

CORE121 Election Science Syllabus Spring 2022

CORE 121-09 and CORE121-13 Numbers: Election Science

Section 13 meets MWF at 11:30am - 12:30pm in JR Howard 116

Section 9 meets MWF at 1:50pm - 2:50pm in JR Howard 254

Lewis & Clark College

Spring 2022

Instructor: Ian McDonald, Ph.D.

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Office Hours:

Monday and Wednesday 3:30-5 + email or additional times by appointment. You can meet with me in person or via teleconferencing.

Syllabus Links:

html: <https://core121-election-science-spring2022.netlify.app/syllabus.html> pdf: <https://core121-election-science-spring2022.netlify.app/syllabus.pdf>

Course Description

We expect democracies to translate public desire into coherent political choices. And we expect elections to deliver these results. But aggregating preferences with elections is harder than it looks. The simplest elections based on innocent design choices will produce paradoxical and confounding results.

In this course, we'll introduce mathematical and logical tools that can help us understand the paradoxes of elections. You will use these tools to develop and refine your quantitative reasoning skills and apply them to a fundamental problem: how does adding together individual preferences make democracy possible? Topics will include redistricting, voting procedures, and election prediction models. We will look at contemporary examples such as the recent New York City mayoral primary election, and the effect of using districts in choosing the Seattle City Council. You will develop arguments, apply data visualization tools and consider the relevance of statistical reasoning and causal inference.

This section will teach quantitative reasoning and numeracy skills using applications related to elections. Currently, scholars employ a wide variety of quantitative approaches when trying to understand problems of social choice and democratic outcomes. Topics and data examined in this section include those related to campaign finance, redistricting, voting algorithms, voter turnout, polling, and election fraud analysis. You will learn the production and interpretation of data visualizations, statistics, and how to design research for causal inference. You will also gain basic proficiency with Microsoft Excel and RStudio.

This class discusses political topics but it is not part of the college's political science curriculum. It might leverage your interest in political topics but doesn't require any political knowledge, at all. We will use politics to demonstrate the power of quantitative reasoning.

Learning Objectives

At the conclusion of this course, you will be able to:

- Examine ideas, arguments, biases, and assumptions coming from many perspectives, including your own, with an open yet critical mind.
- Analyze texts and/or quantitative information, recognizing, describing, and questioning patterns, trends, anomalies, and relationships.
- Present clear, compelling, and effective arguments and/or analysis, supported by evidence.
- Critically assess numbers and quantitative data as they are employed by political scientists, pundits, and the media for understanding and predicting political phenomena.
- Relate issues of diversity, equity, and inclusion to how data is gathered, interpreted, and emphasized.

Course Website

<https://classroom.google.com/u/0/c/NDUwMzYxODk3MTUw>

This website will be used for both sections. Google Classroom is one of two sites you will use to submit assignments; the other is My Open Math. Google Classroom will direct you to the right source for readings and submissions. This site will also contain all documents and links related to the course.

Course Administration

Course Portals

In this course you will access four different portals that require your LC id and password for initial contact. Google Classroom will direct you from session to session, but you will be directed to these sites at different phases of the course.

My Open Math

Readings, videos, and quizzes will be available from My Open Math. Sign up using the link below. All material will be directly linked from our class website, so you do not need to regularly check this site directly. <https://www.myopenmath.com/forms.php?action=enroll> The course ID: 132786 The enrollment key: democracy

Google Classroom

In addition to serving as the class website, you will submit papers and your excel labs through Google Classroom. Enroll using this link: <https://classroom.google.com/c/NDUwMzYxODk3MTUw?cjc=mds6pv2>

The class code is: mds6pv2

RStudio

You can access RStudio using a web browser and signing in to the college's server at <https://rstudio.cloud>

In your lab assignments, you will explore datasets, generate data visualizations, and perform simple calculations using the RStudio platform, based on the R programming language. Dozens of videos and online documents can provide a background explanation of R, and a good place to start is the online manual R for Data Science at <https://r4ds.had.co.nz/introduction.html>.

