

# Statistics for the Social and Behavioral Sciences

Fall 2027

## Course Information

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<b>Course Title</b>	Statistics for the Social and Behavioral Sciences
<b>Course Code</b>	SOCSC-UH 1010Q
<b>Credits</b>	4
<b>Lecture</b>	C2   Tuesdays & Thursdays, 2:00 PM – 3:30 PM
<b>Recitation</b>	C2   Fridays, 2:00 PM – 3:30 PM
<b>Prerequisites</b>	MATH-UH 1000A, or math proficiency test
<b>Cross-lists</b>	Core Curriculum > Quantitative Reasoning Majors > Business, Organizations and Society Majors > Business, Organizations and Society > Social Science Courses Majors > Economics Majors > Political Science Majors > Social Research and Public Policy Minors > Economics Minors > Social Research and Public Policy

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## Faculty Information

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<b>Instructor</b>	Dr. Yanwen Wang
<b>Office</b>	A5 1186-C
<b>Email</b>	<a href="mailto:yanwen.wang@nyu.edu">yanwen.wang@nyu.edu</a>
<b>Office Hours</b>	Wednesdays 2:00 PM – 4:00 PM, or by appointment
<b>Website</b>	<a href="http://www.yanwenwang.com">http://www.yanwenwang.com</a>

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## Instructor Information

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<b>Instructor</b>	TBA
<b>Office</b>	TBA
<b>Email</b>	<a href="mailto:tba@institution.edu">tba@institution.edu</a>
<b>Office Hours</b>	By appointment

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## 1 Course Description

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This course introduces students to the fundamentals of statistics and probability—the building blocks for social science research. Divided into two parts, the course provides an overview of descriptive and inferential statistics, with an emphasis on conceptual understanding and statistical thinking. Students will also learn to use R for data analysis and visualization. Through lectures, recitations, and problem sets, students will gain the basic skills necessary to conduct quantitative research by the end of the semester.

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## 2 Course Learning Outcomes

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Upon successful completion of this course, students will be able to:

- Demonstrate a command of descriptive and inferential statistics. Specifically, students will distinguish between samples and populations, apply principles of experimental design, analyze datasets, perform hypothesis testing, and communicate statistical insights effectively.
- Demonstrate proficiency in statistical computing and coding, specifically using R.

The course contributes to several program-specific learning outcomes (PLO), including:

- Critical thinking (Econ PLO1, high)
- Project management (Econ PLO3, high)
- Proficiency in empirical analysis (Econ PLO6, high)
- Capacity to engage with the professional literature (Political Science PLO1, medium)
- Information technology skills (Political Science PLO5, medium)
- Critical thinking, writing, and analysis (SRPP PLO3, medium)
- Critical evaluation of methodological approaches (SRPP PLO6, medium)
- Abilities and skills necessary to design, plan, and carry out a research project independently (SRPP PLO8, medium)

A complete list of PLOs can be found here: [Economics](#), [Political Science](#), [Business](#), [Organizations](#), and [Society](#), and [Social Research and Public Policy](#).

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## 3 Teaching and Learning Methodologies

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### 3.1 Instructional Time

The course is organized into (i) **lectures** covering statistical theories, concepts, and examples, (ii) **recitations** on performing data analyses using R, and (iii) **graded activities** including in-class quizzes, exams, and a final project. Students will have access to support through an online

discussion board for peer-to-peer exchange and instructor feedback. Further guidance will be available through email and during scheduled office hours.

See Table 1 for a breakdown of instructional time.

Table 1: Instructional Activities

Activities	Format	Minutes	Frequency	Total Hours
Lectures	in-person	75	22	1650
Recitations	in-person	75	12	900
Quizzes	in-person	75	3	225
Exams	in-person	75	2	150
Final project	in-person	75	1	75
<b>Total</b>				<b>3000</b>

### 3.2 Textbook and Course Materials

The course requires the following resources:

- Çetinkaya-Rundel, Mine, and Johanna Hardin. 2024. *Introduction to Modern Statistics*. Second edition. Vereinigte Staaten: OpenIntro, Inc.
- Wickham, Hadley. 2023. *R for Data Science*. Second edition. Sebastopol: O'Reilly Media, Incorporated. (Optional)

All other materials, including lecture slides, exercises, datasets, assignments, and additional resources, will be posted on Brightspace.

### 3.3 Hardware and Software

A **laptop** is required. You will also need a **calculator** with basic functions for quizzes and exams.

