

**Econ 520: Advanced Microeconomic Theory - Fall 2023**  
**Preliminary Syllabus**  
**Second Part**

**Instructors:**

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**Class Meetings:** Tuesdays and Thursdays 1pm - 2:15pm in 28 Hillhouse Avenue, A102

**Office Hours:** By appointment.

**Course Content:** The course will be divided into two parts. The first part will be taught by Harry and the second by Ernesto. The first part focuses on models of repeated games, reputation effects, bargaining, learning, and community enforcement. The second part surveys the seminal papers and recent developments in the rapidly growing literature on Bayesian persuasion (single agent), information design (multiple agents), and analyzes their applications to finance, political economy, industrial organization, and other fields.

**Evaluation:** A final project (e.g., solve a problem mentioned in class, write a literature review, come up with your own question and make some progress, submit a research proposal that you plan to work on in the future).

**Classroom Behavior Policy:** To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting, chatting, reading newspaper, making phone calls, web surfing, etc.).

**Diversity Statement:** Yale is committed to an environment of diversity, civility, and intellectual discovery in which all students can thrive. Yale does not tolerate harassment or any other act of discrimination on the basis of race, religion, sex, age, national origin, disability, sexual orientation, or gender identity and expression.

**Subject to Change Statement:** Information contained in the course syllabus, other than the grade policy, may be subject to change with advance notice, as deemed appropriate by the instructors.

## First Half

Papers with \* will be taught in the lectures.

**Part 1:** Reputation effects.

1. \*Fudenberg, D. and E. Maskin (1986) "The Folk Theorem in Repeated Games with Discounting or with Incomplete Information," *Econometrica*.
2. \*Fudenberg, D. and D. Levine (1989) "Reputation and Equilibrium Selection in Games with a Patient Player," *Econometrica*.
3. \*Li, Y. and H. Pei (2021) "Equilibrium Behaviors in Repeated Games," *Journal of Economic Theory*.
4. \*Fudenberg, D. and D. Levine (1992) "Maintaining a Reputation when Strategies are Imperfectly Observed," *Review of Economic Studies*.
5. Kalai, E. and E. Lehrer (1993) "Rational Learning Leads to Nash Equilibrium," *Econometrica*.
6. Sorin, S. (1999) "Merging, Reputation, and Repeated Games with Incomplete Information," *Games and Economic Behavior*.
7. \*Gossner, O. (2011) "Simple Bounds on the Value of a Reputation," *Econometrica*.
8. Faingold, E. (2020) "Reputation and the Flow of Information in Repeated Games," *Econometrica*.
9. \*Ely, J and J. Valimaki (2003) "Bad Reputation," *Quarterly Journal of Economics*.
10. Ely, J., D. Fudenberg and D. Levine (2008) "When is Reputation Bad?" *Games and Economic Behavior*.
11. Deb, R., M. Mitchell and M. Pai (2021) "Bad Reputation in Relational Contracting," *Theoretical Economics*.
12. Mailath, G. and L. Samuelson (2001) "Who Wants a Good Reputation?" *Review of Economic Studies*.
13. Horner, J. (2002) "Reputation and Competition," *American Economic Review*.
14. \*Cripps, M. G. Mailath and L. Samuelson (2004) "Imperfect Monitoring and Impermanent Reputations," *Econometrica*.
15. \*Ekmekci, M. O. Gossner and R. Wilson (2012) "Impermanent Types and Permanent Reputations," *Journal of Economic Theory*.
16. \*Pei, H. (2020) "Reputation Effects under Interdependent Values," *Econometrica*.
17. Pei, H. (2020) "Reputation for Playing Mixed Actions: A Characterization Theorem," *Journal of Economic Theory*.
18. \*Schmidt, K. (1993) "Reputation and Equilibrium Characterization in Repeated Games with Conflicting Interests," *Econometrica*.
19. \*Cripps, M. and J. Thomas (1997) "Reputation and Perfection in Repeated Common Interest Games," *Games and Economic Behavior*.

