NYU | ROBERT F. WAGNER GRADUATE SCHOOL OF PUBLIC SERVICE

CORE-GP 1011
Statistical Methods
Spring 2021

Instructors

- Professor Jan Blustein
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  - Office hours on Zoom – link on Classes
- Professor Judy C. Polyné
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Lecture sections

Section 001:
- Day: Wednesday
- Begin: 9:30 am
- End: 11:25 am
- Location: Online -- Zoom link posted on Classes
- Instructor: Professor Blustein

Section 002:
- Day: Wednesday
- Begin: 6:45 pm
- End: 8:40 pm
- Location: GCASL C95 (238 Thompson Street)
- Instructor: Professor Polyné

Lab sections

Section 003:
- Day: Monday
- Begin: 4:55 pm
- End: 6:35 pm
- Location: Online – Zoom link posted on Classes
- Instructor: Professor Polyné

Section 004:
- Day: Monday
- Begin: 6:45 pm
- End: 8:25 pm
- Location: Online – Zoom link posted on Classes
- Instructor: Professor Polyné

Course description

This course introduces students to basic statistical methods and their application to public service. The course covers the essential elements of descriptive statistics, univariate and bivariate statistical inference, and an introduction to multivariate analysis. In addition to covering statistical theory, the course emphasizes applied statistics and data analysis, using the software package STATA.

The course has several "audiences" and goals. For all Wagner students, the course develops basic analytical skills and encourages a critical approach to reviewing statistical findings and using statistical reasoning in decision-making. For those planning to continue studying statistics (often those in policy and finance concentrations), this course provides a foundation for that further work.

Course prerequisites

This course assumes a working knowledge of algebra at the level covered in the Wagner/ALEKS online math program. If you have completed ALEKS successfully, you should be well prepared. If you have not yet checked your skills using ALEKS, you should begin as soon as possible. You may also want to work through the "Basic Mathematics Review" that appears as the prologue chapter of your textbook and/or take one of the math review courses that is offered by the Wagner School.

Course learning objectives

Objective 1:

Understand how to analyze and present data using appropriate quantitative research methods. This includes an understanding of sampling techniques, data analytics, statistics, and visualization. By the end of the course, students will have:

 a. An understanding of the different levels of measurement (nominal, ordinal and interval/ratio) and their relevance for different analytic techniques.

 b. An understanding of basic descriptive statistics including the mean, median, mode, range and standard deviation; and ability to calculate these statistics and to generate them using STATA software; an understanding of when each may be appropriate for descriptive purposes.

 c. An ability to calculate confidence intervals for means and proportions and to assess the relative merits of point versus interval estimates for means and proportions.

 d. An understanding of the basic principles of statistical inference including the importance of sampling distributions and the standard error.

 e. An ability to determine appropriate tests of statistical significance for differences in means, differences in percentage distributions and cross-tabulations, and to execute that work manually and using STATA software.

 f. An ability to determine when bivariate regression and correlation are appropriate analytic approaches, and to calculate and interpret regression and correlation coefficients, both manually and using STATA software.

 g. An ability to design a multiple regression analysis, to generate regression results using STATA software, and to interpret these results for statistical and theoretical significance.

Objective 2:

Conduct an impact analysis using appropriate statistical methods and tools, and present a succinct, well-argued memo written with appropriately incorporated tables and graphs.

 a. Students will select, synthesize and summarize this quantitative data for a "lay" audience. A special focus will be on the ability to communicate statistical concepts and findings in everyday English.

Objective 3:

Develop a healthy skepticism about claims made with statistics. This includes:

 a. An understanding of the importance of unbiased sampling.

 b. An appreciation of Type I and Type II error.

 c. An understanding of causality, including distinguishing between correlation and causation, the challenges to estimating causal relationships, and the importance of causality for determining impact.