The course relies exclusively on **R**, a free, open-source programming language used widely in data science and academia. We will use **Visual Studio Code**, a popular Integrated Development Environment (IDE) with robust support for AI and modern coding workflows.

*Note: We will NOT use Stata, SPSS, or Excel for data analysis in this course. All assignments must be completed in R.*

Please complete the following steps to set up your environment before the first recitation:

1. **Install R:** Download and install the latest version of R from [CRAN](#).
2. **Install VS Code:** Download and install the latest version of [VS Code](#).
3. **Install the R Extension:** Open VS Code, install the R extension via “Extensions” on the left sidebar.

4. **Install packages:** Open the R application (not VS Code) that you installed in Step 1. Copy and paste the following command into the console and press Enter:

```
install.packages(c("languageserver", "httpgd", "tidyverse"))
```

5. **Enable the plot viewer:**

- Open VS Code Settings (Ctrl/Cmd + ,).
  - Search and check for `r.plot.useHttpgd`.
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## 4 Graded Activities

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### 4.1 Problem sets

Throughout lectures and recitations, you are required to complete in-class problem sets designed to familiarize you with R coding and the quiz format. These exercises are graded on a completion basis and will account for 10% of your final grade.

### 4.2 Quizzes

There will be three in-class quizzes covering material from the preceding weeks. These assessments are designed to check your understanding of core concepts and will count towards 30% of your final grade.

### 4.3 Exams

The course includes a midterm and a final exam. Each exam contributes 20% to your final grade.

### 4.4 Project

You will apply what you have learned in class to an individual final project analyzing real-world data. You may choose a dataset from a list provided or propose your own data source of interest (subject to pre-approval). You are strongly encouraged to attend office hours to discuss your project plan.

The project accounts for 20% of your final grade and consists of three deliverables:

1. A short proposal (1–2 pages) due in Week 10
2. A final written report (4–6 pages)
3. Reproducible R scripts used for your analysis

Please refer to Tables 2 & 3 for the breakdown of graded activities and the grading scale.

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Table 2: Graded Activities

Evaluation	Percentage	Date
Recitation	10%	NA
Quizzes	30%	Sep 10, Sep 24, Nov 19
Midterm exam	20%	Oct 22
Final exam	20%	TBA
Final project	20%	TBA

Table 3: Grading Scale

A	A-	B+	B	B-	C+	C	C-	D+	D	F
[100 – 93]	(93 – 90]	(90 – 87]	(87 – 83]	(83 – 80]	(80 – 77]	(77 – 73]	(73 – 70]	(70 – 67]	(67 – 60]	(60 – 0]

## 5 Course Policies

### 5.1 Attendance

While I do not take formal attendance, regular participation in lectures is essential for your success. Please note that missing in-class activities (e.g., quizzes, exams, problem sets) will directly impact your grade.

### 5.2 Make-up and Late Work Policy

Make-up quizzes and exams, as well as extensions for the final project, will be granted only for documented medical reasons, religious observances, or university-sanctioned activities. Whenever possible, you must contact me before the due date to make arrangements.

Unexcused late final projects will be penalized by 10 percentage points for every 24-hour period (or fraction thereof) past the deadline. Projects submitted more than 48 hours late will not be accepted.

### 5.3 Communication

Please use the subject line “Stats: [Your Topic]” when sending me emails. I strive to reply to emails within 24 hours. If you do not receive a response within that timeframe (excluding weekends), please feel free to follow up to ensure I received your message. I am also available during regular office hours or by appointment.

### 5.4 Generative AI

You are permitted to use generative AI tools (e.g., ChatGPT, Gemini, NotebookLM) in this course, but only as assistants. These tools must not replace your own authorship of words, ideas, or analysis. You must remain the intellectual author of all work you submit.

Specifically, you may use generative AI to help you:

- Clarify or elaborate on key concepts.
- Brainstorm ideas.
- Proofread or edit writing.
- Assist with coding.

However, you may NOT use generative AI to:

- Write any portion of your projects or other graded assignments.
- Complete any part of quizzes or exams.
- Generate the core arguments or thesis of your work.
- Substitute for completing required readings.
- Generate responses for class discussions.

You are fully responsible for any text or codes you submit. I reserve the right to ask you to explain how you produced key parts of your text or codes in person. If you cannot demonstrate an understanding of your submission, or if your codes do not reproduce the results you report, this will be treated as a potential violation of academic integrity.

You must include a brief statement in your final project declaring whether you used generative AI and, if so, for which permissible activities listed above. Honest disclosure of permitted AI use will not negatively affect your grade. However, failure to disclose AI use, if detected, will be treated as a violation of academic integrity.