20. Chan, J. (2000) “On the Non-Existence of Reputation Effects in Two-Person Infinitely Repeated Games,” Working Paper.
21. \*Cripps, M. E. Dekel and W. Pesendorfer (2005) “Reputation with Equal Discounting in Repeated Games with Strictly Conflicting Interests,” *Journal of Economic Theory*.
22. \*Atakan, A. and M. Ekmekci (2012) “Reputation in Long-Run Relationships,” *Review of Economic Studies*.
23. Atakan, A. and M. Ekmekci (2015) “Reputation in the Long-Run with Imperfect Monitoring,” *Journal of Economic Theory*.
24. \*\*Ekmekci, M. and L. Maestri (2021) “Wait or Act Now? Learning Dynamics in Stopping Games,” *Journal of Economic Theory*.
25. \*\*Ekmekci, M. L. Gorno, L. Maestri, J. Sun, and D. Wei (2021) “Learning from Manipulable Signals,” *American Economic Review*.

**Part 2:** Bargaining.

1. \*Gul, F., H. Sonnestein and R. Wilson (1986) “Foundations of Dynamic Monopoly and the Coase Conjecture,” *Journal of Economic Theory*.
2. Ausubel, L. and R. Deneckere (1989) “Reputation in Bargaining and Durable Goods Monopoly,” *Econometrica*.
3. Feinberg, Y. and A. Skrzypacz (2005) “Uncertainty about Uncertainty and Delay in Bargaining,” *Econometrica*.
4. Deneckere, R., and M.Y. Liang (2006) “Bargaining with Interdependent Values,” *Econometrica*.
5. Fuchs, W. and A. Skrzypacz (2010) “Bargaining with Arrival of New Traders,” *American Economic Review*.
6. Strulovici, B. (2017) “Contract Negotiation and the Coase Conjecture,” *Econometrica*.
7. Ortner, J. (2017) “Durable Goods Monopoly with Stochastic Costs,” *Theoretical Economics*.
8. \*Gul, F. (2001) “Unobservable Investment and the Hold-Up Problem,” *Econometrica*.
9. Chatterjee, K. and L. Samuelson (1987) “Bargaining with Two-sided Incomplete Information: An Infinite Horizon Model with Alternating Offers,” *Review of Economic Studies*.
10. \*Kambe, S. (1999) “Bargaining with Imperfect Commitment,” *Games and Economic Behavior*.
11. \*Abreu, D. and F. Gul (2000) “Bargaining and Reputation,” *Econometrica*.
12. \*Compte, O. and P. Jehiel (2002) “On the Role of Outside Options in Bargaining with Obstinate Parties,” *Econometrica*.
13. \*Abreu, D. and D. Pearce (2007) “Bargaining, Reputation, and Equilibrium Selection in Repeated Games with Contracts,” *Econometrica*.

14. Wolitzky, A. (2011) “Indeterminacy of Reputation Effects in Repeated Games with Contracts,” *Games and Economic Behavior*.
15. Wolitzky, A. (2012) “Reputational Bargaining with Minimal Knowledge of Rationality,” *Econometrica*.
16. Atakan, A. and M. Ekmekci (2014) “Bargaining and Reputation in Search Markets,” *Review of Economic Studies*.
17. Abreu, D. D. Pearce and E. Stacchetti (2015) “One-Sided Uncertainty and Delay in Reputational Bargaining,” *Theoretical Economics*.
18. Fanning, J. (2016) “Reputational Bargaining and Deadlines,” *Econometrica*.
19. Fanning, J. (2020) “Mediation in Reputational Bargaining,” *American Economic Review*.
20. Fanning, J. (2021) “Outside Options, Reputations, and the Partial Success of the Coase Conjecture,” Working Paper.
21. Ekmekci, M. and H. Zhang (2022) “Reputational Bargaining with Ultimatum Opportunities,” Working Paper.