Learning Assessment Table

Course Learning Objective Covered	Corresponding Assignment Title
Objective 1	Homework, Midterm Exam, Final Exam, Final Assignment
Objective 2	Final Assignment
Objective 3	Homework, Midterm Exam, Final Exam, Final Assignment

NYU Classes site

All sections of Stat 1 use a single Classes site. Before your first lecture, review these tabs on the site: "Get Started," "Syllabus" and "Class 1." You have some tasks to complete.**

Accessing your textbooks

There are two course texts. The first is Joseph Healey and Christopher Donoghue's Statistics: A Tool for Social Research (Cengage Publishers, 11th edition). The 11th edition is available on the Cengage website in a number of configurations. You can buy an e-text plus three hole punch paper version **here** for $69.95 (Digital Platform and Print, ISBN 9780357585078), or just the e-text here for $50.00 (Digital Platform, ISBN 9780357371114)

You can save some money by buying an older softcover edition of the book with the same title. Many are available online. Any edition from the 7th onward is essentially identical to the 11th; pagination varies slightly but the chapter numbering is the same, and you should have no problem. Note that previous versions of the text were solo authored by Healey.

If you are taking this course in the same term as a section of Management and Leadership (CORE-1020) that is using a textbook published by Cengage, you may want to purchase the text for this course directly through the publisher as part **of Cengage Unlimited eTextbooks** ($69.99). You will receive the e-textbooks for both courses for one reduced price (and have the option of renting hardcopies for a small fee). Please contact wagner.onlinecourses@nyu.edu if you have any questions about this option.

The other text for the course is a homegrown e-text called **STATA: The Wagner Way** (hereinafter Wagner Way). This e-text covers the use of STATA software for data analysis. It is available on the Stat 1 Classes as a free .pdf download. Also, on the site are some Wagner Way videos.

STATA and the weekly lab sessions

This is a course in applied statistics with a lot of data analysis, both for homework and for the final assignment. Some of these analyses will be done manually, with the help of a hand-held calculator. However, computers do this sort of work quickly and without error, making a software package such as STATA indispensable. STATA skills are taught in weekly labs sessions. During these labs, your instructor will demonstrate STATA procedures, explain STATA output, and generally reinforce and support use of the computer program. Attendance in lab is mandatory.

Accessing STATA software

You must have STATA software on your computer by the first day of class.

Buying a Stata license for your own computer

We will use Stata/IC version 16 in Stat 1. The IC version is sufficient for this course. Stata/SE is not required. Stata/IC 16 can be leased at the **Stata website**. The price for a new six- month license is $48, making this the best price for putting Stata on your personal computer.

** Note ** you must follow that link and switch to the "6-month" tab to see the $48 deal. Students who are planning to take Stat 2 may wish to purchase the one-year license for $94.

Also **note:** you must interact with vendors directly. Wagner faculty will not be able to assist you with purchase, installation, or getting your software up and running.

Accessing Stata on campus

The LaGuardia Co-op computer labs will be open for computer reservations during Spring 2021. The hours will be Monday - Thursday: 11:30am - 6:30pm & Friday: 10:30am - 5:30pm. Please follow developments at the LaGuardia Co-op homepage. If and when the labs are open, you will need to use your NYUCard for swipe access to the lab.

Accessing Stata via NYU's Virtual Computer Lab (VCL)

NYU provides remote access to Stata via its Virtual Computer Lab (VCL) vcl.nyu.edu. However, in our experience this service functions intermittently, leading to lots of frustration and lost time. We do not recommend using the VCL and cannot support users.

Technology needs for class participation

All Stat 1 students need a computer and a good internet connection for online classes --- a phone will not work for the group activities that are integral to the online sessions. In addition, to participate during in-person classes, you will need to bring a laptop (again, a phone won't work). If you do not have access to needed technology, contact wagnerstudentservices@nyu.edu.

Class Policies

Arriving to classes prepared

Important: The lecture and lab sessions build on the foundation that you create during your pre-class work, and your instructor will assume that you have completed the assignedadvance work.

