

**UPADM-GP 111: Quantitative Analysis for Public Policy**

**Fall 2023**

**Instructor Information**

* Scarlett Wang
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* Office Hours: By appointment

# Teaching Assistant Information

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* Office Hours: By appointment

# Course Information

* Class Meeting Times: Wednesday, 9/5 – 12/15, 11:00am – 1:30 pm
* Class Location: 194 Mercer, Room 307
* Lab Meeting Times: Fridays, 9/5 – 12/15, 8:00am – 9:00am
* Lab Location: Bobst Room LL 150

# Course Description

This course introduces students to basic statistical methods and their applications to management, policy, and financial decision-making. The course covers the essential elements of descriptive statistics and univariate and bivariate statistical inference and introduces multivariable analysis. The course emphasizes applied statistics and data analysis in addition to statistical theory and encourages a critical approach to reviewing statistical findings and using statistical reasoning in decision-making.

Translation: In this class, you will learn how to use data to think about social science questions. This course is introductory only in the sense that we assume no prior knowledge of statistics or advanced mathematics. We plan to move fast and help you acquire the tools you need to be successful in a rapidly evolving field, to be able to perform your very own independent analysis in a variety of contexts, to understand published research, and to be a sophisticated consumer of quantitative information. You will leave this class with technical skills that you can use and a better ability to understand the world around you.

# Course and Learning Objectives

By the end of the semester, you should be able to:

1. have a broader and more general understanding of statistics and social science research when reading articles, both academic and general;
2. be able to identify the appropriate statistical analyses to apply to specific research questions;
3. be proficient in using Excel for conducting statistical analyses and;
4. be able to form conclusions based on the results of statistical analyses**.**

# Learning Assessment Table

|  |  |
| --- | --- |
| **Course Learning Objective Covered** | **Corresponding Assignment Title** |
| #1,3 | Homework 1 |
| #1,2 | Homework 2 |
| #1, 2, 3, 4 | Homework 3 |
| #1, 2, 3, 4 | Homework 4 |
| #1, 2, 3, 4 | Homework 5 |
| #1, 2, 4 | “Midterm” Exam |
| #1, 2, 3, 4 | Homework 6 |
| #1, 2, 3, 4 | Homework 7 |
| #1, 2, 3, 4, | Homework 8 |
| #1, 2, 3, 4 | Homework 9 |
| #1, 2, 3, 4 | Homework 10 |
| #1, 2, 3, 4 | Final Project |

**Textbooks and Materials**

Readings for this class will come from a textbook, listed below, and from other handouts and materials that I will produce and post on the Brightspace site.

Required:

* Anderson, D. R., Sweeney, D. J., Williams, T. A., Camm, J. D., & Cochran, J. J. (2020). *Modern business statistics with Microsoft Excel*. New York: Cengage Learning.
* MindTap for Essentials of Modern Business Statistics with Microsoft® Excel®, 8th Edition (NOTE: This is the required courseware connected to the required textbook; an e-book is included in MindTap so you do not need to purchase the textbook separately unless you require a physical copy of the book).
* Microsoft Excel in Office 365

The course requires access to Excel. Within Excel, the Data Analysis ToolPak should be installed. Please download the full version of Excel, which is available through Office 365 (register [with your NYU email).](https://www.microsoft.com/en-us/education/products/office/default.aspx) Instructions on how to download Office 365 are available here:

# <https://tisch.nyu.edu/cit/information-technology/faq/gain-access-to-office365>

# You must download the full version of Excel to your computer. The online version will not be sufficient for this course.

**Course Requirements and Grading**

Your performance in this class will be assessed through multiple assignment types. These components are weighted:

* + Pre-Class Quizzes: 10%

# Attendance: 10% (Each student is allowed one absence, not counting the midterm exam.)

* + Homework Assignments: 20%
  + “Midterm” Exam: 30%
  + Final Project: 30%

Pre-class quizzes:

These are available online in advance of class via Brightspace Quizzes feature. These are multiple-choice questions based on the reading for that week as well as the past material for the course. These questions focus on major themes to help you identify and review critical concepts, prepare for class each week, and prepare for the exam. These quizzes should be completed individually, and they will be graded based on the correctness of the answers. These should take about 2-15 minutes to complete. The timer starts when you open the quiz. They need to be completed one hour before class. **The lowest quiz grade will be dropped.**

Homework Assignments:

Your homework assignments are posted online and are due before the next lecture. Your homework assignments will be graded based in part on how well you answer the questions. While you must turn in your own answers, it is acceptable to work in groups. The Friday lab sections will address the most difficult questions and will focus mostly on the Excel portion of the assignments, **so you must attempt your homework in advance**.