R Programming for Beginners I will introduce you to the R programming language using the RStudio platform. The goal isn't to achieve mastery of R syntax but rather show you the basic workflow and help you recognize situations when R's power in data management and visualization will help you. A set of interactive primers can be found on the RStudio cloud website at: <https://rstudio.cloud/learn/primers>

If you want to dive into R, I recommend the R Programming 101 video series in YouTube. It's entertaining and gentle.

We will have four labs in which you will copy and execute R code in RStudio and report the results. You will also observe the results of changing the code slightly. For ambitious data visualization projects, you may discover that R can satisfy your requirements better than Excel with a reasonable learning curve.

https://www.youtube.com/watch?v=nRtp7wSEtJA&list=PLtL57Fdbwb_AWmWWrFV_pLqq2uicpUIO9

Microsoft Excel

You will also use Microsoft Excel, an ordinary spreadsheet tool, in labs. You will gain exposure to spreadsheets, and when you compare the experience to RStudio, you'll see how a scripted programming language has particular advantages and problems compared to spreadsheet applications.

For this purpose, Microsoft Excel is preferred over Google Sheets or other open-source alternatives. Lewis & Clark has a Campus Agreement for Microsoft Office. Because of this, current students, staff and faculty can use their @lclark.edu email address to activate a free Office 365 account, which allows them to use Microsoft apps such as Excel. This program is 100% managed by Microsoft and is completely separate from Lewis & Clark College.

To set up Office 365:

- Go to <https://products.office.com/en-us/student/office-in-education> to sign up.
- Enter your Lewis & Clark email address
- Click the Get Started button
- Access the link that is sent to your email to complete the registration
- Follow the prompts to activate Office 365 and create your Microsoft account
- Install Office and sign-in with your newly created Office 365 ID

Lab Groups

You will regularly work on labs in groups of 3-4.

Please fill out this short survey to help me select your Excel and RStudio mates: <https://forms.gle/kHNKVKgsM34vr7bK7>. I will post this survey as an ungraded Google Classroom assignment. Please complete it by Monday January 24.

Attendance

Your attendance is expected every class session. If you can't attend class, please notify me. Your grade will be reduced if you routinely miss class without notification or reason. See the grade formula below for details.

Laptops and Phones

If you have access to a laptop computer, you *should* bring it to class routinely.

You can bring phones into the classroom, but please note that we have very limited time together and we need to make it count. We all need to be present and free of distraction. I will count on you to do your part.

Your classroom experience won't be successful if we aren't all focused. We don't have much time together and we can't afford to waste it. I will approach you if maintaining focus appears to be a problem.

Recording Classes

Lewis & Clark policy generally forbids recording of classes. The policy states: "... the secret recording (audio or video) of classes, meetings or other conversations, including telephone calls, is prohibited, as not compatible with the law or the promotion of an open exchange of ideas."

Please do not record classes without discussing it with me. The concern is protecting privacy, for everyone in the classroom. See me if you have questions. The policy is available at <https://www.lclark.edu/live/profiles/3606-recording-policy>.

Rescheduling Exams

Notice that the midterm and final exam are scheduled on days that precede college holidays. The exams will take place on those days, and cannot be rescheduled.

Tutoring at the SQRC

The Symbolic and Quantitative Resource Center (SQRC) is an informal and free drop-in peer tutoring center. The SQRC will offer both in-person and remote tutoring this semester. In-person tutoring will take place in JR Howard 134 and remote tutoring will take place on the SQRC Discord server. Use this link to join the Discord server: <https://discord.gg/VWfT99b>

Changing Sections or Withdrawing

Any requests to change your Words or Numbers section should be directed to the General Education Office (GenEd@lclark.edu). Because it is a required course designed for first year students, withdrawal is not permitted (unless you are withdrawing from all courses for the semester).

