

Syllabus for Math 100: Quantitative Reasoning

General Class Info:

<u>Instructors and Teaching Assistants:</u>	Justin Brown, PhD Email: justin.brown@northwestern.edu Office: Hogan Hall, Room 2-160	Molishka Flores-Narvaez Email: molishka.flores-narvaez@northwestern.edu
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Class: Mondays and Wednesdays, 9AM-12PM, Location TBA

Office Hours: Instructors and Teaching Assistants will hold office hours Monday - Thursday, 1:30-2:30PM

Text: *Quantitative Reasoning: Thinking in Numbers* by Zaslow

Course Description and Goals:

Course Description:

This is a course about quantitative reasoning, which is the process of analyzing and interpreting numerical data through the use of mathematical tools. Math courses often focus on understanding how to solve concrete mathematical problems---solve this equation, compute this number, etc— without saying much about the types of scenarios where these problems arise or why one should care. Our aim here instead will be to fully come to terms with these types of scenarios (how much will this mortgage cost me over 30 years? how risky is this medical drug relative to the benefits it provides?) and to understand how they can be approached via quantitative means. In everyday life you see numbers being thrown about everywhere, and what we care about is understanding how to use and interpret these numbers to draw meaningful conclusions. As a result, this will likely be quite different from other math courses you've previously taken, but in the end it should be very worthwhile.

Each chapter of the book begins by asking a basic question one might want to address, such as: is college worth the cost, or, should we worry about arsenic in rice? Then, the book goes through a discussion of the type of data one would need in order to be able to give a meaningful answer to this question, and how this

data can be gathered. Finally, the data is analyzed using various mathematical tools, many of which are summarized in the appendices, and an answer to the question is obtained. This is the format we will follow in class as well: talk about the question and the data one would need to obtain to develop an answer, talk about the mathematical tools needed to analyze that data, and use these tools to find an answer. We won't have enough time to go through all 10 chapters in full, but will pick ones which give an overview of different aspects of quantitative reasoning.

Course Goals:

Specifically, by the end of the course you should be able to:

- Formulate questions which can be addressed via quantitative means
- Gather the types of data which are necessary to address these questions
- Understand the mathematics which goes into the tools used to analyze this data
- Formulate an answer to these questions based on quantitative analysis

Course Organization and Grading:

Course Organization:

Each week of the course is taught by one of the four instructors and is spent covering a different chapter of the book and corresponding quantitative skill(s). Students will read the chapter for that week prior to coming to class. We will start class with a brief 10-minute quiz on the material from the week prior. We will spend the remainder of the first class period learning and practicing the skill/method for that particular week and going over the main chapter question. In the next class period of the week, we will focus on related exercises from the chapter and learn how to collect and analyze data. In addition to the quizzes, you will have two homework assignments due each week and a group project due at the end of week 4. Here is the general schedule for each week:

Class Meeting 1 (Monday)

Homework: Read the chapter prior to class

10-Minute Quiz on previous week's chapter (there is no quiz in week 1)

Hour 1: Lecture

Hour 2: Work on appendix problems

Hour 3: Work through the main chapter question

Class Meeting 2 (Wednesday)

Homework Due: Selection of appendix problems

Hour 1: Discuss "exercises" from end of chapter

Hour 2: Data collection

Hour 3: Group-Work

Friday (Each Week)

Homework Due: Selection of "exercises" from end of chapter

Quizzes:

At the start of weeks 2, 3, and 4, you will have a brief quiz on the material from the week prior. These quizzes are in place to help you assess your learning as you progress through the course - we want to ensure you are developing the necessary quantitative skills for your college career (and beyond!). Importantly, we also view this as an opportunity for you to begin to refine your study skills and get a feel for formal assessments at Northwestern. Most incoming students have not *learned how to learn*. Your instructors and TAs will give you some studying tips in class and we are always happy to discuss this and other methods for success in office hours.

Homework:

Homework will be due on Canvas at 9am on Wednesdays and Fridays (see schedule above). You are welcome (and encouraged!) to work together on problem sets but each student must hand in their own assignment in their own writing. You should strive for clearly written and unambiguous solutions, which should get easier to produce as the course moves on.