Before lecture, you will begin by viewing one or two "This Week in Stat 1" videos. You'll then do the assigned textbook reading. You should plan to devote at least one quiet hour to textbook reading each week. **The required textbook readings and videos will be posted week-by-week on NYU Classes.**

After completing the reading, you will take a brief online 5-question multiple choice mini-quiz, which counts toward your course grade. You will get a score when you complete the mini-quiz. If you get 4 or 5 questions right on the week's quiz, you are prepared for lecture. If you do not, go back and review the relevant sections in the course video and/or reading.

Mini-quizzes are administered through the "Tests and quizzes" tab on the Classes site. Take your quiz in only one browser tab/window (having multiple tabs/windows open can cause loss of answers). **The quizzes close one hour before the scheduled lecture. You should begin your quiz well before that time, but at least 1 hour and 15 minutes before your scheduled lecture. You cannot be excused from submitting a quiz due to last minute connectivity problems: it is your responsibility to begin your submission well ahead of the deadline.** In tallying your score on the mini-quizzes, you are permitted to have missed (i.e. received a zero) on one quiz, without penalty. In other words, your lowest scored mini-quiz will be dropped.

Before lab, you will prepare using The Wagner Way. Many of you may prefer to do this by viewing the videos, which are accessible through the Main site. There are no mini-quizzes on the lab video material.

Attending alternate lecture sessions

You have been assigned to a lecture section (your "home" section) and you are expected to attend every week. Occasionally this may not be possible due to personal circumstances. If so, email your instructor. To make up the class, you may watch the video recording of one of the online sections, or you may email an instructor from an online section to ask if there is room for you to attend that section. You cannot attend an in-person section for which you are not registered.

Even if you are unable to attend your usual section, you must submit assignments (mini-quizzes, homeworks) at the time designated for your home section.

Submitting assignments

You will submit numerous handwritten or typed assignments electronically in Stat 1, including your homework and final assignments. **Each assignment must be submitted as a single .pdf file.** For homework this can be a scan of your handwritten work or it may be electronically typed.

You will be responsible for creating the single .pdf to upload for each assignment. You can scan handwritten work using your smartphone. iPhone users may want to use Notes, which is already on their phone. Android users have a number of options for apps to install, including Adobe Scan, Tiny Scanner, Genius Scan, etc. Invest time in choosing your scanning method (enlist help from a classmate if you're stumped). Practice using your phone scanner to avoid last minute technical difficulties. Note: If your phone doesn't have the capability to take a picture and use a scanner app, you can take a picture from your laptop and upload the documents to Classes.

Check each .pdf that you create before uploading for completeness, correct order of pages, and legibility. The Stat 1 team will see and grade what you have submitted, not what you intended to submit.

The Classes site provides clear instructions for naming each assignment file that you submit. **You must follow the file naming instructions.**

Homework is due one hour before your scheduled lecture. Due dates and times are posted clearly in Classes, and late submissions cannot be accepted. Please do not ask your instructor to make an exception for you. Again, allow time to check your work and deal with technical glitches.   If you attend an alternative section, you are still responsible for meeting the submission deadline for your home section.

Grading approach to homework assignments

Homework is graded on a scale of 0 (not submitted)/ 1 (submitted but deficient)/ 2 (submitted and adequate). In tallying homework grades, students are permitted to have missed (i.e. received a zero) for one homework, without penalty. In other words, your lowest scored homework will be dropped.

If you do not get a "2" on a homework assignment, that says that you need to put more time into that week's topics. Go back and review your answers to the assignment against the answers that are posted on the Main site under Resources. Plan to attend a tutoring session to reinforce that week's topics.

Calculator

You will need a small hand calculator for Stat 1. A highly recommended calculator for the class is the Casio fx-300ES PLUS, which has a "Natural Display." It is $12.95, and it accommodates long Stat 1 calculations easily; and is available at the NYU Bookstore, as well as many online sites.

Tutoring sessions

Tutors will be available for Zoom meetings and discussion of homework problems (times and locations TBA on the Classes site). Tutors will not answer questions about the final assignment (see below).