You must turn in your homework via Brightspace. The deadline is one hour before class one week after it has been assigned. **No late homework will be accepted. No exceptions.**

“Midterm” Exam:

The “midterm” exam will be given on Wednesday, October 25th. More information will be shared as the exam date approaches.

Final Project:

The final project will consist of a data set and some research questions. You will conduct the appropriate statistical analyses and provide a written summary of the results. This will be due at the end of the semester (in lieu of an in-person final exam). Details for this project will be released later in the course via Brightspace. This will be turned in via Brightspace online.

# Administrative Details

This section provides a few other guidelines for the course.

Course Organization:

This course has two weekly meetings – a lecture and a lab section. Attendance is required and will be recorded.

The lectures will be based on, but not limited to, the readings listed for that lecture period: do the readings before the lecture. In addition, you should review the past week’s homework solutions and make sure you remember the main points from the prior lecture as well. You will need to do the reading to have success on the concept quizzes.

Your TA will teach the lab section; this focuses mostly on broad discussions on the points raised by the more difficult homework problems or key skills students seem to be struggling with overall. Before you come to the lab section, start your homework. There will not be time in the lab sections to cover every homework question; you will get the most out of these by preparing in advance.

Anticipated Plan:

* + Wednesdays: Lecture
  + Thursdays: Review Notes, Do the Homework
  + Fridays: Lab Section, Ask Homework Questions, Finish HW.
  + Saturdays - Tuesdays: Read, Do the Concept Questions (Quiz); Do something else. It’s a big,

interesting world.

Office Hours/Additional Help:

I will hold office hours by appointment. Typically, it’s best to schedule something with me for right after class. If this doesn’t work, we can find another time that works. There are also a lot of optional materials through MindTap. These include Excel videos, applets, and ungraded practice problems.

Email:

“Should we email you or email TA?” In general, you should copy both of us. Email is the quickest way

to get a response from us regarding your questions about the course.

Late or Missing Assignments:

No late assignments will be accepted and there are no exceptions. You must complete the concept question quizzes by their deadline and submit the homework online by the due date.

Special Requests:

Excused absences and other accommodations should be requested and discussed in advance. A student with a qualified disability requesting a reasonable accommodation should do so through the Moses Center.

The Course Website:

All of the materials you will need for the course will be posted on Brightspace and via the online textbook and MindTap. You should regularly check the Brightspace website and, of course, pay attention to course-related emails sent to you through it. These will often contain important announcements.

Technology:

This is a high-use course for technology – computers, calculators, etc. are often useful in class for doing computations and accessing the course website.

# Academic Integrity

Academic integrity is a vital component of Wagner and NYU. All students enrolled in this class are required to read and abide by [Wagner’s Academic Code.](https://wagner.nyu.edu/portal/students/policies/code) All Wagner students have already read and signed the [Wagner Academic Oath.](https://wagner.nyu.edu/portal/students/policies/academic-oath) Plagiarism of any form will not be tolerated and students in this class are expected to report violations to me. If any student in this class is unsure about what is expected of you and how to abide by the academic code, you should consult with me.

# Henry and Lucy Moses Center for Students with Disabilities at NYU

Academic accommodations are available for students with disabilities. Please visit the [Moses Center for](https://www.nyu.edu/students/communities-and-groups/students-with-disabilities.html) [Students with Disabilities (CSD) website](https://www.nyu.edu/students/communities-and-groups/students-with-disabilities.html) and click the “Get Started” button. You can also call or email CSD (212-998-4980 or mosescsd@nyu.edu) for information. Students who are requesting academic accommodations are strongly advised to reach out to the Moses Center as early as possible in the semester for assistance.

# NYU’s Calendar Policy on Religious Holidays

[NYU’s Calendar Policy on Religious Holidays](https://www.nyu.edu/about/policies-guidelines-compliance/policies-and-guidelines/university-calendar-policy-on-religious-holidays.html) states that members of any religious group may, without penalty, absent themselves from classes when required in compliance with their religious obligations. Please notify me in advance of religious holidays that might coincide with exams to schedule mutually acceptable alternative.

