# MATH 1010: Mathematics for Liberal Arts Students
# Spring 2019

**Instructor:** Mimi Weiss
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**Course dates/times:** M, W 2:00 – 3:15
**Course Location:** NC 1605
**Office Hours:** M, W 3:15 – 4:15
or by appointment

**Dept. Associate Chair:** Stephen Hartke – SCB-4303, Phone: 303-315-1721
**Course Captain:** RaKissa Manzanares – SCB-4110, Phone: 303-315-1717

**Course Description**
Designed to give liberal arts students the skills required to understand and interpret quantitative information that they encounter in the news and in their studies, and to make quantitatively-based decisions in their lives. Topics include a survey of logic and analysis of arguments, identifying fallacies in reasoning, working with numbers and units, linear and exponential relations and essentials of probability and statistics. The emphasis is on applications with case studies in economics, finance, environmental sciences, health, music and science.

**Prerequisites:** The mathematical prerequisite for the course is that you have met the entrance requirements for the university, namely three years of high school mathematics.

**Course Objectives:** Math 1010 is a UCD Core mathematics course designed specifically for liberal arts students. The course has two major goals:

- To strengthen your quantitative skills and restore your confidence in using those skills.
- To demonstrate the relevance and applicability of mathematics to your lives and careers.

Hopefully, the course will give you an awareness of the role that mathematics plays in today's society in everything from population crises to financial planning, from environmental issues to the spread of disease. If successful, this course should equip you with quantitative skills that you will need for future courses, for careers, and for life itself!

**Text:** *Using and Understanding Mathematics: A Quantitative Reasoning Approach 7th edition*, by Bennett and Briggs.

An eBook is available and recommended for purchase since we will be utilizing the associated MyMathLab software.

You can purchase the software and the text by going to www.coursecompass.com. On the right hand side of the screen under the **Register** tab click on **Student**. At this point you will need the **Course ID** which is: weiss22017 and either a student access code (provided with purchase of a new textbook) or a

valid credit card. If you purchased the text new at the bookstore it will have a student access code which gives you access to the homework software. I would recommend just using a credit card and purchasing the software because it will also give you access to an eBook which you can use for the class. The total cost for the software and eBook is about $100.

Note: The text is very readable and the software is INCREDIBLE. The software gives you immediate feedback and tutoring on the homework problems and greatly helps to increase your understanding of the concepts.

**Calculator:** You are required to bring a scientific calculator to class every day.

**Attendance**
Attendance will be taken daily**.** You are expected to attend class faithfully and to take responsibility for your own learning. **Each student is allowed to miss up to 3 class periods over the course of the semester.** If you chose to miss more than the allotted 3, you will lose the opportunity to improve prior exam grades on the final exam.

**"A genius is a talented person who does his homework." ~Thomas Edison**

**Methods of Evaluation**

**Homework**

Homework problems will be assigned weekly from the online homework program MyMathLab (MML). These assignments will be graded and are worth a total of 100 points. The lowest assignment will be dropped at the end of the semester. You will use MML to do the online homework. You get immediate feedback while doing the online homework since the problems are graded as you do them. Additionally, if you want to improve your score on a particular assignment you can return and retry that assignment before its due date.If you do not do an online homework by its due date you will receive a zero on that homework.

**Quizzes**

There will be 11 homework quizzes over the course of the semester worth 15 points each. Each quiz will be over the prior week's homework and will be given every Wednesday except during exam weeks (e.g. homework assigned in week 1 will be covered in the quiz on Wednesday of week 2). **No make up quizzes will be given**. You must contact me in **advance** to arrange another time to take the quiz (prior to the scheduled in class quiz). To compensate for unforeseen circumstances, one-quiz score will be dropped. The quizzes will be given at the end of the class. Do not be late!

**Project/Activities**

There will be several activities and at least one group project that will be required of all students.