**Part 3:** Repeated games with incomplete information.

1. Hart, S. (1985) “Nonzero-Sum Two-Person Repeated Games with Incomplete Information,” *Mathematics of Operations Research*.
2. \*Shalev, J. (1994) “Nonzero-Sum Two-Person Repeated Games with Incomplete Information and Known-Own Payoffs,” *Games and Economic Behavior*.
3. Israeli, I. (1998) “Sowing Doubt Optimally in Two-Person Repeated Games,” *Games and Economic Behavior*.
4. \*Cripps, M. and J. Thomas (2003) “Some Asymptotic Results in Discounted Repeated Games of One-Sided Incomplete Information,” *Mathematics of Operations Research*.
5. Peski, M. (2014) “Repeated Games with Incomplete Information and Discounting,” *Theoretical Economics*.
6. \*Pei, H. (2021) “Trust and Betrayals: Reputational Payoffs and Behaviors without Commitment,” *Theoretical Economics*.
7. Pei, H. (2021) “Repeated Communication with Private Lying Costs,” Working Paper.

**Part 4:** Social learning.

1. Banerjee, A. (1992) “A Simple Model of Herd Behavior,” *Quarterly Journal of Economics*.
2. Bikhchandani, S., D. Hirshleifer and I. Welsh (1992) “A Theory of Fads, Fashion, Custom, and Cultural Change as Informational Cascades,” *Journal of Political Economy*.
3. \*Smith, L. and P. Sørensen (2000) “Pathological Outcomes of Observational Learning,” *Econometrica*.

4. Gale, D. and S. Kariv (2003) “Bayesian Learning in Social Networks,” *Games and Economic Behavior*.
5. Acemoglu, D., M. Dahleh, I. Lobel and A. Ozdaglar (2011) “Bayesian Learning in Social Networks,” *Review of Economic Studies*.
6. Lobel, I. and E. Sadler (2015) “Information Diffusion in Networks Through Social Learning,” *Theoretical Economics*.
7. Hann-Caruthers, W., V. Martynov and O. Tamuz (2018) “The Speed of Sequential Asymptotic Learning,” *Journal of Economic Theory*/
8. \*Rosenberg, D., and N. Vieille (2019) “On the Efficiency of Social Learning,” *Econometrica*.
9. Harel, M., E. Mossel, P. Strack and O. Tamuz (2021) “Rational Groupthink,” *Quarterly Journal of Economics*.
10. Smith, L., P. Sørensen and J. Tian (2021) “Informational Herding, Optimal Experimentation, and Contrarianism,” *Review of Economic Studies*.
11. Dasaratha, K., B. Golub and N. Hak (2021) “Learning from Neighbors about a Changing State,” *Review of Economic Studies*.
12. \*Eyster, E. and M. Rabin (2010) “Naive Herding in Rich-Information Settings,” *American Economic Journal: Microeconomics*.
13. Eyster, E. and M. Rabin (2014) “Extensive Imitation is Irrational and Harmful,” *Quarterly Journal of Economics*.
14. \*He, K. and K. Dasaratha (2020) “Network Structure and Naive Sequential Learning,” *Theoretical Economics*.
15. \*Banerjee, A. and D. Fudenberg (2004) “Word-of-mouth Learning,” *Games and Economic Behavior*.
16. \*Wolitzky, A. (2018) “Learning from the Outcome of Others,” *American Economic Review*.

**Part 5:** Community enforcement.

1. \*Kandori, M. (1992) “Social Norms and Community Enforcement,” *Review of Economic Studies*.
2. \*Ellison, G. (1994) “Cooperation in the Prisoner’s Dilemma with Anonymous Random Matching,” *Review of Economic Studies*.
3. \*Deb, J. and J. Gonzalez-Diaz (2019) “Enforcing Social Norms: Trust Building and Community Enforcement,” *Theoretical Economics*.
4. Ali, N. and D. Miller (2016) “Ostracism and Forgiveness,” *American Economic Review*.
5. Deb, J. (2020) “Cooperation and Community Responsibility,” *Journal of Political Economy*.
6. Deb, J., T. Sugaya, and A. Wolitzky (2020) “The Folk Theorem in Repeated Games with Anonymous Random Matching,” *Econometrica*.

