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**ECON 2160: STRATEGIC ANALYSIS**

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<b>TERM:</b>	Fall 2023
<b>INSTRUCTOR:</b>	Anne Schaller
<b>INSTRUCTOR E-MAIL:</b>	<a href="mailto:anne.schaller@vanderbilt.edu">anne.schaller@vanderbilt.edu</a>
<b>MEETINGS:</b>	Tuesdays and Thursdays from 8:00 AM to 9:15 AM
<b>CLASSROOM:</b>	Calhoun Hall 204
<b>OFFICE HOURS:</b>	Wednesdays from 12:00 PM to 2:00 PM
<b>OFFICE HOURS LOCATION:</b>	Calhoun Hall 212A

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**COURSE DESCRIPTION**

This course provides an introduction to game theory, which uses mathematical frameworks to study strategic interaction. Concepts from game theory are used extensively in biology, business, economics, international relations, law, politics, sociology, and a number of other fields. This course will focus on both the theoretical underpinnings of strategy games as well as applications of these theories.

**PREREQUISITES**

The prerequisites for this course are Principles of Macroeconomics (ECON 1010) and Principles of Microeconomics (ECON 1020). Students should also be comfortable with basic mathematical reasoning. No calculus is required for this course, but elementary algebra and probability theory will be used regularly. No previous knowledge of game theory is required.

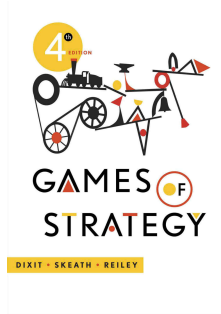
**LEARNING OBJECTIVES**

At the end of this course, students should be able to:

- Explain fundamental concepts in game theory.
- Model games using game tables and game trees.
- Explain and find Nash, rollback, mixed-strategy, sub-game perfect, Bayesian Nash, and perfect Bayesian equilibria.
- Explain key applications of game theory to collective-action problems, auctions, and voting.

## COURSE MATERIALS

- **Textbook:** We will use the following textbook for the course:



**Title:** *Games of Strategy*

**Edition:** Fourth

**Authors:** Avinash Dixit, Susan Skeath, and David Reiley

**Publisher:** W. W. Norton & Company

**Publication Date:** 2015

**ISBN-13:** 978-0-393-91968-4

**Available at:** [Amazon](#) and elsewhere online

- **Other Readings:** I will assign articles, some from popular sources and some from academic publications, on an approximately weekly basis. I may change some of the articles as the course progresses, so I don't recommend reading ahead. I will post each article on Perusall, which is accessible through Brightspace, and ask you to engage with the articles there. Perusall is an online platform where you can comment on or ask questions about the course readings, as well as reply to your classmates' comments and questions.

## TOPICS

Topic	Textbook Chapter(s)
Introduction	1,2
Simultaneous Games	4
Sequential Games	3
Subgame-Perfect Equilibrium	6
Mixed Strategies	7
Uncertainty and Information	8
Strategic Moves and Bargaining	9
Repeated Games	10
Collective Action Games	11
Auctions	16
Voting and Public Policy	15

**Note:** The topics listed above are subject to change and may be adjusted depending on class progress. Any changes will be announced in class. A more detailed calendar is available on page 6.

## ASSIGNMENTS AND GRADING

Course Component	Weight
In-Class Questions	10%
Attendance and Class Participation	10%
Application Paper	15%
Problem Sets	20%
Midterm Exam	20%
Final Exam	25%

