

Kent State University

Math 10051 Quantitative Reasoning (4 credit hours)

COURSE DESCRIPTION:

In the broadest sense mathematics should provide students the needed quantitative tools, logical reasoning and problem solving skills, and a sense that quantitative modeling can be used to describe and understand developments in many areas of daily living. This course will explore various applications of mathematics in the social sciences, financial world, and the health and environmental fields. The emphasis in this course will be on developing students' quantitative and logical reasoning and improving students' abilities to communicate quantitative ideas both orally and in writing. Topics from numeracy, finance, probability, statistics, and mathematical modeling with linear and exponential functions will be embedded in each module. This course is for students not planning to major in a field requiring advanced mathematical skills.

SUGGESTED INSTRUCTIONAL METHODS:

Multiple instructional methods will be used to actively engage students in the learning process.

“FLIPPED PEDAGOGY.” Flipping the classroom” is an active-learning technique in which students learn the basics of the course content by preparing for class. In this course you are expected to complete assigned exercises BEFORE coming to each class. The students and instructor then spend class time interacting with and elaborating on that content, deepening learning and making it “stick”. The majority of our class time will be spent working on problems and engaging in activities either in a group or individually. This daily work will encourage students to think, reflect, discuss, and write about mathematical ideas and concepts in context. This course organization will help you **“learn by doing”** and develop a strong understanding of algebraic modeling.

LEARNING OUTCOMES:

- Use and interpret ratios in a variety contexts; quantify risk by calculating and interpreting probabilities.
- Solve real world problems relating to rate of changes and differentiating when to use models that utilize absolute change and models that use relative change.
- Gain knowledge of mathematics as a practical tool in examining the world of finance through a realistic study of simple and compound interest and loans, credit cards, and budgeting.
- Interpret and make inferences from statistical graphs, tables, and chart with regard to shape, center and spread.
- Understand how statistics are used in analyzing polls.
- Investigation of sampling methods and graphs with applications in scientific studies including the use of spreadsheet.
- Critically evaluate statistical studies and be able to describe the strengths, limitations, and deceptiveness.
- Understand the basics of probability.
- Investigation of linear modeling including piecewise models, linear systems, and regression.
- Estimating solutions to real world problems using equations with variables. And identifying how changing parameters can affect results

- Investigation of exponential modeling with applications in personal finance.
- Use basic logarithm properties to address the questions such as regarding times periods arising in real-world situations modeled exponentially.

WHY ARE MY MATH AND WRITING COURSES “LINKED”?

Your *College Writing I* and *Quantitative Reasoning* courses complement each other because they feature thinking skills directly connected to each other both in college and in the world outside of college. Successful students learn to analyze, synthesize, and critically evaluate; to listen to alternative viewpoints; and to reconsider their first ideas on a topic. They use these skills to succeed not only in their coursework, but also in their careers, and as citizens.

If we examine the course goals for *College Writing I* and *Quantitative Reasoning*, we see overlap in the skills learned in the two courses, as the table below shows.

College Writing I Goals	Shared Goals Between the Two Courses	Quantitative Reasoning Goals
Improve rhetorical knowledge: recognize the elements that inform rhetorical situations. Improve knowledge of composing processes. Improve knowledge of writing and editing conventions.	Develop critical reading, analysis and evaluation. Develop information literacy. Improve communication and collaboration. Practice revising and rethinking. Practice working in digital environments. Improve logical reasoning. Engage students in meaningful learning experiences.	Increase students’ quantitative and reasoning abilities. Improve students’ ability to communicate quantitative ideas both orally and in written format. Strengthen mathematical abilities that are needed in other disciplines.

Your instructors will use this overlap to help you succeed, collaborating to show you ways to apply the work you are doing in one course to your work in the other course. The linked classes will help you succeed in all of your courses at the university by developing your critical thinking.

WHY DOES THIS MATTER TO ME?

Your linked courses will give you a competitive edge in college and beyond. College educated people develop certain habits of mind: asking critical questions, listening to alternative views, revising work in progress, persisting through complexity and difficulty, and understanding their own thinking processes. These habits add up to what we call “critical thinking,” which is fundamental to coursework in all majors.

You have probably noticed that successful professionals in leadership roles can communicate persuasively. These people have influence in large part because they can blend writing and quantitative reasoning skills to make decisions, as well as to motivate, inspire and influence other people.