7. Ghosh, P. and D. Ray (1996) "Cooperation in Community Interaction Without Information Flows," *Review of Economic Studies*.
8. \*Sugaya, T. and A. Wolitzky (2020) "Do a Few Bad Apples Spoil the Barrel?: An Anti-Folk Theorem for Anonymous Repeated Games with Incomplete Information," *American Economic Review*.
9. Sugaya, T. and A. Wolitzky (2021) "Communication and Community Enforcement," *Journal of Political Economy*.
10. \*Takahashi, S. (2010) "Community Enforcement When Players Observe Partners' Past Play," *Journal of Economic Theory*.
11. \*Heller, Y. and E. Mohlin (2018) "Observations on Cooperation," *Review of Economic Studies*.
12. \*Clark, D., D. Fudenberg and A. Wolitzky (2021) "Record-Keeping and Cooperation in Large Societies," *Review of Economic Studies*.

**Part 6:** Large repeated games.

1. Green, E. (1980) "Non-Cooperative Price Taking in Large Dynamic Markets," *Journal of Economic Theory*.
2. Sabourian, H. (1990) "Anonymous Repeated Games with a Large Number of Players and Random Outcomes," *Journal of Economic Theory*.
3. Fudenberg, D., D. Levine and W. Pesendorfer (1998) "When are Nonanonymous Players Negligible?" *Journal of Economic Theory*.
4. \*Al-Najjar, N. and R. Smorodinsky (2000) "Pivotal Players and the Characterization of Influence," *Journal of Economic Theory*.
5. Al-Najjar, N. and R. Smorodinsky (2001) "Large Nonanonymous Repeated Games," *Games and Economic Behavior*.
6. \*Sugaya, T. and A. Wolitzky (2021) "Repeated Games with Many Players," Working Paper.

**Part 7:** Dynamic games with limited memories.

1. Liu, Q. (2011) "Information Acquisition and Reputation Dynamics," *Review of Economic Studies*.
2. \*Liu, Q. and A. Skrzypacz (2014) "Limited Records and Reputation Bubbles," *Journal of Economic Theory*.
3. Acemoglu, D. and A. Wolitzky (2014) "Cycles of Conflict: An Economic Model," *American Economic Review*.
4. \*Pei, H. (2022) "Reputation Building under Observational Learning," *Review of Economic Studies*.
5. \*Pei, H. (2023) "Reputation Effects under Short Memories," Working Paper.

6. \*Bhaskar, V. (1998) “Informational Constraints and the Overlapping Generations Model: Folk and Anti-Folk Theorems,” *Review of Economic Studies*.
7. Bhaskar, V. G. Mailath, and S. Morris (2013) “A Foundation for Markov Equilibria in Sequential Games with Finite Social Memory,” *Review of Economic Studies*.
8. \*Bhaskar, V. and C. Thomas (2019) “Community Enforcement of Trust,” *Review of Economic Studies*.

**Part 8:** Steady state learning.

1. \*Fudenberg, D. and D. Levine (1993) “Self-Confirming Equilibrium,” *Econometrica*.
2. \*Fudenberg, D. and D. Levine (1993) “Steady State Learning and Nash Equilibrium,” *Econometrica*.
3. \*\*Fudenberg, D. and D. Levine (2006) “Superstition and Rational Learning,” *American Economic Review*.
4. \*Fudenberg, D. and K. He (2018) “Learning and Type Compatibility in Signaling Games,” *Econometrica*.
5. \*Clark, D. and D. Fudenberg (2020) “Justified Communication Equilibrium,” *American Economic Review*.

## Second Half

**Background Reading:**

- Bergemann, Dirk and Stephen Morris. “Information Design: A Unified Perspective.” *Journal of Economic Literature* 57(1): 1-57, 2019.
- Forges, Françoise. “Games with Incomplete Information: From Repetition to Cheap Talk and Persuasion.” *Annals of Economics and Statistics* 137: 3-30, 2020.
- Kamenica, Emir. “Bayesian persuasion and information design.” *Annual Review of Economics* 11: 249-272, 2019.

**Tentative Schedule:** Papers marked with (\*) will constitute the main part of the lecture.

### Section 1 : Comparison of Experiments

- Blackwell, David. “Comparison of experiments.” *Proceedings of the second Berkeley symposium on mathematical statistics and probability* 2: 93-103, 1951.
- Blackwell, David. “Equivalent comparisons of experiments.” *The annals of mathematical statistics*: 265-272, 1953.