**Exams**

There will be 3 in class exams worth 100 points each – see tentative schedule for dates. A **3" X 5" hand written notecard** will be allowed on each exam and all 3 notecards will be allowed on the Final Exam. **There will be no make up exams,** unless you contact me in **advance** so that we may

arrange another test date (prior to the scheduled in class exam): documentation **will** be requested. You must bring your student ID card to each exam.

**Final Exam**

There will be a comprehensive final exam worth 150 points. Each student who has maintained the attendance policy will have the opportunity to improve prior exam scores on the final exam.

**Computing Your Final Grade**

| | | Letter Grade |
|---|---|---|
| Homework Quizzes | 150 points | A: 720-800 points |
| MML Homework | 100 points | B: 640-719 points |
| In-class Exams | 300 points | C: 560-639 points |
| Project/Activities | 100 points | D: 480-559 points |
| Final Exam | 150 points | F: Below 480 points |
| Total | 800 points | |

**Course Expectation**

Mathematics is not a spectator sport. You must engage with the material to learn. Rule of thumb: plan to spend two to three hours outside of class (reviewing your lecture notes, reading the text, and working problems) for every hour spent in class. It is important that you seek help from your instructor or your classmates if you get stuck. I encourage you to form study groups.

**Incompletes**

The incomplete policy of the department and college is strictly enforced. Incomplete are only given in situations in which a student has been in good standing all semester (passing the course with a grade of C or better), is prevented from completing a course assignment (for example the final exam) by circumstances beyond his control (for example: hospitalization or death of a family member).

**Academic Dishonesty**

Students are required to know, understand, and comply with the CU Denver Academic Dishonesty Policy as detailed in the Catalog and on the CLAS website. Academic dishonesty consists of plagiarism, cheating, fabrication and falsification, multiple submission of the same work, misuse of academic materials, and complicity in academic dishonesty. If you are not familiar with the definitions of these offenses, go to http://www.ucdenver.edu/academics/colleges/CLAS/faculty-staff/policies/Pages/DefinitionofAcademicDishonesty.aspx. This course assumes your knowledge of these policies and definitions.

Failure to adhere to them can result in possible penalties ranging from failure of this course to dismissal from the University; so, be informed and be careful. If this is unclear to you, ask me. The College of Liberal Arts and Sciences (CLAS) Ethics Bylaws allow the instructor to decide how to respond to an ethics violation, whether by lowering the assignment grade, lowering the course grade, and/or filingcharges against the student with the Academic Ethics Committee. Violating the Academic Honor Code can lead to expulsion from the University.

**Disruptions**

Class disruptions (cell phones, music, etc) and any other inappropriate behavior will not be tolerated. I will penalize accordingly. Please see the CU-Denver Code of Student Conduct for details.

**Disabilities**

Students with disabilities who need accommodations should make me aware of this either by contacting me directly or by having the Disabilities Services Office (SCB-2116; 303-315-3510) contact me by the end of week 1 of classes.

**Talk to Me**

I'll give my best effort to make this class run smoothly for you, but it is important that you communicate with me when any issues arise or if there are any problems/concerns.

**Getting Help**

The Learning Resource Center - Located in SCB-2105. 303-315-3531

- Offers free tutoring and help concerning class assignments, course-loads, and study skills

MERC (Math Education Resource Center) - Located in NC 4015. 303-315-1712

- Free assistance on assignments
- Must bring valid CU-Denver ID.

**For relevant university deadlines and procedures (such as the last day to withdraw from a course) as well as academic support sites, please see this website https://clas.ucdenver.edu/faculty-staff/sites/default/files/attached-files/student_services_and_calendar.pdf.**

**Colorado Commission on Higher Education Learning Objectives**

The Colorado Commission on Higher Education has approved MATH 1010 for inclusion in the Guaranteed Transfer (GT) Pathways program in the GT-MA1 category. For transferring students, successful completion with a minimum grade of C- grade guarantees transfer and application of credit in this GT Pathways category. For more information on the GT Pathways program, go to http://highered.colorado.gov/academics/transfers/gtpathways/curriculum/html.

