

# API-201 Schedule, Materials & Deliverables (Fall 2023)

Note: All readings are optional unless explicitly marked with an asterisk (\*).











**Syllabus** [↗ \(https://docs.google.com/document/d/1PDsUdyPLQ\\_knJ2zm7YW-Xk8wg130elshJnwQoG5jsiU/edit?usp=sharing\)](https://docs.google.com/document/d/1PDsUdyPLQ_knJ2zm7YW-Xk8wg130elshJnwQoG5jsiU/edit?usp=sharing) | **Reporting Absences** [↗ \(https://docs.google.com/forms/d/e/1FAIpQLSfhZmmEHODV6Ja1wg6ghuSsTQNaZOWpY4Qe0yc\\_99oUJVCncg/viewform?usp=sf\\_link\)](https://docs.google.com/forms/d/e/1FAIpQLSfhZmmEHODV6Ja1wg6ghuSsTQNaZOWpY4Qe0yc_99oUJVCncg/viewform?usp=sf_link)









**Teaching team office hours** [↗ \(https://docs.google.com/document/d/1wPWoUW-R3bOfTC\\_fgXsxudjY4uCCW3Bse-niZSH3atk/edit?usp=sharing\)](https://docs.google.com/document/d/1wPWoUW-R3bOfTC_fgXsxudjY4uCCW3Bse-niZSH3atk/edit?usp=sharing) | **Class slides** [↗ \(https://5harad.com/empirical-methods\)](https://5harad.com/empirical-methods)

**R summer training** [↗ \(https://canvas.harvard.edu/courses/125663/pages/intro-r-summer-assignment\)](https://canvas.harvard.edu/courses/125663/pages/intro-r-summer-assignment)

## I - DESCRIBING DATA







Date	Class	General Topic	Materials & Readings	Handouts
8/31 (Th)	1	Welcome & Introduction	Case studies on <b>voting</b> <a href="https://5harad.com/papers/1p1v.pdf">↗ (https://5harad.com/papers/1p1v.pdf)</a> ( <b>podcast</b> <a href="https://www.thisamericanlife.org/630/things-i-mean-to-know/act-one-1">↗ (https://www.thisamericanlife.org/630/things-i-mean-to-know/act-one-1)</a> ) and <b>policing</b> <a href="https://5harad.com/papers/stop-and-frisk.pdf">↗ (https://5harad.com/papers/stop-and-frisk.pdf)</a>	<b>Handout</b> <a href="https://drive.google.com/file/d/1-77VkSbXMxsDhSYcU66p77c/view?usp=sharing">↗ (https://drive.google.com/file/d/1-77VkSbXMxsDhSYcU66p77c/view?usp=sharing)</a>
9/5 (Tu)	2	Intro to R	R4DS - <b>Ch. 1</b> <a href="https://r4ds.hadley.nz/intro">↗ (https://r4ds.hadley.nz/intro)</a> and <b>Ch. 3</b> <a href="https://r4ds.hadley.nz/workflow-basics">↗ (https://r4ds.hadley.nz/workflow-basics)</a>  In-class <b>exercises</b> <a href="https://colab.research.google.com/github/5harad/API-201-2023/blob/main/lecture/intro-to-R-exercises.ipynb">↗ (https://colab.research.google.com/github/5harad/API-201-2023/blob/main/lecture/intro-to-R-exercises.ipynb)</a> and <b>answers</b> <a href="https://colab.research.google.com/github/5harad/API-201-2023/blob/main">↗ (https://colab.research.google.com/github/5harad/API-201-2023/blob/main)</a>	<b>Handout</b> <a href="https://drive.google.com/file/d/1-8-FcvED5212X2TdpAu8njf/view?usp=sharing">↗ (https://drive.google.com/file/d/1-8-FcvED5212X2TdpAu8njf/view?usp=sharing)</a>