Group Project:

You will also have a group project in the class due at the end of week 4. You will work with 2-3 other students on a project pertaining to your week 1 chapter and quantitative skill. Given that the course is focused on answering concrete questions through quantitative means, demonstrating these skills in questions you yourself come up with will be crucial. The project should be structured like one of the chapters in the book: identify a question which can be addressed via quantitative means, gather the necessary data, and interpret that data mathematically in order to get an answer to the question posed. There will be various deadlines involved with this (one for finding your question, one for gathering the necessary data, etc) and more details will be given later.

Course Grading Scheme:

Quizzes (3 total):	30%
Homework - Appendix problems (4 total)	20%
Homework - Exercises (4 total)	20%
Group project:	30%
Total:	100%

Note: This course is pass/fail so you will not receive a final letter grade

Schedule:

	Week 1 8/8-8/12	Week 2 8/15-8/19	Week 3 8/22-8/26	Week 4 8/29-9/2
Group 1: Home Instructor Brown	Ch 4: <i>Should we worry about arsenic in rice?</i> Brown	Ch 10: <i>Should I take this drug for my headache?</i> Truchan	Ch. 8: <i>Why is it dark at night?</i> Ratliff	Ch. 3: <i>How much will this car cost?</i> Canez
Group 2: Home Instructor Canez	Ch. 3: <i>How much will this car cost?</i> Canez	Ch 4: <i>Should we worry about arsenic in rice?</i> Brown	Ch 10: <i>Should I take this drug for my headache?</i> Truchan	Ch. 8: <i>Why is it dark at night?</i> Ratliff
Group 3: Home Instructor Ratliff	Ch. 8: <i>Why is it dark at night?</i> Ratliff	Ch. 3: <i>How much will this car cost?</i> Canez	Ch 4: <i>Should we worry about arsenic in rice?</i> Brown	Ch 10: <i>Should I take this drug for my headache?</i> Truchan
Group 4: Home Instructor Truchan	Ch 10: <i>Should I take this drug for my headache?</i> Truchan	Ch. 8: <i>Why is it dark at night?</i> Ratliff	Ch. 3: <i>How much will this car cost?</i> Canez	Ch 4: <i>Should we worry about arsenic in rice?</i> Brown

Getting Help:

1. Office hours. ☆Did you know that asking for help is a sign of strength? We are here to help you develop necessary skills for your future classes at Northwestern and we want you to succeed! Please come see us if you need help or guidance. Drop in to any office hours session to clarify a specific point in class, discuss questions before a quiz, discuss your group project, ask about study skills, your

background, your career goals, etc.

2. Additional Resources. You can also find useful resources for safety and security, academic support, mental and physical health, and general well-being at the NUhelp [website](#) and [app](#).

How to Do Well in the Course:

1. Come to class prepared. Pre-read the indicated reading assignments before coming to class. Be rested and refreshed.
2. Participate in class. Actively participate in class! Be mentally present and take notes on class material. Work actively with your group. Don't be afraid to ask questions or make mistakes - mistakes are a natural part of the learning process!
3. Think about the bigger picture. Consider how the material fits into the remainder of the course and in your life! Reinforcing class material and making connections will help your understanding and memory and may help you identify what you still have questions about.
4. Test yourself on the material and identify study habits that work well for you. Research in teaching and learning tells us that frequent testing/assessment, whether informal or formal, is the best way that students learn. We encourage you to test yourself frequently on your knowledge of the material. Identify the main points of the lecture and draft your own potential test questions. Rephrase or modify appendix and exercise questions and practice solving them. Even at the end of the class period, ask yourself, did I understand the material? If not, what areas do I have the most trouble with? Most importantly, be mindful while studying – ask yourself, is this study technique really working for me?
5. Don't just re-read your class notes and book. Research shows students that rely on reviewing class notes and the textbook as the sole methods of study do not perform better. Active engagement, spaced recall, and “desirable difficulties” when studying and learning are the most effective. Don't believe us - check out these articles: [Article 1](#), [Article 2](#), [NU Reading mistakes](#), [Fonts and learning](#).
6. Work in a group and test each other. How many times have you thought, “I've got this” but when you have to articulate it out loud it doesn't come out as planned or you recognize you have more questions than answers? Improve your understanding and retention of material by talking about it with others and describing or drawing the main concepts together. Read [here](#) for tips on how to run a study group. However, don't get in a trap and just listen to your peers, you must *participate* in the discussion to get the most out of it.