Diversity, Equity, and Inclusion

Lewis & Clark and its faculty are committed to diversity, equity, and inclusion in the classroom. I will work hard to ensure that all backgrounds and perspectives thrive in this course.

I am committed to the goal that anyone can achieve mastery of basic quantitative reasoning and the ideas presented in this course. Typecasting ourselves as a “math” or “non-math” person is self-limiting and needless.

If your learning needs are not being met, or you do not feel comfortable with the material being discussed, I am counting on you to let me know. I will do my best to support a classroom climate that supports a diversity of thoughts, perspectives, and experiences, and that honors your identities (including race, gender, class, religion, ability, etc.). Matters of identity and American politics are inextricably intertwined and as such will be regularly discussed in class and will likely require consideration in your research projects.

Activities and Grading Formula

The work in this class includes the following:

- Reading ahead of classroom attendance and participation
- Reading, videos, and exercises using the My Open Math platform
- Labs and lab submissions using Microsoft Excel and RStudio
- One 3-4 page paper
- Two group projects

Two exams: 20% each

Each exam is independent and not cumulative (Learning Objectives #2 and #4). The midterm will take place during the regular class period for Friday, March 11. The final exam takes place as scheduled by the college: https://college.lclark.edu/offices/registrar/final_exam_schedule/spring/

Students cannot take the exams with the other section.

The section 9 final exam takes place on Monday, May 2 from 1-4pm in JR Howard 254 The section 13 final exam takes place on Wednesday, May 4 from 1-4pm in JR Howard 116

Each component of the grade is based on a 100 point scale, and I try to adhere to that formula so that you don't have to reweight the numbers that you see in assignments or exams. For example, your midterm score will be based on 20 points.

Research paper & presentation: 20%

You are responsible for one 3-4 page paper on a topic related to elections or public opinion that marshals data to provide evidence and includes an original data visualization. In addition, you will present your argument and analysis to the class and answer questions from your colleagues about your analysis. As part of this project, you will need to address how your data and analysis reflects on issues of inclusion, diversity, and equity. (Learning Objectives #2, #3, #4, and #5).

Note that there will be a data visualization contest sponsored by the library, and you're invited to submit your work for that competition. The library will publish details later in the semester.

Homework/labs: 20%

The class will be structured to be participatory, particularly using small groups. This requires everyone to have done the readings and come prepared adequately to critically engage with a variety of arguments, approaches, and data. I will assign periodic activities that will build data literacy, including quizzes, homework, or other assignments. Students will be expected to complete a series of excel-based learning labs, with time devoted to this activity in class. (Learning Objectives #1, #2, #3, #4, and #5)

Attendance/ Participation: 5%

This portion of the grade will be reduced if you routinely miss class without prior notification or some important reason. Some sessions will not require in class attendance, and you will know about those sessions well in advance. Two or more absences will reduce the score given.

Group Projects: 15%

There will be two group projects to submit in this course. The output of each project will vary (presentation, written components) and will be explained at the start of each project. You will be graded based on project quality and by peer review. Significant class time will be devoted to these projects.

Late work submissions Unless otherwise specified, late work will be penalized by 2/3 of a grade per day. This means, for example, that an assignment graded as a B will be dropped to C+ the first late day, and to C- the second day. Work submitted more than 48 hours late will not be accepted.

Letter grades will follow this scale: 92-100: A 89-91: A- 86-88: B+ 78-85: B 74-77: B- 69-73: C+ 62-68: C 58-61: C- 50-57: D Less than 50: F

Weekly Assignments

The first seven assignments (before spring break) are each worth three points. The two group assignments after spring break are each worth eight points.

Week 1 (due Jan 21)

This assignment is ungraded. Be sure to:

- Access Microsoft Office and download the office suite: <http://www.office.com>
- Log into the library's RStudio server at <https://rstudio.cloud>.
- Register as a new student at myOpenMath.com: <http://myopenmath.com> As noted earlier, the Course ID is **132786** and the passcode is **democracy**
- Make sure you are enrolled in the course portal for Google Classroom. <https://classroom.google.com/u/0/c/NDUwMzYxODk3MTUw>

Week 2 (due Jan 28)

My Open Math Percentage Problem Solving

Enter your results in the My Open Math website. We will review the process in class.