			<a href="#">/lecture/intro-to-R-answers.ipynb)</a>	
9/7 (Th)	3	Grammar of data analysis - I	<p>R4DS - <a href="#">Ch. 4</a>  (<a href="https://r4ds.hadley.nz/data-transform.html">https://r4ds.hadley.nz/data-transform.html</a>)</p> <p>In-class <a href="#">exercises</a> </p> <p>(<a href="https://colab.research.google.com/github/5harad/API-201-2023/blob/main/lecture/grammar-data-analysis-exercises.ipynb">https://colab.research.google.com/github/5harad/API-201-2023/blob/main/lecture/grammar-data-analysis-exercises.ipynb</a>)</p> <p>and <a href="#">answers</a> </p> <p>(<a href="https://colab.research.google.com/github/5harad/API-201-2023/blob/main/lecture/grammar-data-analysis-answers.ipynb">https://colab.research.google.com/github/5harad/API-201-2023/blob/main/lecture/grammar-data-analysis-answers.ipynb</a>)</p>	<p><a href="#">Handout</a>  (<a href="https://drive.google.com/file/d/1-85Y5EpVwMfqYi6ljV-pQbCQuR/view?usp=sharing">https://drive.google.com/file/d/1-85Y5EpVwMfqYi6ljV-pQbCQuR/view?usp=sharing</a>)</p>
9/12 (Tu)	4	Grammar of data analysis - II	<p>R4DS - <a href="#">Ch. 4</a>  (<a href="https://r4ds.hadley.nz/data-transform.html">https://r4ds.hadley.nz/data-transform.html</a>)</p> <p>In-class <a href="#">exercises</a> </p> <p>(<a href="https://colab.research.google.com/github/5harad/API-201-2023/blob/main/lecture/grammar-data-analysis-exercises.ipynb">https://colab.research.google.com/github/5harad/API-201-2023/blob/main/lecture/grammar-data-analysis-exercises.ipynb</a>)</p> <p>and <a href="#">answers</a> </p> <p>(<a href="https://colab.research.google.com/github/5harad/API-201-2023/blob/main/lecture/grammar-data-analysis-answers.ipynb">https://colab.research.google.com/github/5harad/API-201-2023/blob/main/lecture/grammar-data-analysis-answers.ipynb</a>)</p>	<p><a href="#">Handout</a>  (<a href="https://drive.google.com/file/d/1-Ab6_ITDoWvYsvozW0EbFJ/view?usp=sharing">https://drive.google.com/file/d/1-Ab6_ITDoWvYsvozW0EbFJ/view?usp=sharing</a>)</p>
9/14 (Th)	5	Visualizing data	<p><a href="#">An Economists Guide to Visualizing Data</a>  (<a href="https://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.28.1.209">https://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.28.1.209</a>)</p>	<p><a href="#">Handout</a>  (<a href="https://drive.google.com/file/d/1-9qUCXsjmE3cwiiCYKANvOq/view?usp=sharing">https://drive.google.com/file/d/1-9qUCXsjmE3cwiiCYKANvOq/view?usp=sharing</a>)</p>

9/19 (Tu)	6	The grammar of graphics	<p>R4DS - <a href="https://r4ds.hadley.nz/data-visualize">Ch. 2</a>  (<a href="https://r4ds.hadley.nz/data-visualize">https://r4ds.hadley.nz/data-visualize</a>)</p> <p>In-class <a href="#">exercises</a> </p> <p>(<a href="https://colab.research.google.com/github/5harad/API-201-2023/blob/main/lecture/grammar-graphics-exercises.ipynb">https://colab.research.google.com/github/5harad/API-201-2023/blob/main/lecture/grammar-graphics-exercises.ipynb</a>) and</p> <p><a href="#">answers</a> </p> <p>(<a href="https://colab.research.google.com/github/5harad/API-201-2023/blob/main/lecture/grammar-graphics-answers.ipynb">https://colab.research.google.com/github/5harad/API-201-2023/blob/main/lecture/grammar-graphics-answers.ipynb</a>)</p>	<p><a href="#">Handout</a>  (<a href="https://drive.google.com/file/d/1-J6R0egGXF96PNxF9R_bMeI/view?usp=sharing">https://drive.google.com/file/d/1-J6R0egGXF96PNxF9R_bMeI/view?usp=sharing</a>)</p>
9/21 (Th)	7	Selecting the right statistic	MMC - 1.3 - 1.4	<p><a href="#">Handout</a>  (<a href="https://drive.google.com/file/d/1-NpBENwqJ_qmCAXtyLt_-Rz/view?usp=sharing">https://drive.google.com/file/d/1-NpBENwqJ_qmCAXtyLt_-Rz/view?usp=sharing</a>)</p>
9/26 (Tu)	8	Cause and effect		<p><a href="#">Handout</a>  (<a href="https://drive.google.com/file/d/18YKnd7FhNeWKdk7617jdDoc/view?usp=sharing">https://drive.google.com/file/d/18YKnd7FhNeWKdk7617jdDoc/view?usp=sharing</a>)</p>
9/28 (Th)	9	Strategies for causal inference	<p><a href="https://www.cambridge.org/core/books/natural-experiments-in-the-social-sciences/96A64CBDC2A2952DC1C68AF77DE675AF">Natural Experiments in the Social Sciences</a>  (<a href="https://www.cambridge.org/core/books/natural-experiments-in-the-social-sciences/96A64CBDC2A2952DC1C68AF77DE675AF">https://www.cambridge.org/core/books/natural-experiments-in-the-social-sciences/96A64CBDC2A2952DC1C68AF77DE675AF</a>)</p> <p>Chs. 1 - 3</p>	<p><a href="#">Handout</a>  (<a href="https://drive.google.com/file/d/1-54acu38ljW8inql4hz72nBw/view?usp=sharing">https://drive.google.com/file/d/1-54acu38ljW8inql4hz72nBw/view?usp=sharing</a>)</p>

9/29 (F)	<b>Due Date</b>	<b>Final Exercise Proposals Due</b>	<b>Proposal form</b> ( <a href="https://canvas.harvard.edu/courses/125663/assignments/749718">https://canvas.harvard.edu/courses/125663/assignments/749718</a> )	
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## II - PROBABILITY