- Crémer, Jacques. “A simple proof of Blackwell’s ‘comparison of experiments’ theorem.” *Journal of Economic Theory* 27(2): 439–443, 1982.
- De Oliveira, Henrique. “Blackwell’s informativeness theorem using diagrams.” *Games and Economic Behavior* 109: 126-131, 2018. (\*)
- Liang, Annie. “Notes on Comparison of Experiments.” [Link to the notes](#) (\*)
- Brooks, Benjamin, Frankel, Alexander, and Kamenica, Emir. “Comparisons of Signals.” *Working paper* [2198], 2022. (\*)
- Jewitt, Ian. “Information order in decision and agency problems.” *Nuffield College*, 2007.
- Lehmann, Erich Leo. “Comparing location experiments.” In *Selected Works of EL Lehmann*, pages 779–791. Springer, 2011.

## Section 2 : Bayesian Persuasion with Commitment

- Kamenica, Emir and Matthew Gentzkow. “Bayesian Persuasion.” *American Economic Review* 101(6): 1283-1309, 2011. (\*)
- Liang, Annie. “Notes on Information Design.” [Link to the notes](#) (\*)
- Rayo, Luis and Ilya Segal. “Optimal Information Disclosure.” *Journal of Political Economy* 118(5):949-87, 2010. (\*)
- Kolotilin, Anton. “Optimal information disclosure: Quantity vs. quality.” *UNSW Australian School of Business Research Paper* (2013-19), 2014.
- Gentzkow and Kamenica (2016) “A Rothschild-Stiglitz Approach to Bayesian Persuasion.” *American Economic Review* 106(5): 597-601.
- Dworzak and Martini (2019) “The Simple Economics of Optimal Persuasion.” *Journal of Political Economy* 127(5): 1993-2048. (\*)
- Ostrovsky, Michael and Schwarz, Michael. “Information Disclosure and Unraveling in Matching Markets.” *American Economic Journal: Microeconomics* 2(2): 34–63, 2010.

### Section 3 : Relaxing the Commitment Assumption

- Koessler, Frédéric and Vasiliki Skreta. “Informed Information Design.” *Working paper*, November 2022.
- Lipnowski, Elliot, and Doron Ravid. “Cheap Talk with Transparent Motives.” *Econometrica* 88(4): 1631-1660, 2020. (\*)
- Lipnowski, Elliot, Doron Ravid, and Denis Shishkin. “Persuasion via Weak Institutions.” *Journal of Political Economy* 130(10): 2705-2730, 2022. (\*)
- Lin, Xiao and Liu, Ce. “Credible Persuasion.” *arXiv preprint arXiv:2205.03495*, 2022. (\*)
- Guo, Yingni, and Eran Shmaya. “Costly Miscalibration.” *Theoretical Economics* 16(2): 477–506, 2021.
- Lyu, Qianjun, and Wing Suen. “Information Design in Cheap Talk.” *arXiv preprint arXiv:2207.04929*, 2022.
- Ivanov, Maxim. “Communication via a Strategic Mediator.” *Journal of Economic Theory* 145(2): 869–884, 2010.
- Min, Daehong. “Bayesian Persuasion under Partial Commitment.” *Economic Theory* 72(3): 743–764, 2021.
- Salamanca, Andrés. “The value of mediated communication.” *Journal of Economic Theory* 192: 105191, 2021.

