

# Government 100: Predicting the Future

## Spring 2017

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Office hours: Tuesdays, 9:30am–11:30am, or by appointment

### Course Description

Prediction is a fundamental task of social science. Predictive methods help us validate social scientific theory, understand the substantive importance of empirical findings, and combat our tendency to “fight the last war”—to base our expectations about the future too closely on past events. Most importantly, prediction provides a framework for thinking in a clear and structured way about uncertainty. Using cases from politics, international relations, finance, sports, and entertainment, students in this course will develop a number of qualitative and quantitative tools for predicting uncertain events. The course will help students understand and combat the analytic biases that can stand in the way of successful forecasting, and provide practice in communicating findings through oral presentations and visualization.

### Objectives

The course has two broad goals. First, the course aims to introduce you to academic scholarship, analytic tools, and qualitative and quantitative methods associated with prediction and forecasting. Second, the course will give you opportunities to practice information literacy and communication skills, with a focus on non-written communication and the visual display of information.

When you complete this course, you will be an educated consumer of predictions about future events. You will be able to:

- Critically evaluate forecasts you encounter in the academic literature and in the popular press.
- Identify biases that affect your analytic judgments.
- Apply predictive techniques from the class to a variety of issues in the social sciences and other fields, and make sound judgments in the face of uncertainty.
- Communicate your ideas effectively in oral presentations and briefings.

### Requirements and Policies

I expect you to attend class, complete the readings before the class session for which they are assigned, participate in class discussion and

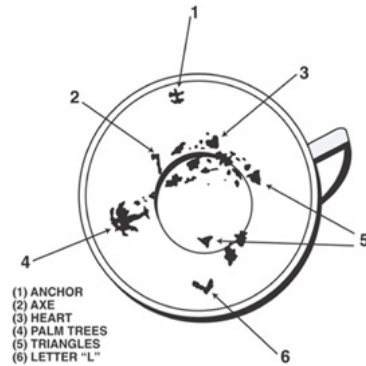


exercises, and turn in course assignments on time.

### *Attendance and participation*

A significant portion of class time will be devoted to discussion. Discussions in class are designed to achieve learning goals that lectures cannot—helping you think through key concepts, understand alternative perspectives, and gain practice expressing your views to others in a constructive way. In addition, discussions will help clarify the readings and introduce new material and tools.

Because discussion is so important to the goals of the course, you must attend class to do well in this course. But it is not enough to just show up—you must complete the readings before their assigned class session and engage in class discussions and exercises. Students will earn high participation grades by consistently demonstrating careful reading of the course materials and interacting with the instructor and fellow students. If you find you are having trouble speaking up in class, please come see me so we can discuss how to help you participate effectively in the course.



*Note: We will not cover tea leaves in this course.*

### *Forecasting teams*

You will be assigned to a forecasting team in the first week of class. I encourage you to work with your team to improve your predictions in the online tournament, to share prediction ideas and resources, and to seek comments on your work. **While you may consult with others on your team, you must submit your own, individual, assignments.** Engaging with your forecasting team is a required part of this course, so please take your team responsibilities seriously. I will take into account your performance as a teammate when calculating your participation grade for the course.

### *Omnibus project*

You can earn extra credit toward your participation grade by serving as a research subject for the Government Department's Omnibus Project. This is an opportunity to be involved with political science research conducted by students and faculty. There will be an alternative writing assignment for those who aren't eligible to participate.

### *Readings*

There are two required books for the course:

Nate Silver. 2012. *The Signal and the Noise: Why So Many Predictions Fail—but Some Don't*. New York: Penguin Books.

Philip E. Tetlock and Dan Gardner. 2015. *Superforecasting: The Art and Science of Prediction*. New York: Crown.

The books are on reserve at Swem Library and available at the W&M bookstore, Amazon, and elsewhere.

In addition, you may wish to consult the following if you are interested in quantitative approaches to prediction:

Gareth James, Daniela Witten, Trevor Hastie and Robert Tibshirani. 2015. *An Introduction to Statistical Learning: with Applications in R, 6<sup>th</sup> Edition*. New York: Springer.

A free copy is available at <http://www-bcf.usc.edu/~gareth/ISL/>, along with R code and other resources.

Additional readings will be linked from the course's Blackboard site. The reading list is subject to change, and I will announce any changes in class or via email.