<https://www.myopenmath.com/course/course.php?cid=132786&folder=0-1>

The assignment is worth two points and you will see your score in Google Classroom. <https://classroom.google.com/c/NDUwMzYxODk3MTUw/a/NDUwNjkwNzMyOTk4/details>

Week 3 (due Feb 4)

My Open Math Growth Models exercise at <https://www.myopenmath.com/assess2/?cid=132786&aid=9486788#/>

The assignment is worth two points, and the results will be posted at <https://classroom.google.com/c/NDUwMzYxODk3MTUw/a/NDUwNzIyNTE2NjU1/details>

Week 4 (due Feb. 11)

Group Excel Lab #1 <https://classroom.google.com/c/NDUwMzYxODk3MTUw/a/NDUwODY2OTQ5MTMw/details>

Week 5 (due Feb 18)

Identify datasets suitable for the end of semester project. <https://classroom.google.com/c/NDUwMzYxODk3MTUw/a/NDUwOTEwMTIyNjU0/details>

Week 6 (due Feb 25)

Group Excel Lab 2 <https://classroom.google.com/c/NDUwMzYxODk3MTUw/a/NDUwOTYwNTQyMjE4/details>

Week 7 (due Mar 4)

Read <http://www.opentextbookstore.com/mathinsociety/2.5/VotingTheory.pdf> (pp. 35-43) and submit here: <https://classroom.google.com/c/NDUwMzYxODk3MTUw/a/NDUwOTE3ODg3NDI5/details>

Week 8 (no weekly assignment)

Week 9 (due Mar 18)

Weekly Assignment: Apportionment <https://classroom.google.com/c/Mzc2MjMzMzMzQ1ODU0/a/MzgwMDI0MDEwNjU3/details>

Week 10 (no assignment... Happy Spring Break!)

Week 11 (due Apr 1)

Group Project #1: Voting Systems <https://classroom.google.com/c/NDUwMzYxODk3MTUw/a/NDUwOTYzMTY2Mjgw/details>

Week 12 Weekly Assignment (due Apr 8) The last weekly assignment Group Project #2: Gerrymandering <https://classroom.google.com/c/NDUwMzYxODk3MTUw/a/NDUwOTY1OTE1MzI3/details>

Course Schedule

Week 1

Wednesday, January 19 Topic: A personal course introduction. Syllabus review, a few words about me, and the purpose of CORE121. Zoom Link for both sections: <https://zoom.us/j/5083547883?pwd=QzVVNG5QMjJSTUIPZ1JTSWszQitTZz09>

Friday, January 21 Reasoning with probability with the Monty Hall Problem.

Zoom Link for both sections: <https://zoom.us/j/5083547883?pwd=QzVVNG5QMjJSTUIPZ1JTSWszQitTZz09>

Pre-class Reading:

Read about the back story of the Monty Hall problem. (No submission but consider the discussion questions before class.)

<https://www.statisticshowto.com/probability-and-statistics/monty-hall-problem/> <https://www.nytimes.com/1991/07/21/us/behind-monty-hall-s-doors-puzzle-debate-and-answer.html> <https://www.vox.com/2015/12/1/9821256/monty-hall-problem-mansplainers>

Week 2

Monday, January 24 Manipulating Percentages with Voter Turnout

Pre-class Homework Assignment: Read pages 1-6 of this textbook chapter. <http://www.opentextbookstore.com/mathinsociety/2.5/ProblemSolving.pdf>

In class we will complete the first three “Try it Now” examples from the reading.

Wednesday, January 26 Using growth formulas: arithmetic vs. geometric/exponential growth.