**GT Pathways Mathematics (GT-MA1) Content Criteria:**

a) Demonstrate good problem-solving habits, including:

- Estimating solutions and recognizing unreasonable results.
- Considering a variety of approaches to a given problem, and selecting one that is appropriate.
- Interpreting solutions correctly.

b) Generate and interpret symbolic, graphical, numerical, and verbal (written or oral) representations of mathematical ideas.

c) Communicate mathematical ideas in written and/or oral form using appropriate mathematical language, notation, and style.

d) Apply mathematical concepts, procedures, and techniques appropriate to the course.

e) Recognize and apply patterns or mathematical structure.

f) Utilize and integrate appropriate technology.

**GT Pathways Mathematics (GT-MA1) Competencies:**

**A. Quantitative Literacy**: Competency in quantitative literacy represents a student's ability to use quantifiable information and mathematical analysis to make connections and draw conclusions. Students with strong quantitative literacy skills understand and can create sophisticated arguments supported by quantitative evidence and can clearly communicate those arguments in a variety of formats (using words, tables, graphs, mathematical equations, etc.).

Students should be able to:

**1. Interpret Information**.

a. Explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words).

**2. Represent Information**.

a. Convert information into and between various mathematical forms (e.g., equations, graphs, diagrams, tables, words).

**3. Perform Calculations**.

a. Solve problems or equations at the appropriate course level.

b. Use appropriate mathematical notation.

c. Solve a variety of different problem types that involve a multi-step solution and address the validity of the results.

**4. Apply and Analyze Information**

a. Make use of graphical objects (such as graphs of equations in two or three variables, histograms, scatterplots of bivariate data, geometrical figures, etc.) to supplement a solution to a typical problem at the appropriate level.

b. Formulate, organize, and articulate solutions to theoretical and application problems at the appropriate course level.

c. Make judgments based on mathematical analysis appropriate to the course level.

**5. Communicate Using Mathematical Forms.**

a. Express mathematical analysis symbolically, graphically, and in written language that clarifies/justifies/summarizes reasoning (may also include oral communication).

**B. Problem Solving**: Competency in problem solving represents a student's ability to design, evaluate, and implement a strategy to answer a question or achieve a goal.

Students should be able to:

**1. Define a Problem**.

a. Construct a detailed and comprehensive problem statement or goal.

b. Identify relevant contextual factors.

**2. Propose a Strategy**.

a. Identify reasonable approaches to solving the problem within the given context.

**3. Evaluate Potential Strategies**.

a. Provide an evaluation of the potential strategy(ies) which may include:

- i. the history of the problem,
- ii. the logic behind the potential strategy(ies),
- iii. the feasibility of the proposed strategy(ies), and
- iv. the potential impacts of the proposed strategy(ies).

b. Choose a feasible strategy.

**4. Apply a Strategy**.

a. Implement chosen approach(es).

b. Gauge success of the chosen strategy(ies) and revise as needed.

As a CORE course in mathematics, by the end of the semester all students will:
1. ***Calculate***: Accurately and logically manipulate a mathematical representation to attain desired information.
2. ***Represent*****:** Able to translate between representations to clearly represent information and gain insight. Representations may be expressed symbolically, graphically, numerically, or verbally.
3. ***Interpret:*** Draw meaningful inferences and communicate insights from mathematical representations.Mathematical representations may include statistical, graphical, algebraic, geometric, or symbolic.
4. ***Model:*** Develop and/or apply an appropriate mathematical model for a real-world problem. This can be demonstrated by e.g. developing a model, choosing an appropriate model from several, or explaining the primary assumptions needed to use a particular model.

These CORE Learning Objectives will be demonstrated and assessed within the following specific learning objectives for this Mathematics for the Liberal Arts Course.

