator and scratch paper. **For partial credit on the multiple-choice portion of the test, you can upload your scratch paper in CANVAS.**

Activity	Percentage
Group Quizzes/ In-Class Participations	15%
Hawkes Homework Score	20%

Projects/Group Activities	20%
Mid-term Exam	20%
Final Exam	25%
Total	**100%**

Required or Recommended Reading Assignments
All required readings use chapters from the course text that align with the lectures below

General Description of the Subject Matter of Each Lecture or Discussion
Part One Logic and Problem Solving
Chapter 1: Thinking Critically
- 1A: Living in a Media Age (Optional)
- 1B: Propositions and Truth Values (Optional)
- 1C: Sets and Venn Diagrams (Optional)
- 1D: Analyzing Arguments (Logical Fallacies Required)
- 1E: Critical Thinking in Everyday Life (Optional)

Chapter 2: Approaches to Problem Solving
- 2A: Understand, Solve, and Explain
- 2B: Extending Unit Analysis
- 2C: Problem-Solving Hints

Part Two Quantitative Information in Everyday Life
Chapter 3: Number in the Real World
- 3A: Uses and Abuses of Percentages
- 3B: Putting Numbers in Perspective
- 3C: Dealing With Uncertainty
- 3D: Index Numbers: The CPI and Beyond (Optional)
- 3E: Numerical Surprises: Polygraphs, Mammograms, and More (Optional)

Chapter 4: Managing Money (Required)
- 4A: Taking Control of Your Finances
- 4B: The Power of Compounding
- 4C: Savings Plans and Investments
- 4D: Loan Payments, Credit Cards, and Mortgages
- 4E: Personal Income Taxes (Optional)
- 4F: Understanding the Federal Budget (Optional)

Part Three Statistics and Probability
Chapter 5: Statistical Reasoning
- 5A: Fundamentals of Statistics
- 5B: Should You Believe a Statistical Study?
- 5C: Statistical Tables and Graphs
- 5D: Graphs in the Media (Optional)

5E: Correlation and Causality (Optional)
Chapter 6: Putting Statistics to Work
6A: Characterizing Data
6B: Measures of Variation
6C: The Normal Distribution
6D: Statistical Inference (Optional)
Chapter 7: Living with the Odds
7A: Fundamentals of Probability
7B: Combining Probabilities
7C: The Law of Large Numbers
7D: Assessing Risk
7E: Counting and Probability
Part Four Modeling
Chapter 8: Exponential Astonishment
8A: Growth: Linear versus Exponential
8B: Doubling Time and Half-Life (Optional)
8C: Real Population Growth
8D: Logarithmic Scales: Earthquakes, Sounds, and Acids
Chapter 9: Modeling Our World
9A: Functions: The Building Blocks of Mathematical Models
9B: Linear Modeling
9C: Exponential Modeling
Chapter 10: Modeling With Geometry (Optional)
10A: Fundamentals of Geometry
10B: Problem Solving with Geometry
10C: Fractal Geometry
Part Five Further Applications (Optional)
Chapter 11: Mathematics and the Arts
11A: Mathematics and Music
11B: Perspective and Symmetry
11C: Proportion and the Golden Ratio
Chapter 12: Mathematics and Politics
12A: Voting: Does the Majority Always Rule?
12B: Theory of Voting
12C: Apportionment: The House of Representatives and Beyond
12D: Dividing the Political Pie
Chapter 13: Mathematics and Business
13A: Network Analysis
13B: The Traveling Salesperson Problem
13C: Scheduling Problems

Required Course Syllabus Statements

Generative AI
This course requires you to complete assignments that assess your understanding and application of the material. You are expected to do your own work, and the use of artificial intelligence (AI) tools, such as

chatbots, text generators, paraphrasers, summarizers, or solvers, is strictly prohibited for any part of your assignments. Using these tools will be considered academic dishonesty and will be handled according to the university's policy. If you have questions about acceptable use of AI tools, please consult the instructor before submitting your work.

Using Remote Testing Software
☒ This course does not use remote testing software.

☐ This course uses remote testing software. Remote test-takers may choose their remote testing locations. Please note, however, that the testing software used for this may conduct a brief scan of remote test-takers' immediate surroundings, may require use of a webcam while taking an exam, may require the microphone be on while taking an exam, or may require other practices to confirm academic honesty. Test-takers therefore shall have no expectation of privacy in their test-taking location during, or immediately preceding, remote testing. If a student strongly objects to using test-taking software, the student should contact the instructor at the beginning of the semester to determine whether alternative testing arrangements are feasible. Alternatives are not guaranteed.

Required University Syllabus Statements

Accommodations/Students with Disabilities
Students needing accommodations due to a permanent or temporary disability, pregnancy or pregnancy-related conditions may contact UVU Accessibility Services at accessibilityservices@uvu.edu or 801-863-8747.

Accessibility Services is located on the Orem Campus in BA 110.

Deaf/Hard of Hearing students requesting ASL interpreters or transcribers can contact Accessibility Services to set up accommodations. Deaf/Hard of Hearing services can be contacted at DHHservices@uvu.edu

DHH is located on the Orem Campus in BA 112.

Academic Integrity
At Utah Valley University, faculty and students operate in an atmosphere of mutual trust. Maintaining an atmosphere of academic integrity allows for free exchange of ideas and enables all members of the community to achieve their highest potential. Our goal is to foster an intellectual atmosphere that produces scholars of integrity and imaginative thought. In all academic work, the ideas and contributions of others must be appropriately acknowledged and UVU students are expected to produce their own original academic work.

Faculty and students share the responsibility of ensuring the honesty and fairness of the intellectual environment at UVU. Students have a responsibility to promote academic integrity at the university by not participating in or facilitating others' participation in any act of academic dishonesty. As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and

writing, assessments, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Likewise, instructors are responsible to clearly state expectations and model best practices.

Further information on what constitutes academic dishonesty is detailed in UVU Policy 541: *Student Code of Conduct*.

Equity and Title IX
Utah Valley University does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation, gender identity, gender expression, age (40 and over), disability, veteran status, pregnancy, childbirth, or pregnancy-related conditions, citizenship, genetic information, or other basis protected by applicable law, including Title IX and 34 C.F.R. Part 106, in employment, treatment, admission, access to educational programs and activities, or other University benefits or services. Inquiries about nondiscrimination at UVU may be directed to the U.S. Department of Education's Office for Civil Rights or UVU's Title IX Coordinator at 801-863-7999 – TitleIX@uvu.edu – 800 W University Pkwy, Orem, 84058, Suite BA 203.

Religious Accommodation
UVU values and acknowledges the array of worldviews, faiths, and religions represented in our student body, and as such provides supportive accommodations for students. Religious belief or conscience broadly includes religious, non-religious, theistic, or non-theistic moral or ethical beliefs as well as participation in religious holidays, observances, or activities. Accommodations may include scheduling or due-date modifications or make-up assignments for missed class work.
To seek a religious accommodation, a student must provide written notice to the instructor and the Director of Accessibility Services at accessibilityservices@uvu.edu. If the accommodation relates to a scheduling conflict, the notice should include the date, time, and brief description of the difficulty posed by the conflict. Such requests should be made as soon as the student is aware of the prospective scheduling conflict.

While religious expression is welcome throughout campus, UVU also has a specially dedicated space for meditation, prayer, reflection, or other forms of religious expression.