## 5.5 Integrity

At NYU Abu Dhabi, a commitment to excellence, fairness, honesty, and respect within and outside the classroom is essential to maintaining the integrity of our community. By accepting membership in this community, students, faculty, and staff take responsibility for demonstrating these values in their own conduct and for recognizing and supporting these values in others. In turn, these values create a campus climate that encourages the free exchange of ideas, promotes scholarly excellence through active and creative thought, and allows community members to achieve and be recognized for achieving their highest potential.

Students should be aware that those who engage in behaviors that violate the standards of academic integrity will be subject to review and may face the imposition of penalties in accordance with the procedures set out in the [NYUAD policy](#).

## 5.6 NYU Moses Center for Student Accessibility

New York University is committed to providing equal educational opportunity and participation for students with disabilities. The Moses Center works with NYU students to determine appropriate and reasonable accommodations that support equal access to a world-class education. Confidentiality is of the utmost importance. Disability-related information is never disclosed without student permission.

Please find further information at the [Moses Center for Accessibility and Inclusive Culture](#), or email [mosescenter@nyu.edu](mailto:mosescenter@nyu.edu).

### 5.7 Mental Health Resources

As a university student, you may experience a range of issues that can interfere with your ability to perform academically or impact your daily functioning, such as heightened stress, anxiety, difficulty concentrating, sleep disturbance, strained relationships, grief and loss, or personal struggles. If you have any well-being or mental health concerns, please visit the Counseling Center on the ground floor of the Campus Center from 9 AM – 5 PM Abu Dhabi time, Sunday – Thursday. You can also schedule an appointment to meet with a counselor by calling +971 2-628-8100 or emailing [nyuad.healthcenter@nyu.edu](mailto:nyuad.healthcenter@nyu.edu).

If you require mental health support outside of these hours, call NYU's Wellness Exchange hotline at +971 2-628-5555, which is available 24 hours a day, 7 days a week. You can also utilize the Wellness Exchange mobile chat feature, details of which you can find on the student portal.

### 5.8 Copyright

All course materials—including slides, recordings, lecture notes, handouts, assignments, and exam questions—remain the intellectual property of the faculty. You may use these materials solely for your own learning and research purposes (with proper citation).

You are not permitted to disseminate, post, or share these materials in any form or medium (e.g., uploading to external websites or sharing with students outside the course). Doing so violates intellectual property rights and is subject to disciplinary action by the University under the Code of Student Conduct.

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## 6 Course Schedule (Shortened)

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The course is divided into five main topics as described below.

Recitation sessions are highlighted in blue, and quizzes/exams/assignments in red.

### Topic 1 – Introduction to Data

W1 – Aug 25	Syllabus, hello data
W1 – Aug 27	A clean dataset, types of variables
W1 – Aug 28	Recitation 1
W2 – Sep 1	Sampling strategies and principles
W2 – Sep 3	Experimental and observational studies
W2 – Sep 4	Recitation 2

### Topic 2 – Exploratory Data Analysis

W3 – Sep 8	Exploring categorical variables
W3 – Sep 10	Quiz 1 on Topic 1
W3 – Sep 11	Recitation 3
W4 – Sep 15	Exploring numeric variables
W4 – Sep 17	Exploring relationships between variables
W4 – Sep 18	Recitation 4
W5 – Sep 22	Correlation, Simpson's paradox
W5 – Sep 24	Quiz 2 on Topic 2
W5 – Sep 25	Recitation 5

### Topic 3 – Regression

W6 – Sep 29	Regression with a single predictor
W6 – Oct 1	Regression with multiple predictors I
W6 – Oct 2	Recitation 6
W7 – Oct 6	Regression with multiple predictors II
W7 – Oct 8	Model diagnostics
W7 – Oct 9	Recitation 7
W8	Fall break

- W9 – Oct 20      Review for midterm  
W9 – Oct 22      **Midterm exam on Topics 1–3**

#### Topic 4 – Foundations of Inference

- W10 – Oct 27      Hypothesis testing, p-value, statistical significance  
W10 – Oct 29      Confidence intervals, bootstrapping  
W10 – Oct 30      **Recitation 8, Final project proposal**  
W11 – Nov 3      Central Limit Theorem, the normal distribution  
W11 – Nov 5      Type I & II errors, power  
W11 – Nov 6      **Recitation 9**