Students will be able to:

- Use set notation to write the members of sets or state that a set has no members. ***Represent***
- Draw a Venn diagram with two circles showing the relationship between a pair of sets. ***Represent***
- Draw a Venn diagram with three overlapping circles to represent the relationship among three sets. ***Represent***
- Use unit (dimension) analysis to convert from one unit of measure to another. ***Calculate***
- Convert percentages to fractions and decimals and vice versa. ***Calculate***
- Compute absolute and relative change. ***Calculate***
- Solve problems involving percentages including percentage difference questions, 'of' vs. 'more than' questions and price and sale percentage questions. ***Calculate***
- Represent numbers using scientific notation and be able to multiply and divide numbers in scientific notation without a calculator. ***Represent***
- Use estimation to determine whether given statements are reasonable (i.e. A person could walk across the U.S. in one year.) ***Interpret***
- Solve financial problems involving simple and compound interest. ***Calculate & Model***
- Solve financial problems involving continuous compound interest. ***Calculate***
- Use the Savings Plan Formulas (with regular payments) to determine the amount of money needed to invest each month in a savings plan to achieve a desired goal. ***Calculate & Model***
- Calculate total and annual return for investments. ***Calculate***
- Calculate annual percentage yield for investments. ***Calculate***
- Calculate loan, credit card and mortgage payments for fixed APR loans. ***Calculate & Model***
- Identify which statistical sampling technique is being used in a given study. ***Interpret***
- Read a statistical study and identify any bias or confounding variables present. **Interpret**
- Use the theoretical method to determine the probability of a given outcome or event. ***Calculate***
- Use the empirical method to estimate probabilities ***Calculate***
- State an estimate of a subjective probability and explain how they arrived at it. ***Calculate***

- Calculate the probability of an event not occurring. ***Calculate***
- Construct a probability distribution for a given set of events. ***Calculate***
- Calculate the odds for and odds against an event happening. ***Calculate***
- Identify whether two events are independent or dependent. ***Interpret***
- Identify whether two events are overlapping or non-overlapping. ***Interpret***
- Compute 'and' probabilities for independent events and 'or' probabilities for overlapping and non-overlapping events. ***Calculate***
- Use the at least once rule to find the probability of certain events. ***Calculate***
- Calculate the expected value of a given game or insurance policy. ***Calculate***
- Identify examples of the gambler's fallacy ***Interpret***
- Identify and use the appropriate counting technique (i.e. arrangements with repetition, permutations or combinations) to count the number of ways a given event can occur (i.e. how many ways can the nine performances at a piano recital be ordered). ***Calculate***
- Identify whether a quantity is growing linearly or exponentially. ***Interpret***
- Use doubling time and half-life time reasoning to predict future populations/quantities given information about a growth or decay rate. ***Model***

*NOTE: I reserve the right to change the syllabus throughout the course of the semester.*

**Tentative Course Schedule**

| **Week of** | **Topic/Reading** | **Notes** |
|---|---|---|
| January 21st | Syllabus, 1C, 1E | |
| January 28th | 2A, 2B | Quiz 1 |
| February 4th | 3A | Quiz 2 |
| February 11th | 3A, 3B | Quiz 3 |
| February 18th | Review/Catch-Up | **Exam #1** |
| February 25th | 4A, 4B, 4C | Quiz 4 |
| March 4th | 4C, 4D | Quiz 5 |
| March 11th | 8A, 8B | Quiz 6 |
| March 18th | Review/Catch-Up | **Exam #2** |
| March 25th | Spring Break – No Class | |
| April 1st | 5A, 5B, 5C, 5D | Quiz 7 |
| April 8th | 6A, 6B, 6C | Quiz 8 |
| April 15th | 6C, 7A, 7B | Quiz 9 |
| April 22nd | 7C, 7E | Quiz 10 |
| April 29th | Review/Catch-Up | **Exam #3** |
| May 6th | Review/Catch-Up | Quiz 11 |
| May 13th | **Final Exam Week** | |

*NOTE: I reserve the right to change the tentative schedule throughout the course of the semester.*