Important notes regarding the final assignment

Doing the final assignment takes planning, time and concentration. Many students report that completing the assignment is the best learning experience in the course. You should allocate significant time to it, starting in Week 11 of the course. Please note the following:
- Your lecture instructor and your lab instructor will orient you to the assignment.
- You may work with your fellow students, but this is not a group project. You must run your own analysis, write your own memo, and create your own tables.
- Final assignments written by prior students in Stat 1 may not be used as sources for writing your final assignment memo.
- Problem-solving is a big part of the exercise. Lab & lecture instructors will field specific questions that are limited in scope. "How should I do this part of the analysis?" will not be answered. "I'm thinking of using procedure X to answer question Y because I believe that the assignment is asking me to examine relationship Z. Does this make sense?" is an appropriate question.
- Working and re-working the presentation of your findings is also a big part of the exercise. However, lab & lecture instructors cannot review your written drafts.
- Please do not ask your tutors for assistance with this assignment, or with other STATA issues – these should be directed to the lab instructor. Tutors' responsibility is to handle questions related to the lecture/homework.

Late submission policy for the final assignment

Extensions will be granted only in case of emergency, out of respect to those who abide by deadlines despite equally hectic schedules. Late submissions without extensions will be penalized 20% (one grade) per 24-hour period.

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. All Wagner students have already read and signed the Wagner 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 Students with Disabilities (CSD) website and click on the Reasonable Accommodations and How to Register tab or call or email CSD at (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.

Course requirements and grades

Course grades are based on the following:
- Online midterm exam (25%)
- Online final exam (25%)
- Final assignment (30%)
- Mini-quizzes (10%) and homework (10%)

Unexcused failure to complete any assignment will result in a grade of zero.

Topics (with readings posted on Classes tabs for each week)

Class 1 – Introduction

Class 2 – Central Tendency and Variation

Class 3 – The Normal Curve

Class 4 – Sampling and the Sampling Distribution

Class 5 - Estimation

Class 6 – Hypothesis Testing – I (One-sample means and proportions)

Class 7 – Hypothesis testing – 2 (Two-sample means and proportions)

Class 8 – Midterm Exam review (The midterm covers material through Class 6)

Class 9 – Analysis of Variance

Class 10 – Bivariate Tables, Chi-Square

Class 11 & 12 – Bivariate Regression & Correlation

Class 13 – Controlling for Other Variables (Intro to multiple regression)

Class 14 – Dummy Variables in multiple regression

Class 15 – Wrap up and review

Important dates

Midterm Exam

Midterm exam review sessions will be given during the usual class periods on Wednesday March 24.

To comply with the NYU's policy on reducing academic workloads during Spring semester long weekends, the midterm exam will be given at unusual times. You may sign up to take the midterm on Thursday March 25 from 6:45 – 8:25 PM, or Friday March 26 from 9:30 – 11:25 AM. **If you are unable to make either of these times, notify your instructor ASAP.**

Final Exam

Final exam review sessions will be given during the usual class periods on Wednesday May 5.

Final exams will be given online during the usual class periods on Wednesday May 12.

Final Assignment

The final assignment is due on Monday May 10th at 6pm for all sections, via the Assignments tab on NYU Classes.

Homework Assignments

Homework assignments are posted week-by-week on the Classes site. You will not submit homework prior to Class 1. You will begin submitting homework prior to Class 2. That homework will cover the material that was discussed during Class 1.

Mini-Quizzes

Mini-quizzes are posted on your lecture section Classes site. You will submit a mini-quiz prior to Class 1. That quiz will cover the material in this syllabus, as well as the welcome video. Thereafter, you will submit a mini-quiz prior to nearly every class.

NYU's calendar policy on Religious Holidays

NYU's Calendar Policy on Religious Holidays states that members of any religious group may, without penalty, absent themselves from classes when required in compliance with their religious obligations. Please notify your instructor in advance of religious holidays that might coincide with exams to schedule mutually acceptable alternatives.