

Syllabus

NUTR 207: Statistical Methods for Nutrition Science and Policy

Friedman School of Nutrition Science and Policy, Tufts University, Fall 2021

Lectures: Mondays (lectures) and Wednesdays (recitation), 1:30pm to 3:00pm, Behrakis Auditorium, Jaharis, plus online materials as assigned

Professor: Sean B. Cash, Ph.D.

sean.cash@tufts.edu | Phone: 617.636.6822 (voice mails are forwarded)

Office hours: Mondays 12:00 – 12:50 pm, Wed. 3:00 – 3:30 pm, or by appt., Jaharis 127

Teaching Assistants:

Adrienne Dunlap, adrienne.dunlap@tufts.edu

Gabriela (Gabi) Fretes, gabriela.fretes@tufts.edu

Elena Martinez, elena.martinez@tufts.edu

Office hours: Office hours are offered every weekday at varying times, as noted below. Office hours held over Zoom will not be recorded.

Day of Week	Time	Format	Held By	Location (Room # or Zoom)
Monday	12-12:50 pm	In-person	Sean	Jaharis 127
	8 - 9pm	Online	Elena	https://tufts.zoom.us/j/98627283804?pwd=eVJYbFlySHFHblJbjRGRXIkMG15QT09 Meeting ID: 986 2728 3804 Passcode: nutr207
Tuesday	11am - 12pm	In-person	Adrienne	75 Kneeland Avenue, Room 844
	7 - 8pm	Online	Gabi	https://tufts.zoom.us/j/94017607006?pwd=V2Q4STc4ODRZRTZ2Mi9RbnA4ZWdvZz09 Meeting ID: 940 1760 7006 Passcode: nutr207
Wednesday	3 - 4pm	In-person	Elena	75 Kneeland Avenue, Room 844
	3 - 3:30pm	In-person	Sean	Jaharis 127 (administrative and advising issues only, no course material topics)
Thursday	1 - 2pm	In-person	Adrienne	TBD
Friday	11am - 12pm	Online	Gabi	https://tufts.zoom.us/j/94017607006?pwd=V2Q4STc4ODRZRTZ2Mi9RbnA4ZWdvZz09 Meeting ID: 940 1760 7006 Passcode: nutr207

Tufts Graduate Credit: 3 SHUs

Prerequisites for taking this course: None, but familiarity with basic mathematical concept is useful and expected.

Course Description: In this class we will explore statistical techniques for analyzing

social science data, with specific applications to nutrition, food policy, agriculture and the environment. Although it is necessary to teach some theory, it is my intent that the course be practical and user-oriented. The primary goal here is to learn how to analyze data in ways that will be useful in your academic and professional careers, both in conducting your own work and critically assessing the work and claims of others.

For most students, this course is the first part of a year-long sequence. This is a first semester graduate course in statistics that is required for students in the AFE, FANPP, and NICBC programs. This one-semester course will provide students with an introductory level understanding of social science statistics concepts and methodologies, and how they are applied, interpreted and presented in published research articles. Topics will include data gathering, experimental design, probability, descriptive statistics, graphical displays, hypothesis testing, nonparametric tests, analysis of variance, and ordinary least squares regression (OLS). A distinctive feature of this course is its focus on methods that can be used with observational data, which frequently arise in the social sciences.

Course Objectives: Students who take this course will be able to:

- Understand how data are collected for addressing questions relevant to food and nutrition science and policy;
- Identify different types of data based upon how they are collected and what they measure;
- Describe and identify common sources of bias affecting data collection and interpretation for given studies;
- Explain and apply principles of probability and sampling to statistical study design;
- Identify and explain common fallacies of interpreting statistical results in media reports, policymaking, and other applied contexts;
- Utilize appropriate tools for both numerical and graphical descriptive analysis of quantitative data;
- Understand the concept of a sampling distribution and apply it to defining confidence intervals and hypothesis tests;
- Explain and apply key concepts of inferential statistical analysis, including hypothesis testing, estimation, model construction, and prediction;
- Understand how both the collection and analysis of data reflect structural biases present throughout society and institutions, and describe available tools for mitigating this;
- Begin NUTR 307, our spring course in regression analysis, with no additional preparation; and
- Explain fully why the cartoon on the last page of the syllabus is funny.