We will frequently apply concepts from the course to current issues. I encourage you to keep up with the news and with websites that specialize in prediction and forecasting. In particular, students should regularly read [fivethirtyeight.com](http://fivethirtyeight.com) and other data journalism sites, such as the *New York Times*' [The Upshot](http://theupshot.com) and [vox.com](http://vox.com). We will work together in class to identify additional resources on predictions in particular substantive areas (such as sports, finance, entertainment, and politics)—and all students should follow one or more of these sites.

### Assignments

The assignments in this course are designed to give you multiple opportunities to practice the skills of prediction, non-written communication, and the visual representation of information, and to contribute to other learning goals for the course. More details on each of these assignments will be provided in class.



*Note: We will not cover palm reading in this course.*

You will have **homework** assignments due roughly every Monday at 5pm. These assignments will require you to find and evaluate outside information relevant to class topics and to prepare predictions of your own. These assignments are worth 15% of your course grade, but you can miss two homework assignments with no effect on your grade.

You will participate in an online **prediction tournament** over the course of the semester and write a two-page **reflection paper**—due April 27—in which you explain how you might improve your predictions in the future. This assignment is worth 10% of your course grade.

You will make a one-minute **elevator pitch**, describing a subject you have chosen to research and the importance of predictions in this domain. You will practice the elevator pitch in class on February 7 and present the final elevator pitch in class on February 9. This assignment is worth 10% of the course grade.

You will deliver a **briefing** in the final two weeks of class in which you describe your area of research, make your final prediction, and explain the methodology you used to come to that prediction. You will also offer a **constructive critique** on the briefings of others. This

assignment is worth 25% of the course grade.

You will submit a **research memo** in which you briefly explain your findings and provide a visual representation of your prediction. This assignment is due on your final exam date—2pm on May 8 for the 2pm section and 2pm on May 10 for the 3:30 section. It is worth 25% of the course grade.

### *Grades*

Your grade will be based on the following:

Class participation:	15 %
Homework:	15 %
Prediction tournament and reflection paper:	10 %
Elevator pitch:	10 %
Briefing and critique:	25 %
Research memo:	25 %

I reserve A's for excellent work. I give B's for good, above-average performance in the course. C's are for work of average quality, and D's indicate below-average performance. Those students whose work is substantially below average will receive an F.

	100-93	A	92-90	A-	
89-87	B+	86-83	B	82-80	B-
79-77	C+	76-73	C	72-70	C-, etc.

### *Late work*

We will have limited flexibility in accommodating delays for in-class presentations. Let me know—before the due date—if there is some reason that you will not be able to present on your assigned day. Weekly homework assignments will not be accepted late.

### *Academic Honesty*

Your work in this class is governed by the Honor Code. Do not plagiarize. If you use someone else's words in written work, you must put them in quotes and cite the source. If you use someone else's ideas in written work, you must cite the source, even if you don't use the source's exact words. Always err on the side of citing other work. If you have questions about what constitutes plagiarism, please ask me before you submit the assignment.

For guidance on appropriate sourcing, see the following resources:

<http://guides.swem.wm.edu/writingandciting>

<http://library.duke.edu/research/plagiarism>

### *Accommodations*

William & Mary accommodates students with disabilities in accordance with federal laws and university policy. Any student who may need an accommodation based on the impact of a learning, psychiatric, physical, or chronic health diagnosis should contact Student Accessibility Services staff at 757-221-2509 or at [sas@wm.edu](mailto:sas@wm.edu) to determine if accommodations are warranted and to obtain an official letter of accommodation. See <http://www.wm.edu/sas> for more information.

### *Communication*

The best way to reach me is via email ([jkaplow@wm.edu](mailto:jkaplow@wm.edu)). If you have more than a quick question, office hours are better than email. If my regular office hours don't work for you, please email me to set up an appointment.

We will be using a Slack group for the class to facilitate communication among members of forecasting teams and to share resources. Join the group at [gov100.slack.com](http://gov100.slack.com) using your wm.edu email address. Please treat the Slack group as a professional space, with the topic of conversation generally focused on the course. I encourage you to create Slack channels for your forecasting teams. You may make these channels private, if you wish, but I recommend that you include me (@jkaplow) in the channel so that you can bring me into the conversation if you need help.

### *Technology in class*

We will often need to refer to internet-based resources, so I recommend that you bring a computer or tablet with you to class. Please turn off the sound on your devices and resist the temptation to watch videos, check Facebook, or play games. Show respect for other students and give them your full attention during class discussions or student presentations.