#### Topic 5 – Statistical Inference

- W12 – Nov 10      **Quiz 3 on Topic 4**  
W12 – Nov 12      Inference for a single proportion/mean  
W12 – Nov 13      **Recitation 10**  
W13 – Nov 17      Inference for comparing proportions/means  
W13 – Nov 19      Inference for two-way tables  
W13 – Nov 20      **Recitation 11**  
W14 – Nov 24      Inference for linear regressions  
W14 – Nov 26      Review  
W14 – Nov 27      **Recitation 12**  
TBA              **Final project**  
TBA              **Final exam**
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## 7 Course Schedule (Detailed)

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### Topic 1 – Introduction to Data

#### I: Hello data (Aug 25)

- Course structure and objectives
- What is statistics? Why should we care?

#### II: Knowing the data (Aug 27)

- Tidy data
- Numeric vs. categorical variables
- Association vs. independence
- Explanatory vs. response variables

#### III: Sampling strategies and principles (Sep 1)

- Populations, samples
- Random, stratified, cluster, multistage sampling
- Weight

#### IV: Experimental and observational studies (Sep 3)

- Principles of experiments: controlling, randomization, replication, blocking
- Observational studies

✦ Aug 28      [Recitation 1: R basics and setup](#)

✦ Sep 4        [Recitation 2: Importing data and basic summaries](#)

✦ Sep 10      [Quiz 1](#)

### Topic 2 – Exploratory Data Analysis

#### I: Exploring single variables (Sep 8, Sep 15)

- Bar, pie chart, mosaic plot...
- Histogram, box plot, density curve...
- Mean, median, mode, variance, standard deviation
- Frequency, proportion

## II: Exploring two or more variables (Sep 17, Sep 22)

- Contingency table
- Two-way or three-way visualization
- Correlation
- Simpson's paradox, spurious correlation

- ✦ Sep 11      [Recitation 3: Visualization I](#)
- ✦ Sep 18      [Recitation 4: Visualization II, data wrangling I](#)
- ✦ Sep 24      [Quiz 2](#)
- ✦ Sep 25      [Recitation 5: Data wrangling II](#)

## Topic 3 – Regression

### I: Regression with a single predictor (Sep 29)

- Fitting a line, residuals
- Least squares regression
- Slope and intercept

### II: Regression with multiple predictors (Oct 1, Oct 6)

- Reference level of categorical predictors
- Fitting a model with multiple predictors
- Interpretation

### III: Model diagnostics (Oct 8)

- $R^2$ , Adjusted  $R^2$ , AIC, BIC...
  - Model selection
  - Multicollinearity
  - LINE: Linearity, Independence, Normal residuals, Equal variability
- ✦ Oct 2      [Recitation 6: Correlation, simple linear regression](#)
  - ✦ Oct 9      [Recitation 7: Multiple regression and diagnostics](#)
  - ✦ Oct 22     [Midterm exam](#)

## Topic 4 – Foundations of Inference

### I: Hypothesis testing (Oct 27)

- Null and alternative hypothesis
- Randomization, variability, p-value, statistical significance
- Hypothesis testing

### II: Confidence interval (Oct 29)

- Bootstrapping
- Confidence interval as plausible range of values

### III: Central Limit Theorem (Nov 3)

- Central Limit Theorem
- The normal distribution
- Z-scores, normal probability calculations
- Margin of error

### IV: Decision errors and statistical power (Nov 5)

- Type I & II errors
- Two-sided hypotheses
- Statistical power

♣ Oct 30      [Recitation 8: Simulation-based inference](#); [Final project proposal](#)

♣ Nov 6      [Recitation 9: Hypothesis testing](#)

♣ Nov 10      [Quiz 3](#)

## Topic 5 – Statistical Inference

### I: Inference for a single proportion/mean (Nov 12)

- Inference for a single proportion
- T-distribution, t-tests, degrees of freedom

### II: Inference for comparing proportions/means (Nov 17)

- Difference in proportions
- Difference in independent means

- Difference in paired means

### III: Inference for two-way tables (Nov 19)

- Expected counts in a two-way table
- Chi-squared statistic, Chi-squared distribution

### IV: Inference for linear regression (Nov 24)

- Regression with a single predictor
- Regression with multiple predictors
- Checking assumptions for inference

✦ Nov 13      [Recitation 10: Statistical tests](#)

✦ Nov 20      [Recitation 11: Workshop](#)

✦ Nov 27      [Recitation 12: Workshop](#)

✦ TBA          [Final project](#)

✦ TBA          [Final exam](#)

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