Weekly Class Format

Before Monday class	Watch required pre-recorded lectures posted on Canvas in weekly modules
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Monday class	In-person lecture by Professor Cash
Wednesday class	In-person recitation session led by Professor Cash and Elena Martinez <i>Recitation sessions are mandatory and will be a time for examples, review and questions about quizzes, course material, problem sets, etc. They will not always take the full class period, but Prof. Cash will stay until 3pm to answer student questions.</i>

Description of assignments, exams, and other required activities

Problem Sets: **40%** of your grade will be based on four large assignments, tentatively due September 29, October 20, November 17, and December 8. Each assignment will be distributed on Canvas a few weeks before it is due. Each week, specific questions will be assigned, but you will submit the completed problem set by the due date. Problem sets are to be submitted via Canvas as a single .pdf file. You are encouraged to work in small groups on these problem sets, but each student is responsible for handing in an individual set of answers.

Exams: There will be a midterm examination worth **20%** of the overall grade on Wednesday, October 27th during class time. The final exam will be worth **25%** of your overall grade, and will be held on Monday, December 20th from 1:30-3:30pm. Additional information on the format, grading and content of the exams will be distributed prior to each exam

Participation: Attendance in lectures and recitations is a necessary (but not sufficient!) condition for mastering this material and passing the course. **15%** of your grade will be based on course participation including submission of quizzes, lab exercises, and the research ethics training certificate.

Quizzes are designed to provide you with an opportunity to assess your understanding of the course material on an ongoing basis, rather than (for example) finding out that your understanding is deficient by failing a major exam. Quizzes will be available on Canvas and are due Tuesdays by 11:59pm during assigned weeks, as noted in the course outline below.

Labs: There are four pre-recorded statistical software lab sessions that should be viewed and completed during the weeks of September 20, October 4, October 18, and November 22nd.

Research Ethics Training Certificate (CITI): The online human subjects research ethics training is a School-wide requirement for graduation and should be completed by the end of the fall semester. Completion of this requirement will be discussed in class, and will count toward your participation grade. Please submit a copy of the completion certificate to via Canvas when you complete the training, It is in your best interest to complete the training as early as possible, but the final deadline is November 19th at 11:59pm. Most students in NUTR 207 should be completing the required "Social-Behavioral-Educational

Researchers” group modules. For more information, please see <https://viceprovost.tufts.edu/sber-irb-trainings>.

Grading

Your grade in this class will be determined by problem sets, participation (attendance, in-class exercises, labs, quizzes, engagement in lectures, completion of CITI training) and two exams. Points will be awarded for each assignment, and an overall course score will be calculated from the weights given below. Your course score will then be mapped into a letter grade on the basis of “natural breaks” in the distribution of class grades. Please note that these breaks may be used to raise, but never lower, grades from a standard grade distribution (e.g., 90% will always be at least an A-).

Assignment(s)	Grading Weight
Problem Sets (4 total)	40%
Participation	15%
Midterm Examination, Wednesday, October 27 th , 1:30-3:00pm	20%
Final Examination, Monday, December 20 th , 1:30-3:30pm	25%
Total	100%

Penalties for late or incomplete assignments: No late assignments will be accepted, and a zero grade will be recorded for missing work. If you think you may have difficulty completing a problem set on time, please ask us for an extension as early as possible. *No extensions will be granted fewer than 48 hours before an assignment is due* except in documentable emergency circumstances. We will always try to accommodate busy schedules, but not poor planning.

Grading questions: If you believe that an assignment or exam question was graded incorrectly, you are welcome to raise the issue with us. If you simply don't like your grade and come to argue with us for more points, you will probably find that there are better uses of your time. Grading questions are to be submitted via Canvas no sooner than 24 hours after the assignment is returned to you and no later than one week after the assignment is returned to you. Additional details will be provided in the answer keys posted on Canvas.

Course texts and materials

Required Text: The required primary textbook for this course is *Statistical Methods for the Social Sciences*, 5th edition, A. Agresti 2018 (referred to as “AA” in the reading list). There will be required readings from this textbook on a regular basis. We recommend that you purchase or buy an electronic or hard copy for your own use. Copies are also on reserve at the Hirsh Library. Since the material in this course builds on itself from week to week, it is important that you keep up with the readings as they are assigned. Assigned readings are to be completed *before* the relevant class meeting. Note that the readings are not a replacement for coming to lecture and taking notes on the lecture material.