- **In-Class Questions:** Once every week to two weeks, I will ask you to answer practice problems in class. You will pair up with another student in the class and work through the problem(s) together. You will turn in one answer sheet as a pair and will both receive the same grade. I will drop your two lowest scores. No makeups will be given.
- **Attendance and Class Participation:** Regular participation is expected and rewarded. Your participation grade depends on doing the readings, commenting on the readings on Perusall, showing up to class, and being engaged in class discussions and exercises. A small number of excused absences will not negatively affect your participation grade.
- **Application Paper:** You will write a short paper applying the principles of game theory to a real-world problem. Detailed guidelines will be discussed in class and posted on Brightspace. You must email me your proposed topic no later than Tuesday, October 24. The paper is due on Thursday, November 30. I encourage you to start early and discuss potential topics with me. I would be happy to provide feedback on any drafts emailed to me at least 72 hours before the deadline.
- **Problem Sets:** There will be 11 problem sets over the course of the semester, distributed via Brightspace on an approximately weekly basis. I will drop your lowest score, so your highest 10 problem set grades will each account for 2% of your final grade. I encourage you to form study groups and work together with classmates on problem sets. However, *each student must submit their own assignment*.
- **Exams:** There will be two in-person exams, a midterm on Tuesday, October 17, and a final on Saturday, December 16. The final exam will be cumulative. These exam dates are not flexible. Please do not schedule interviews, vacations, or travel when we have an exam. There is no “alternate” final exam. If you miss the midterm exam due to a documented illness or family emergency, I will compute your midterm grade using your percentile rank from the final exam. Calculators are neither permitted nor necessary to complete the exams. Prior to each exam, I will post practice problems to aid you in your preparations. Though I will not provide answer keys for these practice problems, you are welcome to discuss the problems with me.

## GRADING SCALE

A	$\geq 94\%$	C	[74%, 77%)
A-	[90%, 94%)	C-	[70%, 74%)
B+	[87%, 90%)	D+	[67%, 70%)
B	[84%, 87%)	D	[64%, 67%)
B-	[80%, 84%)	D-	[60%, 64%)
C+	[77%, 80%)	F	< 60%

## CLASS POLICIES, RESOURCES, AND MISCELLANEOUS INFORMATION

- **Attendance:** Attendance is mandatory and essential for success in this course. However, circumstances may occasionally arise that require you to miss class. If you need to miss class, please email me to let me know and ask a classmate for the notes from the class you missed.
- **Office Hours:** I will hold regular office hours in person. If you cannot attend my regular office hours or prefer to meet via Zoom, please email me to set up an alternate meeting time.
- **Late Submissions and Extensions:** Unless you have made alternate arrangements with me, I will deduct 5 percentage points from your grade for every day that an assignment is late. You will receive no credit for assignments turned in after answer keys have been released. If you feel you have extenuating circumstances and need to submit something late, please contact me as soon as you are able, and we will discuss it. Granting extensions is at my discretion.
- **Email:** Please feel free to email me any questions that I can answer relatively quickly in writing. Please also note that some issues (particularly those requiring lengthy explanation) are not well suited to email correspondence. When you have a more complex concern or question, please make an appointment with me or come to office hours. In general, I aim to respond to all emails within 24 hours, but my response time may be slower for emails sent in the evenings or on the weekends.
- **Academic Integrity:** I expect students to be honest and ethical at all times in accordance with the [Vanderbilt Honor Code](#). You must obtain permission from me before using AI composition software (like ChatGPT) for any assignments in this course. Please also take particular care to cite and quote sources appropriately when writing your paper. If you have questions, please consult me.
- **Brightspace Gradebook:** I will input grades in Brightspace on a regular basis. If you notice a clerical error, please notify me as soon as possible so that I may correct the mistake.

- **Technology:** You are welcome to use a laptop or tablet in class as long as it contributes to your learning. If these devices become distracting, I reserve the right to disallow them in class. Please keep your cell phones on silent and put away for the duration of class.
- **Accommodations:** I am committed to creating a learning environment that meets the needs of Vanderbilt's diverse student body. If you anticipate or experience any barriers to learning in this course, please feel welcome to discuss your concerns with me. If you have a disability, or think you may have a disability, you may also want to consider requesting an official accommodation from Vanderbilt's [Student Access Office](#). If you have already been approved for accommodations, please let me know so I can honor those arrangements.
- **Religious Observances:** I will accommodate students who need to miss class to observe religious holidays. Students must notify me of a planned absence at least three class periods in advance and are responsible for making up any work missed.
- **Mental Health:** As your instructor, I place the highest importance on your mental health and overall well-being. Please feel free to reach out to me about any difficulties that impact your performance in this course. You do not need to disclose any personal information, though you are always welcome to talk to me about anything you are experiencing. (That being said, please be aware that I am subject to some mandatory reporting requirements concerning allegations of sexual misconduct.) I also encourage you to utilize the other resources Vanderbilt provides to students, such as those available through the [University Counseling Center](#).
- **Feedback:** I am committed to continual self-improvement and welcome you to provide feedback on this course. In addition to completing the regular end-of-semester evaluation for this course, which I strongly encourage you to do, I invite you to share your thoughts with me as the course progresses. Also, please do not be shy about correcting me if I make a math error or some other mistake in class.
- **Acknowledgements:** I acknowledge the work of other educators who provided teaching materials that aided me in the design of this course. I have borrowed liberally from courses by Kent Dolezal, Eric Rasmusen, Mike Shor, Tucker Smith, and colleagues on #econtwitter. I also acknowledge resources on syllabus and course design from Vanderbilt's Center for Teaching.
- **Disclaimer:** This syllabus is intended to summarize what may be covered during the semester, and I will follow it as closely as possible. However, I reserve the right to modify or supplement the course material as needs arise.