### *Statistical computing*

I will be demonstrating some of the quantitative techniques in this class using the free *R* and *RStudio* statistical software. I recommend you follow along using your own version of *RStudio*, which you can download from [rstudio.com](http://rstudio.com). *R* isn't exactly easy to learn if you've never used a programming language before, but this is a good opportunity to get acquainted with statistical computing. Employers are looking for students that have experience with *R* or another statistical computing language. There are many *R* resources available online; popular options include <http://tryr.codeschool.com/> or <https://www.datacamp.com/>. You can also consult the [\*Introduction to Statistical Learning\*](#) book, or just ask me for help.

## **Course Outline**

After an introduction to prediction, we examine why prediction is so difficult, and then examine specific strategies for effective forecasting, including structured analytic techniques and quantitative methods.

### **I. Introduction**

- Why study prediction?
- Thinking like a forecaster
- Election 2016 post-mortem

### **II. Why prediction is (sometimes) hard**

- Predictability
- Evaluating predictions
- Analytic bias

### **III. General forecasting strategies**

- Reasoning from the past
- The wisdom of crowds
- Pairwise comparison
- Simulation

### **IV. Structured analytic techniques**

- Scenarios
- Analysis of competing hypotheses
- Contrarian analysis

### **V. Quantitative approaches**

- Visualizing predictions
- Predicting with regression
- Statistical learning

## Detailed Schedule and Readings

Key dates:

Add/Drop deadline, January 27

Last day to withdraw, March 17

Note that some of the links below will not work unless you are logged onto Blackboard. If you're having trouble with a link, log into Blackboard and try again.

This reading list/schedule is subject to change!

Monday (homework due at 5pm)	Tuesday	Thursday
		<b>January 19</b> Why study prediction?
<p><b>23</b> Sign up for online forecasting tournament at <a href="http://glopen.com">glopen.com</a> and complete training modules at <a href="http://training.goodjudgment.com">training.goodjudgment.com</a>. Join class Slack group at <a href="http://gov100.slack.com">gov100.slack.com</a></p>	<p><b>24</b> <b>Thinking like a forecaster</b> <i>The Signal and the Noise</i> (Silver) Ch. 8 and 10 <i>Superforecasting</i> (TG) Ch. 1–4 and Appendix</p>	<p><b>26</b> <b>Election 2016 post-mortem</b> Silver Ch. 2 <a href="http://Fivethirtyeight.com">Nate Silver. 2017. "The Real Story of 2016."</a> <a href="http://Fivethirtyeight.com">Fivethirtyeight.com</a> <a href="http://Fivethirtyeight.com">Amanda Cox and Josh Katz. 2016. "Presidential Forecast Post-Mortem."</a> New York Times Upshot. <a href="http://Fivethirtyeight.com">Nate Silver. 2016. "Why FiveThirtyEight Gave Trump a Better Chance Than Almost Anyone Else."</a> <a href="http://Fivethirtyeight.com">Fivethirtyeight.com</a>. <a href="http://Fivethirtyeight.com">Nate Silver. 2016. "How I Acted Like a Pundit and Screwed Up on Donald Trump."</a> Fivethirtyeight.com.</p>
<p><b>30</b> Resource pool</p>	<p><b>31</b> <b>Predictability</b> Silver Ch. 1 and 13 TG Ch. 5–8 and 11 <a href="http://Fivethirtyeight.com">Ben Casselman. 2014. "The Conventional Wisdom on Oil is Always Wrong."</a> <a href="http://Fivethirtyeight.com">Fivethirtyeight.com</a>.</p>	<p><b>February 2</b> <b>Evaluating predictions</b> <a href="http://Fivethirtyeight.com">Jeremy Singer-Vine. 2016. "Grading the 2016 Election Forecasts."</a> BuzzFeed.com.</p>