Pre-class Reading Assignment: Read the first 10 pages of PDF at <http://www.opentextbookstore.com/mathinsociety/2.5/GrowthModels.pdf>. Read through Example 6, pp. 173-182.

Friday, January 28 Computing inflation and real dollars

Skim Excel Lab #1 and watch this short video: https://www.youtube.com/watch?v=y_Nt5BL_wgU

Week 3

Monday, January 31 Excel lab (Campaign Finance): Computation from simple data in Excel.

We will finalize lab groups for the semester and begin the lab

Wednesday, February 2 Statistics, the difference between Statistics vs. Mathematics.

Pre-class Reading Assignment #1:

Read Pages 1-11 in <http://www.opentextbookstore.com/mathinsociety/2.5/Statistics.pdf>

Friday, February 4 Introduction to Surveys using statistical inference.

Pre-class Reading Assignment #1: Before class, read <https://www.nytimes.com/2020/11/10/upshot/polls-what-went-wrong.html> (PDF here: https://drive.google.com/file/d/1HKM5UQzn3F1WkuURYjzzkEbepdumG_Qj/view?usp=sharing)

Week 4

Monday, February 7 Data organization: observations, variables, and description. Read <http://www.opentextbookstore.com/mathinsociety/2.5/DescribingData.pdf> pp. 247-269. Watch this 7:47 minute video. <https://www.youtube.com/watch?v=Kno1gJiO5Dg>

Wednesday, February 9

Friday, February 11

Week 5

Monday, February 14 Topic:

RStudio Lab 1

<https://classroom.google.com/c/Mzc2MjMzMzQ1ODU0/a/Mzc5OTM1Njk2MTEx/details>. Note: the goal isn't to master R syntax. You will simply copy, paste, and run R code, and you'll get the hang of the RStudio workflow.

Pre-class Homework Assignment #1:

We will try to recreate the lab described here: <https://core121-election-science-fall2021.netlify.app/core121-lab-1-v1>

Watch this R Programming 101 video (6:55 in length). https://www.youtube.com/watch?v=nRtp7wSEtJA&list=PLtL57Fdbwb_AWmWWrFV_pLqq2uicpUIO9.

Wednesday, February 16 Topic:

Variation and the Standard Deviation

Pre-class Reading Assignment: <https://seeing-theory.brown.edu/probability-distributions/index.html>
Read through the interactive online chapters from Chapter 1: Basic Probability to Chapter 5: Bayesian Inference.

Friday, February 18 My Open Math: Collecting Data

<https://www.myopenmath.com/course/course.php?cid=118940&folder=0-6&r=6116fc9cd5bcf> Complete the exercises in the myOpenMath site.

Week 6

Monday, February 21 Topic:

Confidence Intervals and Margins of Error in the Normal Distribution

Pre-class Reading Assignments: Read <https://www.statisticshowto.com/probability-and-statistics/hypothesis-testing/margin-of-error/>

Read <https://myopenmaths3.s3.amazonaws.com/cfiles/29937/MAT14xTextbook1stEditionCh12.pdf> (pp. 1-5)
AND <https://myopenmaths3.s3.amazonaws.com/cfiles/2408/ReadingE8.pdf> (pp. 1-4)

Wednesday, February 23 Statistics, Central Limit Theorem, and Surveys

Friday, February 25 Statistics, Central Limit Theorem, and Surveys

Week 7

Monday, February 28 Voting Theory Part 1: Ordering preference and preference tables

Wednesday, March 2 Ranked Choice Voting and the New York Mayoral Primary

Friday, March 4 Strengths and weaknesses of the main election choice methods

Week 8

Monday, March 7 Voting Systems (continued) Apportionment and the U.S. House of Representatives (part I)

Pre-class Reading Assignment <http://www.opentextbookstore.com/mathinsociety/2.5/Apportionment.pdf> We will examine the different apportionment methods mentioned in this article, focusing on Webster and Huntington-Hill.

Wednesday, March 9 Topic:

Apportionment and the U.S. House of Representatives.