Optional Texts: Campbell's *Statistics at Square One* is an additional (and inexpensive) reference that you may find useful, and is available on reserve at the Hirsh library. Jeffrey Wooldridge's *Introductory Econometrics: A Modern Approach* is the primary textbook for NUTR 307 in the Spring, and is a useful resource in the last weeks of this course. Additional readings and reference handouts will be distributed in class or made available on Canvas or at the library's reserve desk. A particularly fun statistics reference is *The Cartoon Guide to Statistics* by Larry Gonick & Woollcott Smith.

Calculators: We do not have specific requirements for calculators, but you will need an inexpensive solar powered scientific calculator that can handle logs, parentheses, etc., as we cannot allow you to use your phones on quizzes or exams. Good options include the Casio FX260 SLR3 or FX-300ES, or Texas Instruments 30XIIS. These can be purchased for \$8 - \$20.

Software

Stata statistical software will be used throughout the course, as well as in NUTR 307 and other courses at Tufts. Stata will be used for problem set assignments and lab session exercises. Tufts has made Stata SE available to students to install on their own computers at no additional cost (visit <https://access.tufts.edu/stata> for more information). We recommend installing it as soon as possible so that you will have it ready to go before the first lab assignments. You can also use Stata in Tufts' computer labs or online through our virtual data lab (<https://vdi.it.tufts.edu/>).

Canvas: All course materials, assignments, and announcements will be on Canvas. Make sure your announcement notifications are turned on to be received immediately so that you do not miss important class information. Tufts' guidance on how to check and adjust your notification settings, and recommendations on useful settings, are available at <https://sites.tufts.edu/canvas/2017/09/08/notifications-recommendations-for-students/>

Zoom: Online office hours will be held on Zoom. If you plan to attend any online office hours, download the **desktop app** (or **mobile app**, if you need to use your phone). The website client does not have the same functionality as the apps. If you have a personal Zoom account not affiliated with Tufts, please log in to Zoom using the single sign-on ("SSO") option and your Tufts credentials prior to joining online office hours. Additional useful guidance is available at <https://it.tufts.edu/guides/audio-and-virtual-conferencing-zoom>.

Box: This online cloud storage platform is available for free to all Tufts students. It is an excellent option for making online backups of your files beyond what you save on your personal computer. We highly recommend installing the desktop [Box Drive](#) client and getting in the habit of regularly saving all your class-related files to Box.

Inclusion and Sensitive Topics

It is our intent that students from all backgrounds and perspectives be well-served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed by all as a resource, strength and benefit. It is also our intent to present materials and activities that are respectful of diversity across gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture. Your suggestions are encouraged and appreciated. Please let us know ways to improve the

effectiveness of the course for you personally or for other students or student groups. To help accomplish this:

- If you have a name and/or set of pronouns that differ from those that appear in your official Tufts records, please let us know.
- If any of our class meetings conflict with your religious events, please let us know so that we can make arrangements for you.
- If you feel like your performance in the class is being impacted by your experiences outside of class, please do not hesitate to come and talk with one of us. If you prefer to speak with someone outside of the course, Dr. Rob Mack, Associate Provost and Chief Diversity Officer, is an excellent resource, as is Snaggs Gendron, Boston Campus Student Wellness Officer.

Our approach to potentially sensitive topics in this class is to not shy away from those topics that are relevant to areas of study at the Friedman School. Such topics will necessarily include subjects such as eating behaviors and eating disorders; weight gain and loss; malnourishment, including in humanitarian disaster situations; food assistance and poverty reduction policies; alcohol consumption; diseases and health outcomes; issues of race and gender as they relate to food, nutrition and health; and more generally, ethical research methods as they relate to vulnerable populations. Our goals in covering such material are to never choose a topic deliberately to be provocative, and to ensure that students in the class are familiar with how we approach both the analysis and interpretation of data on such topics. We always strive to be sensitive and respectful in how we approach such topics, and ask that all students in the class do the same.