Date	Class	General Topic	Materials & Readings	Handouts
10/3 (Tu)	10	Intro to probability	MMC: 4.5, 2.6 OIS: 3.1, 3.2	<b>Handout</b>  ( <a href="https://drive.google.com/file/d/1-O8Pi0fjLFbLpQxy9aDroYsyN5KALdn/view?usp=sharing">https://drive.google.com/file/d/1-O8Pi0fjLFbLpQxy9aDroYsyN5KALdn/view?usp=sharing</a> )
10/5 (Th)	11	Bayes' rule	<b>New York Times (2016)*</b> ( <a href="https://canvas.harvard.edu/courses/125663/files/18369897?wrap=1">https://canvas.harvard.edu/courses/125663/files/18369897?wrap=1</a> )  ( <a href="https://canvas.harvard.edu/courses/125663/files/18369897/download?download_frd=1">https://canvas.harvard.edu/courses/125663/files/18369897/download?download_frd=1</a> ) <b>Oster (2014)*</b>  ( <a href="https://fivethirtyeight.com/features/are-mammograms-worth-it/">https://fivethirtyeight.com/features/are-mammograms-worth-it/</a> ) MMC: 4.5 (pp. 292-293); OIS: 3.2.8	<b>Handout</b>  ( <a href="https://drive.google.com/file/d/1-QSduC7pTF2qDB0Dr4WnNkhoGXJ0DwpE/view?usp=sharing">https://drive.google.com/file/d/1-QSduC7pTF2qDB0Dr4WnNkhoGXJ0DwpE/view?usp=sharing</a> )
10/10 (Tu)	12	Application: public pensions in Mexico	<b>Providing Pensions for the Poor</b> ( <a href="https://canvas.harvard.edu/courses/125663/files/18369898?wrap=1">https://canvas.harvard.edu/courses/125663/files/18369898?wrap=1</a> )  ( <a href="https://canvas.harvard.edu">https://canvas.harvard.edu</a> )	<b>Handout</b>  ( <a href="https://drive.google.com/file/d/1-aYr1zDJmk9X47B4UctGggJEwjI6Q1hq/view?usp=sharing">https://drive.google.com/file/d/1-aYr1zDJmk9X47B4UctGggJEwjI6Q1hq/view?usp=sharing</a> )

			<a href="/courses/125663/files/18369898/download?download_frd=1">/courses/125663/files/18369898/download?download_frd=1)</a> *	
10/12 (Th)	13	Thinking Probabilistically about the world		<a href="https://drive.google.com/file/d/105LyulYZzU6P6GudjbM5FwjzjRGJ3srA/view?usp=sharing">Handout ↗ (https://drive.google.com/file/d/105LyulYZzU6P6GudjbM5FwjzjRGJ3srA/view?usp=sharing)</a>
10/13 (F)	<b>Due Date</b>	<b>MIDTERM EXAM (12:00 PM - 1:15 PM; Location TBA)</b>		

### III - STATISTICAL INFERENCE

Date	Class	General Topic	Materials & Readings	Handouts	PO
10/17 (Tu)	14	Intro to RStudio	<a href="https://raw.githubusercontent.com/rstudio/cheatsheets/main/rmarkdown.pdf">R Markdown Cheatsheet ↗ (https://raw.githubusercontent.com/rstudio/cheatsheets/main/rmarkdown.pdf)</a>	No handout	<a href="https://canvas.harvard.edu/courses/125663/sections/1335">PO (https://canvas.harvard.edu/courses/125663/sections/1335)</a>
10/19 (Th)	15	Expected value	MMC: 3.4	<a href="https://drive.google.com/file/d/10C91S8SIQxe-el3m-VxVDrmNRnED2StK/view?usp=sharing">Handout ↗ (https://drive.google.com/file/d/10C91S8SIQxe-el3m-VxVDrmNRnED2StK/view?usp=sharing)</a>	No I
10/24 (Tu)	16	Decision analysis			
10/26 (Th)	17	Confidence intervals - I			
10/31 (Tu)	18	Confidence intervals - II			

11/2 (Th)	19	Statistical significance			
11/7 (Tu)	20	Limits of statistical significance			
11/9 (Th)	21	Sampling and survey design			
11/14 (Tu)	22	Application: Oregon health study			
11/16 (Th)	23	Regression			

## WRAP-UP

Date	Class	General Topic	Materials & Readings	Handouts	PCE	PS
11/21 (Tu)	24	Looking back and looking ahead				
11/22 (Wed)	<b>Due Date</b>	<b>Final Exercise Drafts Due</b>				
11/28 (Tu)	25	Final Exercise Presentations				
11/30 (Th)	26	Final Exercise Presentations				
12/1 (Fri)	<b>Due Date</b>	<b>Final Exercise Due</b>				
12/8	<b>Due Date</b>	<b>FINAL EXAM (Time 9:00 AM - 12:00 PM; Location TBA)</b>				