Syllabus for MATH 100-BR:
Quantitative & Scientific Reasoning

General Class Info:

Instructors: Justin Brown, PhD
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Class: Tuesdays, Wednesdays, Thursdays, and Fridays 9AM-10:20AM

Office Hours: Instructors will hold office hours by request.

Text: No official textbook. Readings will be distributed by the instructors.

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 come to terms with these types of scenarios 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.

We will spend time discussing how to formulate a question quantitatively and determining the quantitative skill that will be needed to address it. Broadly, the skills we will use are: algebra and arithmetic, working with units and estimates, probabilistic and statistical reasoning, and using functions to model data.

Course Goals:

Specifically, by the end of the course students 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 and communicate an answer to these questions based on quantitative analysis;
- Manage their time effectively on both a daily basis and over longer periods;
- Study efficiently and effectively;
- Know when and how to ask for help.

Course Organization and Grading:

Course Organization:

Each week will focus on a specific quantitative skill. Roughly, we will spend the first class of the week setting up the skill by looking at a specific and then reviewing the necessary mathematics. The rest of the week will focus on further problem solving with that specific skill in various scenarios. Time will also be taken in class to work on problems in groups with the assistance of the instructor and to discuss as needed broader study skills that are essential for success at Northwestern.

We will roughly stick to the following schedule for the quantitative skills we hope to cover. However, this is not to say that these skills will *never* be used in other weeks, only that the listed week is when the main focus will be on that specific skill.

Week 1: Data and Functions
Week 2: Arithmetic and Algebra
Week 3: Units and Estimates
Week 4: Probability and Statistics

Homework:

There will be one main homework assignment that students will work on each week, broken up into smaller pieces with multiple due dates. You should expect to have problems to work on and submit each Tuesday through Friday, which should take up no more than 30 minutes of time each night. After each submission you will receive feedback on whether your work and you will revise as the week goes on. The final assignment submission of the week will be due Sunday night, by which point you should have a clear idea of what is expected based on the feedback you received throughout the week. One important factor that we will emphasize is the quality of your quantitative writing and communication: a proper “solution” to a problem should not consist of simply a string of equations or numbers without any context, but should instead include adequate explanations clarifying your work.

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.

Exams:

There will be one midterm and one final exam. The point of these exams is to provide an opportunity to review the material we covered in class and simulate the exam environment you might find in your Northwestern classes. Exams will take place at the end of week 2 and on the last day of class during week 4. Exams will be closed book and closed notes. Calculators will be allowed.

Course Grading Scheme:

Your final course grade will be determined as follows:

Homework and Weekly Assignments: 75%
Midterm: 10%
Final: 15%

Grade	A	A-	B+	B	B-	C+	C	C-	D	F
Final Average (%)	100–93	< 93–90	< 90–87	< 87–83	< 83–80	<80–77	< 77–73	< 73–70	< 60–70	< 60

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. We are always happy to clarify a specific point in class, discuss questions before an exam, ask about study skills, and discuss 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.

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.

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.

Course 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

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.