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| --- | --- | --- | --- | --- | --- | --- |
| **Date** | **Lecture** | **Topic** | **Reading/MindTap** | **Quiz** | **Homework** | **Lab?** |
| 9/6 | 1 | **Introduction to the Course**  We will discuss the role of quantitative methods in public policy and other social sciences. We will review the syllabus of this course and go through Brightspace. We will also get Excel set up on  everyone’s laptops. | Lecture 1 Introductory Materials Chapter 1 | No | Watch the  introductory videos in MindTap | Yes |
| 9/13 | 2 | **Quantitative & Qualitative Data & Numerical Descriptive Measures**  We will cover the basics of descriptive statistics, which include categorizing variables, measuring center and spread, and work on some basic  graphing in Excel. | Chapters 2 - 3 | Yes | Homework 1 | Yes |
| 9/20 | 3 | **Probability**  Very often skipped in introductory statistics courses, probability is essential to understand because it is the bases of statistics. We will review classical probability along with more advanced concepts such as conditional probability and the Bayes’ Theorem. | Chapter 4 | Yes | Homework 2 | Yes |
| 9/27 | 4 | **Samples, The Sampling Distribution and Central Limit Theorem**  We will begin to formally study inferential statistics, which is the foundation for social science research. The idea is that researchers take representative samples of data and make inferences about a population based upon the characteristics of that sample. We will also be introduced to the normal distribution, which is fundamental to this course. | Chapter 6 - 8 | Yes | Homework 3 | Yes |
| 10/4 | 5 | **Hypothesis Testing, Part I**  The lecture this week provides a statistical foundation for the most important question a researcher will ask: does this yield significant results? More generally, the hypothesis testing framework provides guidelines for deciding if the characteristics of one group are different than other. We will be looking at comparing one group  to a population for both large and small samples. | Chapter 8 - 9 | Yes | Homework 4 | Yes |
| 10/11 | 6 | **Hypothesis Testing, Part II**  As a continuation from Lecture 5, we will be looking at hypothesis testing for two groups compared to each other for both large and small samples. | Chapters 10 | Yes | Homework 5 | Yes |
| 10/18 | 7 | **“Midterm” Review**  We will be reviewing materials for the midterm exam, which will be given next week. Practice problems will be provided ahead of time and you will be given an opportunity to ask questions. Lab this week will also be an opportunity to ask  questions. |  | No | No | Yes |
| 10/25 | 8 | **“Midterm” Exam**  You will be taking the “midterm” exam today in class. The exam is open-book, open-notes, and calculator permitted. Please remember to bring all of the necessary materials to class with you, including a pencil. |  | No | No | No |
| 11/1 | 9 | **One-way ANOVA**  This is a continuation of hypothesis testing. We will be looking at how to conduct hypothesis tests for studies that contain more than two groups. | Chapter 13 | Yes | Homework 6 | Yes |
| 11/8 | 10 | **Two-way ANOVA**  What happens when you have more than one variable you are interested in testing? Today, we will look at the methodology for comparing two or more groups on two variables simultaneously. | Chapter 13 | Yes | Homework 7 | Yes |
| 11/15 | 11 | **The Chi-Square Distribution**  Today we will cover a distribution that can be used for three different types of research questions: are two categorical variables independent, is the distribution of a categorical variable as expected, and is the  variance of the sample the same as the population? | Chapter 12 | Yes | Homework 8 | Yes |
| 11/22 |  | **Thanksgiving** |  |  |  | No |
| 11/29 | 12 | **Regression, Part I**  This is the last major topic covered in class this semester. We will look at how to analyze (and create hypotheses for) continuous data. Regression is also related to covariance and correlation, which we will study as well. | Chapter 14 | Yes | Homework 9 | Yes |
| 12/6 | 13 | **Regression, Part II**  We will continue studying regression models and introducing multivariable regressions. As part of this class, there will also be an opportunity to ask any last questions on the final project. | Chapter 15 | Yes | Homework 10 | Yes |
| 12/13 | 14 | **Finishing the Semester**  Your final projects are due 12/20/2022 by 1pm on Brightspace. Use this time to work on it. |  |  |  | Yes |
| 12/20 |  | **Final Project Due** |  |  |  | No |
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