CLASS SCHEDULE

DATE	SECTION – TOPIC	ACTIVITY
January 17	People Bingo	Class introduction
January 19	QLRA assessment, Lesson 1.1	
January 24	5.1; quantitative literacy as a skill	Numbers, Numbers, Everywhere
January 26	No Class	
January 31	5.2; estimating with large numbers	Millions, Billions, Or Trillions (social)
February 2	5.3; scaling factors, unit conversions	The Great Pacific Garbage Patch (environment)
February 7	5.4; interest rates, estimation skills	A trillion dollars of student loans (finance)
February 9	5.5; calculating with percents	Computing and interpreting percentages (social, health, finance)
February 14	Mid-module Assessment; 5.6; absolute and relative change	Measuring Risk and Changes in Risk (health)
February 16	5.7, 5.8; Inference, Sampling Size, Sampling Strategy, bias, g	Reading a Scientific Study (health) Investigating causes of homelessness (social)
February 21	5.9; visual representations; Review	Measuring success, Media piracy (social)
February 23	Module 5 assessment, 6.1; proportional relationships and percentages	Screening Tools: how effective are they? (health)
February 28	6.2; compare proportional relationships	Rising gasoline prices (environment)
March 2	6.3; visual representations; 6.4; recognize proportional relations, conditional probability	At risk for homelessness (social) A closer look at screening tools (health)
March 7	6.5; representing and translon between data representations Mid-module Assessment	Tax targets (social)
March 9	6.6, 6.7; distribution spread	Average expectations (finance) Weighted averages (finance)
March 14	6.8, 6.9; distribution spread, center, shape, Inference, visual representations	Rising temperatures across the US (environment) Gender differences in science and math (social)
March 16	Module 6 assessment	
March 21	7.1; create linear models, use variables, construct and use equations, estimating solutions; 7.2; rates of change, creations of	Mathematical models: What's best? (social) Overview of linear models (finance)

	piecewise functions	
March 23	7.3; create linear models, use variables, construct and use equations, estimating solutions; rates of change, creations of piecewise functions	Four equations.....Two models (finance)
SPRINGBREAK		
April 4	7.4; changing parameters, identifying limitations and patterns, choosing models; Mid-module assessment	Data is trendy (health, environment)
April 6	7.5,7.6; percentages, creating exponential models using variables to construct equations, identifying patterns, changing parameters	Remembering exponential models (social) Social security for me (finance)
April 11	7.7, create linear and exponential models, use variables, construct and use equations, estimating solutions, rates of change, creations of piecewise functions review	There's no place like home (finance)
April 13	Module 7 assessment, 8.1; recognize proportional relationships	Body mass index and other health numbers (health)
April 18	8.2, 8.3; percentages, finding and estimating solutions, other models	400 guilders become a trillion (finance) Modeling car loan payments (finance)
April 20	8.4; other models; review	How did you sleep? (health)
April 25	Module 8 assessment	
April 27	Project Presentations	
May 2	Project Presentations	
May 4	No Class Remembrance Day, review	
Finals Week	7:45 May 12 or 12:45 May 11	

ATTENDANCE POLICY: Excellence attendance is mandatory for your success in the course. A significant portion of your grade is based on your preparation for and participation in each class. **Failure to attend and participate in class can cause you to fail this course.** According to the university policy 3 – 01.2 “Administrative policy regarding class attendance and class absence, students may be excused from class for **PROPERLY DOCUMENTED** “illness and injury, disability related concerns, military service, death in the immediate family, religious observance, academic field trips, participation in an approved concert or athletic event and direct participation in university disciplinary hearings.”

Students in this course must

- Document absences in hard copy form, no phone or email excuses will be accepted.
- Submit excuses in a timely manner: All excuses for anticipated absences must be submitted before the anticipated absence, or in the case of an unanticipated absence, on the first day of the student's return to class.
- Assume all responsibility for getting assignments and submitting work. Even when the absence is excused it is still your responsibility to catch up and submit the required work. Please note, the instructor is not your accountability "buddy", get the information from a trusted group member.

COURSE GRADES

Prep for Next Lesson; PNL exercises	5%
Daily class participation, completion of daily workbook activity	10%
Out of class exercises; OEC	10%
Quizzes	10%
News of the Day articles	5%
Module exams (4 @ 10% each)	40%
Final assessment	10%
Final Project	10%

GRADING SCALE

	A	93–100	A-	90–92	
B+	87–89	B	83–86	B-	80–82
C+	77–79	C	73–76	C-	70–72
D+	67–69	D	60–66	F	0–59

SOCIAL MEDIA POLICY: Being physically in the room while class is in session but being on your phone or social media is not being present in class, it is considered disruptive and as such you will forfeit the day's class points. When you are in class put your phone away, set it to silence, and close your social media. BE PRESENT!

LATE OR INCOMPLETE WORK: Follow the course calendar however it is subject to changes. Any changes in due dates will be announced in class. Late work will NOT be counted for credit without an official accepted excusal form.

CHEATING AND PLAGIARISM: University policy 3342-3-01.8 deals with the problem of academic dishonesty, cheating, and plagiarism. None of these will be tolerated in this class. The sanctions provided in this policy will be used to deal with any violations. If you have any questions, please read the policy [here](#) or ask me.

STUDENTS WITH DISABILITIES: University policy 3342-3-01.3 requires that students with disabilities be provided reasonable accommodations to ensure their equal access to course content. If you have a documented disability and require accommodations, please contact the instructor at the beginning of the semester to make arrangements for necessary classroom adjustments. Please note, you must first verify your eligibility for these through Student Accessibility Services (contact 330-672-3391 or visit www.kent.edu/sas for more information on registration procedures).

REGISTRATION REQUIREMENT: The official registration deadline for this course is Sunday January 22nd. University policy requires all students to be officially registered in each class they are attending. Each student must confirm enrollment by checking his/her class schedule (using Student Tools in Flash Fast) prior to the deadline indicated. Registration errors must be corrected prior to the deadline.