### Section 4: Bayes Correlated Equilibrium Approach to Information Design

- Aumann, Robert J. “Correlated Equilibrium as an Expression of Bayesian Rationality.” *Econometrica* 55(1): 1-18, 1987.
- Forges, Françoise. “Five Legitimate Definitions of Correlated Equilibrium in Games with Incomplete Information.” *Theory and Decision* 35(3): 277-310, 1993.
- Bergemann, Dirk, and Stephen Morris. “Bayes Correlated Equilibrium and the Comparison of Information Structures in Games.” *Theoretical Economics* 11(2): 487-522, 2016. (\*)
- Taneva, Ina. “Information Design.” *American Economic Journal: Microeconomics* 11(4): 151-185, 2019. (\*)

- Bergemann and Morris (2019). “Information Design: A Unified Perspective.” *Journal of Economic Literature* 57(1): 1-57. (\*)

## Section 5: Information Design and Pricing

- Bergemann, Dirk, Benjamin Brooks, and Stephen Morris. “The Limits of Price Discrimination.” *American Economic Review* 105(3): 921-957, 2015. (\*)
- Roesler, Anne-Katrin and Balázs Szentes. “Buyer-Optimal Learning and Monopoly Pricing.” *American Economic Review* 107(7): 2072-2080, 2017. (\*)
- Elliott, Matthew, Andrea Galeotti, Andrew Koh, and Wenhao Li. “Market Segmentation through Information.” *Working Paper*, January 2022.

## Section 6: Robustness Issues

- Mathevet, Laurent, Jacopo Perego, and Ina Taneva. “On Information Design in Games.” *Journal of Political Economy* 128(4): 1370-1404, 2020. (\*)
- Dworzak, Piotr, and Alessandro Pavan. “Preparing for the Worst but Hoping for the Best: Robust (Bayesian) Persuasion.” *Econometrica* 90(5), 2017-2051, 2022.
- Goldstein, Itay, and Chong Huang. “Bayesian Persuasion in Coordination Games.” *American Economic Review* 106(5): 592-596, 2016.
- Inostroza, Nicola and Alessandro Pavan. “Adversarial Coordination and Public Information Design.” *Working Paper*, July 2022.
- Kosterina, Svetlana. “Persuasion with Unknown Beliefs.” *Theoretical Economics* 17(3): 1075-1105, 2022.
- Li, Fei, Yangbo Song, and Mofei Zhao. “Global Manipulation by Local Obfuscation.” *Journal of Economic Theory* 207, 2023.
- Morris, Stephen, Daisuke Oyama, and Satoru Takahashi. “Implementation via Information Design in Binary-Action Supermodular Games.” *Working Paper*, August 2022.
- Ziegler, Gabriel. “Adversarial Bilateral Information Design.” *Working Paper*, June 2020.

## Section 7: Complementary Topics *(provided we have sufficient time)*

### **Section 7.A: Multiple Senders**

- Gentzkow, Matthew, and Kamenica, Emir. “Competition in persuasion.” *The Review of Economic Studies* 84(1): 300–322, 2016.

### **Section 7.B: Psychological Preferences and Privacy**

- Ichihashi, Shota. “Online Privacy and Information Disclosure by Consumers.” *American Economic Review* 110 (2): 569-595, 2020
- Lipnowski, Elliot and Laurent Mathevet. “Disclosure to a Psychological Audience.” *American Economic Journal: Microeconomics* 10(4): 67-93, 2018.
- Rivera Mora, Ernesto. “Mechanism Design with Belief-Dependent Preferences” *R&R at Journal of Economic Theory*, 2023.

### **Section 7.C: Dropping the common prior assumption**

- Alonso, Ricardo and Câmara, Odilon. “Bayesian persuasion with heterogeneous priors.” *Journal of Economic Theory* 165: 672-706, 2016.

### **Section 7.D: Overconfidence**

- Benoît, Jean-Pierre and Juan Dubra. “Apparent Overconfidence.” *Econometrica* 79(5): 1591-1625, 2011.

### **Section 7.E: Costly Messages**

- Nguyen, Anh, and Teck Yong Tan. “Bayesian Persuasion with Costly Messages.” *Journal of Economic Theory* 193, 2021.

### **Section 7.F: Dynamic Information Design**

- Ely, Jeffrey C. “Beeps.” *American Economic Review* 107(1): 31–53, 2017.
- Ely, Jeffrey C. and Martin Szydlowski. “Moving the goalposts.” *Journal of Political Economy* 128(2): 468–506, 2020.
- Ely, Jeffrey, Alexander Frankel, and Emir Kamenica. “Suspense and surprise.” *Journal of Political Economy* 123(1): 215–260, 2015.