Class Policies:

Accommodations: Northwestern University is committed to providing the most accessible learning environment as possible for students with disabilities. Should you anticipate or experience disability-related barriers in the academic setting, please contact [Accessible NU](#) to move forward with the University's established accommodation process (e-mail: accessiblenu@northwestern.edu; phone: 847-467-5530). If you have already established accommodations with AccessibleNU, please let us know as soon as possible, preferably within the first two weeks of the term, so we can work together to implement your disability

accommodations. Disability information, including academic accommodations, is confidential under the Family Educational Rights and Privacy Act.

Academic Integrity: Students are required to comply with University regulations regarding academic integrity. Academic dishonesty includes, but is not limited to, cheating on an exam, obtaining an unfair advantage, impersonating another student during an exam, and plagiarism (e.g., using material from readings without citing or copying another student's paper). Additionally, all course materials are protected by Copyright and are the property of the instructor and/or the publisher. **Posting course materials (e.g. Quizzes, Class Slides) to online repositories such as fraternity or sorority test banks, or websites such as "CourseHero" is a violation of US copyright law and will result in disciplinary action.** Failure to maintain academic integrity will result in a grade sanction, possibly as severe as failing and being required to retake the course, and could lead to a suspension or expulsion from the program. Other penalties may apply. For more information, visit the [NU Academic Integrity](#) page.

Apps: See these links for privacy information for the apps that may be used in this course: [Zoom](#)

Late Policy: Late homework will be docked as follows: < 24 hours late = - 20%; > 24 hours and < 48 hours late = - 40%; > 48 hours late = no credit given.

Uploading Files to Canvas: It is **your** responsibility to ensure your files are uploaded properly. Files that are blank, unreadable, or not in the required format will be considered unsubmitted. The late policy will apply.

Recording of Class Sessions by Instructor: This class or portions of this class may be recorded by the instructor for educational purposes and available to the class during the quarter. Portions of the course that contain images, questions, or commentary/discussions by students will be edited out of any recordings that are saved beyond the current term.

Recording of Class Sessions by Students: Unauthorized student recording of classroom or other academic activities (including office hours) is prohibited. Unauthorized recording is unethical and may also be a violation of University policy and state law. Students requesting the use of assistive technology as an accommodation should contact AccessibleNU. Unauthorized use of classroom recordings – including distributing or posting them – is also prohibited. Under the University's Copyright Policy, faculty own the copyright to instructional materials – including those resources created specifically for the purposes of instruction, such as syllabi, lectures and lecture notes, and presentations. Students cannot copy, reproduce, display, or distribute these materials. Students who engage in unauthorized recording, unauthorized use of a recording, or unauthorized distribution of instructional materials will be referred to the appropriate University office for follow-up.

Student Ownership of Content: Students retain ownership of all content developed while completing this course, as dictated by the University Copyright Policy ("copyright ownership resides with the Creator(s) of copyrightable works"). Per the Family Educational Rights and Privacy Act (FERPA), if your instructor wishes to share your work with future students, your permission must be obtained in writing.

Title IX Statement: It is the policy of Northwestern University to comply with Title IX of the Education Amendments of 1972, which prohibits discrimination (including sexual harassment and sexual violence) based on sex in the University's educational programs and activities. Title IX also prohibits retaliation for asserting or otherwise participating in claims of sex discrimination. The Title IX coordinator and the deputy coordinators have been designated to oversee Northwestern's compliance with Title IX and to respond to reports of violations. For more information about Title IX, go to [Northwestern's Title IX website](#). A person may

also file a complaint with the Department of Education's Office for Civil Rights regarding an alleged violation of Title IX by visiting the U.S. Department of Education's website or calling 800-421-3481.