Academic Conduct and Policies

School Policy on Academic Conduct: Academic integrity, including avoiding plagiarism, is critically important. Each student is responsible for being familiar with the standards and policies outlined in the Friedman School's [Policies and Procedures](#) manual. It is the responsibility of the student to be aware of, and comply with, these policies and standards. In accordance with [Tufts University's policy on academic misconduct](#), violations of standards of academic conduct will be sanctioned by penalties ranging from grade reduction or failure on an assignment, grade reduction or failure of a course, up to dismissal from the school, depending on the nature and context of any infraction.

Professor Cash's Philosophy on Misconduct: The material you submit to show mastery of the course material must be your own work. I take proper academic conduct seriously, as it is unfair to other students when academic misconduct is not addressed. The policy followed here is quite simple: Any plagiarism or cheating will result in my awarding a failing grade for both the assignment and the course, and all violations will be reported to the Academic Dean, Dr. Ed Saltzman.

Classroom Conduct and Disruptions: While in class sessions please make sure that all communication devices are silent and put away. If you would like to use a laptop to take notes, please sit in the back row to avoid distracting other students. Even subtle interruptions are distractions to your classmates and instructor.

Accommodating Disabilities: Tufts University is committed to providing equal access and support to all students through the provision of reasonable accommodations so that each student may access their curricula and achieve their personal and academic potential. If

you have a disability that requires reasonable accommodations, please contact Matthew Hast, the Friedman School Assistant Dean of Student Affairs, at matthew.hast@tufts.edu or 617-636-6719 to make arrangements for determination of appropriate accommodations. Please be aware that accommodations cannot be enacted retroactively, making timeliness a critical aspect for their provision.

Classroom Health and Safety: Our plan is for NUTR 207 to be an in-person course this semester unless university policy and/or public health concerns make it necessary to transition the course to a remote format. We will be following all relevant School and University guidance on ensuring health and wellness during the ongoing pandemic. At the time of this writing, that includes wearing masks in all campus settings. Students are only allowed to participate in the course if they are in compliance with the [Tufts University student vaccination policy](#). Moreover, students are asked to remain at home if they feel unwell or are showing signs of respiratory distress. We will provide all reasonable accommodations for anyone who cannot attend class because of health concerns.

Contacting Us: Questions about course material should be brought to Wednesday recitation sessions, office hours, or posed on the online discussion threads available on Canvas. Answers to questions posed on Canvas will be posted for reference by all students.

You are also free to ask us administrative questions that are not of general interest to your classmates over e-mail. Questions about course material should be submitted in the discussion groups, not via email, so that your classmates can learn from your questions and our responses. Dr. Cash also holds Wednesday office hours at 3:00 pm that are reserved for administrative and general advising questions.

Course & Assignment Schedule

This following schedule shows the major course topics and assignments planned for each week. It is tentative and subject to modification at the discretion of the instructor.

Week	Lecture Dates	Material	Assignments
1	September 8	<p><u>Topics:</u> Introduction: Thinking about data and the people they represent</p> <p><u>Readings:</u> AA Chapter 1; Steve Lohr, “For Today’s Graduate, Just One Word: Statistics” <i>New York Times</i> (6 August 2009); Koelmoos & Nestler, “Statistics in pursuit of social justice”, <i>Significance Magazine</i> (June 2018)</p>	<p>Personal introduction survey (online)</p> <p>Data generation survey (will be completed during class)</p> <p>Quiz 1 due 9/10 at 11:59 pm</p>
2	September 13, 15	<p><u>Topics:</u> Sampling and measurement; Bias</p> <p><u>Readings:</u> AA Chapter 2; 99% Invisible Podcast: “Invisible Women” episode</p>	<p>Quiz 2 due 9/14 at 11:59pm</p> <p><i>Problem set 1 distributed</i></p>