## TENTATIVE COURSE CALENDAR

Week	Deadlines and Other Important Dates
1	-
2	<b>T 8/29:</b> Read/discuss Farmer and Warren (2019) on Perusall by start of class
3	<b>T 9/5:</b> Read/discuss Roberts (2020) on Perusall by start of class <b>T 9/5:</b> Enrollment closes <b>R 9/7:</b> PS1 due at start of class
4	<b>T 9/12:</b> Read/discuss Levitt et al. (2011) on Perusall by start of class <b>R 9/14:</b> PS2 due at start of class
5	<b>T 9/19:</b> Read/discuss The Economist (2022) on Perusall by start of class <b>R 9/21:</b> PS3 due at start of class
6	<b>T 9/26:</b> Read/discuss Sonnad (2014) on Perusall by start of class <b>R 9/28:</b> PS4 due at start of class
7	<b>T 10/3:</b> Read/discuss The Economist (2016) on Perusall by start of class <b>R 10/5:</b> PS5 due at start of class
8	<b>T 10/10:</b> Read/discuss Paiste (2017) on Perusall by start of class <b>R 10/12:</b> PS6 due at start of class
9	<b>T 10/17:</b> Midterm exam <b>R 10/19:</b> No class (Fall break)
10	<b>T 10/24:</b> Application paper topic due via email by 11:59 PM <b>R 10/26:</b> PS7 due at start of class <b>F 10/27:</b> Last day to withdraw from the course
11	<b>T 10/31:</b> Read/discuss Singer (2015) on Perusall by start of class <b>R 11/2:</b> PS8 due at start of class
12	<b>T 11/7:</b> Read/discuss Kamarck (2019) on Perusall by start of class <b>R 11/9:</b> PS9 due at start of class
13	<b>T 11/14:</b> Read/discuss Belsie (2017) and Gorman (2019) on Perusall by start of class <b>R 11/16:</b> PS10 due at start of class
14	<b>T 11/21:</b> No class (Thanksgiving break) <b>R 11/23:</b> No class (Thanksgiving break)
15	<b>R 11/30:</b> Application paper due on Brightspace at 11:59 PM
16	<b>T 12/5:</b> Read/discuss Desilver et al. (2021) on Perusall by start of class <b>R 12/7:</b> PS11 due at start of class
-	<b>S 12/16:</b> Final exam at 3:00 PM

**Note:** The dates listed above are subject to change and may be adjusted depending on class progress. Any changes to the dates listed above will be announced in class.

## REFERENCES

- Belsie, Laurent. 2017. "Performance Ticket Auctions: Going, Going, Gone." *NBER Digest*, <https://www.nber.org/digest/dec17/performance-ticket-auctions-going-going-gone>.
- Desilver, Drew, Carrie Blazina, Janakee Chavda, and Rebecca Leppert. 2021. "More U.S. Locations Experimenting with Alternative Voting Systems." *Pew Research Center*, <https://www.pewresearch.org/short-reads/2021/06/29/more-u-s-locations-experimenting-with-alternative-voting-systems>.
- Farmer, George, and Paul Warren. 2019. "Rationality: Research Shows We're Not as Stupid as We Have Been Led to Believe." *The Conversation*, <http://theconversation.com/rationality-research-shows-were-not-as-stupid-as-we-have-been-led-to-believe-108218>.
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- The Economist. 2016. "Secrets and Agents," <https://www.economist.com/schools-brief/2016/07/22/secrets-and-agents>.
- . 2022. "The Disturbing New Relevance of Theories of Nuclear Deterrence," <https://www.economist.com/finance-and-economics/2022/03/18/the-disturbing-new-relevance-of-theories-of-nuclear-deterrence>.