Pre-class Reading Assignment Read https://www.ianrmcdonald.com/posts/2021-05-10-new-york-and-house-apportionment-in-2020_update/

Friday, March 11 MIDTERM EXAM

Week 9

Monday, March 14 **Topic:** Gerrymandering in the United States and the Group Voting Rules project.

Read <https://www.quantamagazine.org/the-math-behind-gerrymandering-and-wasted-votes-20171012/> and come prepared to discuss this question:

“What is the definition of gerrymandering, and how can we use the efficiency gap to measure it?”

We will also stage the voting systems group project. Your group will be responsible for defining the outcome of the New York mayoral primary using Approval Voting. You will apply a common dataset to the project.

Wednesday, March 16 Gerrymandering and the politics of geography: More on the efficiency gap, measuring gerrymandering, and Seattle City Council Switches to Districts

Preclass Reading Assignment: Read <https://sccinsight.com/2021/03/19/understanding-the-city-council-redistricting-process/> and come prepared to answer this question: “Why would Seattle voters have chosen to adopt a district based system in 2013, given all the uncertainty about managing and defining districts? Isn’t that going backwards?”

Friday, March 18 Your Data Project and Presentation.

We will discuss the end-of-semester data projects, which include a presentation and a short paper. The presentations will cover the final five days of class, and the paper (2-3 pages) is due Wednesday, April 27.

The implications of district building with Dave’s Redistricting tool and District Builder.

Pre-class Video Assignment Watch this video (13:38 minutes): <https://www.youtube.com/watch?v=Pp42Rw2cVQA> and peruse the online tool at <https://davesredistricting.org/maps#home>
We will compare this tool to <https://www.districtbuilder.org/> if time permits

Week 10 Monday, March 21 - Friday, March 25: Spring Break

Week 11

Monday, March 28 Principles of Data Visualization

Preclass Reading Assignment: Read <https://fivethirtyeight.com/features/the-52-best-and-weirdest-charts-we-made-in-2016/> <https://towardsdatascience.com/data-visualization-101-7-steps-for-effective-visualizations-491a17d974de> Read <https://www.livescience.com/45083-misleading-gun-death-chart.html>

Wednesday, March 30 Principles of Data Visualization

Friday, April 1 Datawrapper workshop

Look at this overview of an app called datawrapper. We will use this application to build maps for the lab due on November 15: <https://www.datawrapper.de/maps>

Week 12

Monday, April 4 Using District Building and Dave’s Redistricting Tool

Watch this video (13:38 minutes): <https://www.youtube.com/watch?v=Pp42Rw2cVQA> and peruse the online tool at <https://davesredistricting.org/maps#home>

We will compare this tool to <https://www.districtbuilder.org/> if time permits

Wednesday, April 6

Friday, April 8 Data project workshop.

Week 13

No weekly assignment

Monday, April 11 The U.S. Electoral College

Preclass Reading Assignment: Read <https://www.nytimes.com/article/the-electoral-college.html> AND <https://www.nationalpopularvote.com/written-explanation>.

Come prepared to answer this question: “Maine and Nebraska don’t use winner-take-all allocations of their electors. Why don’t the other 48 states and DC follow their lead?”

Wednesday, April 13 Topic:

Polarization

Pre-class Reading Assignment: Read this article: Mason, Lilliana. 2018. Losing Common Ground: Social Sorting and Polarization *The Forum* v.18(1) <https://bit.ly/3go9bZa>

Friday, April 15 Presentations

Week 14

Monday, April 18 Presentations

Wednesday, April 20 Presentations

Friday, April 22

Week 14

Monday, April 25 Presentations

Wednesday, April 27 Final Exam Review

Data Visualization Paper is Due: <https://classroom.google.com/c/Mzc2MjMzMzQ1ODU0/a/NDI1MjM4NzAwODE1/details>

Week 15

Monday, May 2 Section 9 Final Exam: 1-4pm

Wednesday, May 4 Section 13 Final Exam: 1-4pm