Week	Lecture Dates	Material	Assignments
3	September 20, 22	<p><u>Topics:</u> Descriptive statistics; Research methods; Gender inclusivity; Lab week 1</p> <p><u>Readings:</u> AA Chapter 3; readings on gender inclusivity in surveys</p>	<p>Quiz 3 due 9/21 at 11:59pm</p> <p>Lab 1 due 9/24 at 11:59pm</p> <p><i>Work on problem set 1</i></p>
4	September 27, 29	<p><u>Topics:</u> Probability and probability distributions; Central limit theorem; Use of BMI as a measure</p> <p><u>Readings:</u> AA Chapter 4; Suggested: Cartoon Guide to Statistics Chapter 3</p>	<p>Problem set 1 due 9/29 at 1:29pm</p>
5	October 4, 6	<p><u>Topics:</u> Statistical inference: Estimation and confidence intervals; Why modern beer needed statistics; Lab week 2</p> <p><u>Readings:</u> AA Chapter 5; "The Guinness Brewer who Revolutionized Statistics"</p>	<p>Quiz 4 due 10/5 at 11:59pm</p> <p>Lab 2 due 10/8 at 11:59pm</p> <p><i>Problem Set 2 distributed</i></p>
6	October 13	<p><i>Note: There are no classes on Monday, October 11 (Indigenous Peoples' Day). No office hours will be held this day.</i></p> <p><u>Topics:</u> Introduction to statistical inference</p> <p><u>Readings:</u> AA Chapter 6</p>	<p>Quiz 5 due October 14th at 11:59pm</p> <p><i>Work on problem set 2</i></p>
7	October 18, 20	<p><u>Topics:</u> Statistical inference: Significance tests (continued); comparison of two groups; Publication bias; Lab week 3</p> <p><u>Readings:</u> AA Chapter 7</p>	<p>Problem Set 2 due 10/20 by 1:29pm</p> <p>Lab 3 due 10/22 by 11:59pm</p>
8	October 25, 27	<p>Midterm exam (Wednesday, 10/27)</p> <p><u>Readings:</u> Review AA Chapters 1 - 7 before taking the midterm exam.</p>	<p><i>Problem set 3 distributed</i></p>
9	November 1, 3	<p><u>Topics:</u> Some extensions of significance testing; Chi-squared tests</p> <p><u>Readings:</u> AA Chapter 8.1-8.4; Campbell & Swinscow Chapter 8</p>	<p>Quiz 6 due 11/2 by 11:59pm</p> <p><i>Work on problem set 3</i></p>

Week	Lecture Dates	Material	Assignments
10	November 8, 10	<p><i>Note: Tuesday, November 9th will follow a Thursday schedule, including office hours. No office hours on Thursday, November 11th (Veterans Day).</i></p> <p><u>Topics:</u> One-way analysis of variance; Non-parametric tests; Researchers in social context</p> <p><u>Readings:</u> AA Chapter 12.1 - 12.3</p>	Work on problem set 3
11	November 15, 17	<p><u>Topics:</u> Correlation and covariance; Introduction to simple linear regression; Compensation and human subjects; Lab week 4</p> <p><u>Readings:</u> AA Chapter 9.1-9.4; Optional, but highly recommended: Wooldridge Ch. 2</p>	<p>Problem set 3 due November 17th by 1:29pm</p> <p>CITI training due 11/19 at 11:59pm</p>
12	November 22	<p><i>Note: Thanksgiving recess is November 24–26 (no classes or office hours will be held).</i></p> <p><u>Topics:</u> Linear regression; R-squared; Interpretation</p> <p><u>Readings:</u> AA Chapter 9 (all)</p>	<p>Lab 4 due 11/23 at 11:59pm</p> <p><i>Problem set 4 distributed</i></p>
13	November 29, December 1	<p><u>Topics:</u> Some concluding comments on SLR; Introduction to multiple regression and preparation for NUTR 307; Sample size</p> <p><u>Readings:</u> AA Chapter 10, 11.1 - 11.2; selections from Wooldridge</p>	Work on problem set 4
14	December 6, 8	<p><u>Topics:</u> Catch up and wrap-up; Research perils</p> <p><u>Readings:</u> Review all assigned readings in preparation for the final</p>	<p>Problem set 4 due 12/8 at 1:29pm</p> <p>Prepare for the final exam</p>
15	December 13	Optional review session 1:30-3pm	Prepare for the final exam
16	December 20	Final Exam, December 20, 1:30-3:30pm	

*Weekly learning objectives and the final reading schedule for each section are posted in the modules section on Canvas.

