

Math for Social Justice

Math 103

Fall 2020

In this class we will use mathematics to better understand justice, fairness, and equality.

Then we will use that new knowledge to improve the world.

Instructor: Dr. Dominic Klyve

Office: Bouillon 123

Phone: 963-2545

E-mail: klyved@cwu.edu

Webpage: <https://sites.google.com/site/profklyve/>

Office Hours: By appointment

Meeting times: Mon, Tues: 4:00 – 4:50 via Zoom

Wed, Thur, 4:00 – 4:50 via Zoom or in Samuelson 251 (student choice)

Course Description:

In this course, mathematics will be used to explore issues of social, political and economic justice. We'll use the power of mathematics as an essential analytic tool in understanding justice issues in our community and in the world. The overarching goal of this course is for you to develop the ability and inclination to use mathematics to understand, and improve, the world around you. Topics will vary depending on your interests and on how quickly we move, but we will probably cover these:

- **Quantitative Literacy.** What does it mean to be quantitatively literate? What should people know in order to be responsible citizens in a democracy?
- **Numbers.** How do we interpret numbers in the media and in everyday life? How do we make sense of astronomically large or infinitesimally small numbers?
- **Estimation.** How (and why!) can we use basic ideas of arithmetic to answer interesting questions about the world?
- **Conversions, Percentages & Inflation.** Converting from one unit to another (e.g. currencies), using percentages, and calculating inflation are all different forms of multiplication. How do we use these techniques get used (and abused) in the news?
- **Statistics and data.** How do we use statistics to translate data into a story? How can statistics be manipulated into spinning a particular story?
- **Distribution.** Recent movements have brought the ideas of income and wealth distributions (e.g. the 99% and the 1%) back into the public's consciousness. How can we use mathematics to understand the equal (or unequal) distribution of anything that is valued?
- **Probability.** How do we understand random events? How is probability used to manipulate us?
- **Financial Math.** Underlying all financial systems are ideas of interest, compound interest, and inflation. What is the mathematics behind basic financial tools such as credit cards, home mortgages, and investments?
- **Voting Methods.** In many cases, the result of a vote depends on what type of voting method a group uses. We will discuss various types of voting, including Borda, Condorcet, Instant Runoff Voting and others. (We'll get to this if we have time.)
- **Voting procedures.** How are voting districts drawn? Could they be more fair?

What will happen in the course:

For the most part, classes will combine lecture and discussion of the material in the readings. I will assign you something to read for (almost) every class. You will be responsible for writing a brief response to this reading every class day (see below).

Text and Grading Details

Required Text:

1. None. I'll post things to be read on Canvas throughout the quarter.

Evaluation and Grading:

Attendance & Participation: 10%

Homework: 20%

Reading the news: 15%

Project proposals: 5%

Project: 20%

Final Exam: 20% (15% test, 5% prep)

Reading responses: 10%

Reading Responses: Each day for which a reading is assigned, you are to post a Reading Response to the reading in Canvas. Some students prefer to write this out in full paragraphs (2–3). More commonly, students give a quick summary of how they found the reading, and then list their questions and comments. You could tell me something that you found interesting, and what you still have questions about. Perhaps there are questions which the reading suggests but doesn't answer that you'd like us to discuss in class. These are *due by 10:00 p.m. on the day before class*, so that I can read them and prepare answers before class starts. Your responses, summaries, and points of confusion will guide our discussion that day.

Homework: Homework will be assigned most weeks, and will be due on Monday of the following week.

Weekly “Reading the News”: Part of quantitative literacy is being able to critically interpret numbers and mathematics in the news media. Each week, you'll be asked to report on numbers or mathematics contained in an article you've read related to an issue of social justice. You'll also be asked to respond to someone else's report. These assignments will be completed online using Canvas discussion forums.

Final Exam: At the end of term, we will take an in-class final exam. This test is designed to help ensure that some information is stored semi-permanently in your mind. However, because I trust you all to have a fairly good idea of what you want out of this class, you all will have a chance (and a duty) to help prepare it. After each of our major sections, you are to prepare four factual (fill-in-the-blank, multiple choice, or similar) questions, two short-answer questions, and one essay question. These should be posted on the appropriate Canvas Discussion Board on a daily basis. It would also be a good idea to read and try to answer others' questions on a daily basis as well.

Projects: As mentioned above, a main focus of this course is on actually making the world around us a better, more just place. We will work to enact justice through a quarter-long project. Early in the semester (by Monday, Sep. 28th) you will be required to write up a proposal for a project that aims to change the world in a small but important way. In a single page, you should layout the basic issue you hope to address, how mathematics will be needed to understand and address it, what your initial plan of attack is, and what you hope to accomplish this semester on your issue. In class that same day, you will have an opportunity to pitch your idea to the class, with the goal of attracting other students to your cause.

After everyone has pitched their ideas, we will vote and divide into 8-10 groups, each tackling one proposal, or a combination of several closely related proposals. The project will last the rest of the semester as you work to study the issue, understand it better using mathematics, and work toward change. You will be asked to report to the class periodically on your progress.

As for the scope of the projects, this is largely up to you. Change might happen in small amounts on a large scale, or in larger increments on a smaller scale. You might choose to raise awareness of an issue with an educational campaign – one that highlights how mathematics and/or statistics shapes your views. Many different types of projects will be valued. You must, however, directly work on the issue involved (that is, simply raising money for a charity will not be considered as an appropriate project.)

Other details

Attendance and Participation: Class attendance and participation are a required part of this course and will influence your grade. It is your responsibility to come to class having done the readings and given them serious thought and to be prepared to help the class discuss the material. Missing more than three classes may have a negative impact on your grade.

Cheating and Plagiarism: You are encouraged to interact with others as you do the readings (in fact, it will be a lot more fun doing it that way). Your papers, however, must be your own. You may, of course, seek help from any and all sources, but in the end what you write must be a result of your own thought processes and your assessment of the source material. Do not quote without attribution, and do not state as fact the opinions of one of your sources. Footnotes and bibliographic references are required. Feel free to discuss any questions you have about this with me. Also, please read Central's policy on academic honesty as stated in the College Catalog.

Disabilities: Students with disabilities who wish to set up academic adjustments in this class should confirm with me that I have received a copy of their “Confirmation of Eligibility for Academic Adjustments” from the Center for Disability Services as soon as possible so we can discuss how the approved adjustments will be implemented in class. Students without this form should contact the Center for Disability Services, Bouillon 205 or dssrecept@cwu.edu or 963-2171.

Coronavirus-related matters: Due to COVID-19, and under the directive and mandate of public health officials and the president of Central Washington University, students must adopt face covering protocol before entering any classroom or building at CWU until further notice. Students must also follow the social distancing placement marks in buildings and classrooms. If you do not have a face covering Central Washington University can provide one for you. If you have not yet received your CWU-supplied facial covering, please go the SURC Information Desk. Please do so prior to the start of your first class.

Disclaimer: I reserve the right to change the policies contained in this syllabus as dictated by developments during the quarter.