<b>Monday</b> <b>(homework due at 5pm)</b>	<b>Tuesday</b>	<b>Thursday</b>
<p><b>6</b> Find an analytic bias</p>	<p><b>7</b> <b>Analytic bias</b></p> <p><a href="#">Amos Tversky and Daniel Kahneman. 1973. "Judgment under Uncertainty: Heuristics and Biases." <i>Science</i> 185(4157): 1124–1131.</a></p> <p><b>Elevator pitch practice session</b></p>	<p><b>9</b> <b>Analytic bias</b></p> <p><b>Elevator pitch final presentation</b></p>
<p><b>13</b> Stock market indicators</p>	<p><b>14</b> <b>Reasoning from the past</b></p> <p>Silver Ch. 11</p> <p><a href="#">James Mackintosh. 2016. "The Stock Market of Our Dreams." <i>WSJ.com</i>.</a></p> <p>Video: <a href="#">Can you beat the market?</a></p>	<p><b>16</b> <b>Reasoning from the past</b></p> <p>Silver Ch. 5</p>
<p><b>20</b> The Oscars</p>	<p><b>21</b> <b>Wisdom of crowds</b></p> <p><a href="#">Justin Wolfers and Eric Zitzewitz. 2004. "Prediction Markets." <i>Journal of Economic Perspectives</i> 18(2): 107–126.</a></p>	<p><b>23</b> <b>Wisdom of crowds</b></p> <p>TG Ch. 9</p> <p><a href="#">James Surowiecki. <i>The Wisdom of Crowds</i>. Ch. 9.</a></p>
<p><b>27</b> Prediction critique</p>	<p><b>28</b> <b>Pairwise comparison</b></p> <p><a href="#">Nate Silver. 2014. "Introducing NFL Elo Ratings." <i>Fivethirtyeight.com</i>.</a></p> <p><a href="#">"Introducing ESPN's NFL Football Power Index." 2015. <i>ESPN.com</i>.</a></p> <p><a href="#">Walt Hickey. 2016. "We Give Captain America 4-To-1 Odds Against Winning the Civil War." <i>Fivethirtyeight.com</i>.</a></p>	<p><b>March 2</b> <b>Simulation</b></p> <p>Silver Ch. 4</p>

Monday (homework due at 5pm)	Tuesday	Thursday
<b>Spring break</b>		
<p><b>13</b> March Madness</p>	<p><b>14</b> <b>Scenario analysis</b> <a href="#">Richard J. Heuer Jr. and Randolph H. Pherson. 2015. <i>Structured Analytic Techniques for Intelligence Analysis</i>, Ch. 6.</a> <a href="#">NYU Center for Global Affairs. 2011. <i>Pakistan 2020</i>.</a></p>	<p><b>16</b> <b>Scenario analysis</b></p>
<p><b>20</b> Global Trends</p>	<p><b>21</b> <b>Analysis of competing hypotheses</b> <a href="#">A Tradecraft Primer: Structured Analytic Techniques for Improving Intelligence Analysis. 2009. Pg. 14–15.</a></p>	<p><b>23</b> <b>Contrarian techniques</b> <a href="#">A Tradecraft Primer: Structured Analytic Techniques for Improving Intelligence Analysis. 2009. Pg. 17–25.</a> <a href="#">Stephen Artner, Richard S. Girven, and James B. Bruce. 2016. “Assessing the Value of Structured Analytic Techniques in the U.S. Intelligence Community.” <i>RAND Corporation</i>.</a></p>
<p><b>27</b> Good chart/bad chart</p>	<p><b>28</b> <b>Visualizing predictions</b> <a href="#">Christa Kelleher and Thorsten Wagener. 2011. “Ten Guidelines for Effective Data Visualization in Scientific Publications.” <i>Environmental Modelling &amp; Software</i> 26(6): 822–27.</a></p>	<p><b>30</b> <b>Forecasting team meeting</b></p>



<b>Monday (homework due at 5pm)</b>	<b>Tuesday</b>	<b>Thursday</b>
<b>April 3</b> Selling life insurance	<b>4</b> <b>Predicting with regression</b>  Other resources to be announced	<b>6</b> <b>Avoiding overfitting</b>  <a href="#">Michael D Ward, Brian D Greenhill and Kristin M Bakke. 2010. "The perils of policy by p-value: Predicting civil conflicts." <i>Journal of Peace Research</i> 47(4): 363–375.</a>
<b>10</b> Confusion matrix	<b>11</b> <b>Machine learning</b>  Other resources to be announced	<b>13</b> <b>Machine learning</b>  Other resources to be announced
<b>17</b>	<b>18</b> <b>Briefings</b>	<b>20</b> <b>Briefings</b>
<b>24</b>	<b>25</b> <b>Briefings</b>	<b>27</b> <b>Wrapping up</b> <b>Reflection paper due</b>
<b>Finals</b>		
<b>May 8, 2pm</b> Research memo due (2pm section)	<b>May 10, 2pm</b> Research memo due (3:30pm section)	