



# ECON 703 Syllabus: 2022

**Daniel R. Vincent**

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## Official Matters

Economics 703 is the first of the two course micro-theory sequence in the Economics Department. This course will cover advanced game theory, mechanism design, and some applications to Industrial Organization theory.

All official course announcements will be via coursemail. **Note:** Our first meeting will be Tuesday, August 30 and we will meet every Tuesday and Thursday thereafter until the end of term which I believe is Thursday, December 8.

## Announcements:

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## Course Material

Problem sets, will be posted on a password-protected area:

<http://econweb.umd.edu/~vincent/econ703/ps.html>

The login and password for the restricted area will be announced in class.

## Grading

The course grade will be determined by 30% for in class presentation and 70% the performance on the take-home final exam. You must complete at least one in class presentation, you may do more. Your score will be the maximum of all your presentations. The final exam will be given on the final day of class and will be due Monday, December 9.

There will be about 3 ungraded problem sets for the course.

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## Texts

The text for the course is Drew Fudenberg and Jean Tirole, *Game Theory*, MIT Press, 2002 (or later) ISBN 0262-06141-4. This is also a reading course and we will use articles and working papers for material.

Section 0101: Tuesdays/Thursdays 12:30 pm - 1:45 pm, Tydings 1132

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## Office Hours

Professor Vincent's Office Hours: Thursdays, 11:00am - 12:00pm, Tydings 4130B

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## Topics (Approximately One Week for Each)

## 1. Games and Equilibria

- Games in Strategic Form.
- Best Response Correspondences
- Nash Equilibria -- Nash's Theorem, Debreu, van Glicksburg, Fan. Tarski  
FT (Chapter 1)  
Debreu, G., *Theory of Value*, Wiley. 1959.  
Vives, X., *Oligopoly Pricing: Old Ideas and New Tools*, MIT Press. 2001.  
<http://econweb.umd.edu/~vincent/econ703/MTLec1.pdf>

## 2. Dynamic Games, Equivalence and Equilibria

- Extensive Form Games -- Definition.
- Nodes, Information Sets, Actions, Payoffs.
- Behavior Strategies, Mixed Strategies, Perfect Recall, Kuhn's Theorem.
- Games of Perfect Information, Backward Induction
- Games of Imperfect Information, Subgame Perfect Equilibria  
FT (Chapter 3)  
Elmes, S. and P. Reny, "On the strategic equivalence of extensive form games", *Journal of Economic Theory*, 64, pp.1-23 1994  
Kuhn, H., "Extensive Games and the Problem of Information," *Annals of Mathematics Studies*, 28, 1953.  
Reny, P., "Rationality in Extensive Form Games", *Journal of Economic Perspectives*, 6(4), pp.103-118,1992  
Shaked, A. and J. Sutton, "Involuntary Unemployment as a Perfect Equilibrium in a Bargaining Game", *Econometrica*, 52, pp.1351-1364, 1984  
Rubinstein, A., "Perfect Equilibrium in a Bargaining Model", *Econometrica*, 50, pp. 97-110, 1982,  
Rubinstein, A. and M. Piccione, "One the Interpretation of Decision Problems with Imperfect Recall", *Games and Economic Behavior*, 20, pp. 3-24, 1997,  
Selten, R., "The Chain-Store Paradox," *Theory and Decision*, 9, 1978.  
Selten, R., "Reexamination of the Perfectness Concept for Equilibrium Points of Extensive Form Games," *International Journal of Game Theory*, 4, 1975.  
Thompson, F., "Equivalence of Games in Extensive Form,"; *Rand Corporation*, RN59, 1952.  
<http://econweb.umd.edu/~vincent/econ703/MTLec2.pdf>

## 3. Refinements of Nash Equilibria

- Perfect and Proper Equilibrium
- Sequential Equilibrium
- Perfect Bayesian Equilibrium
- Stable Sets
- Signalling games and further refinements  
FT (Chapter 8)  
Cho, I-K, and D. Kreps, "Signalling Games and Stable Equilibria" *Quarterly Journal of Economics*, 102, 1987.  
Fudenberg, D. and J.Tirole "Perfect Bayesian Equilibria and Sequential Equilibria" *Journal of Economic Theory*, 53,1991.  
Kohlberg, E. and J.-F.Mertens, "On the Strategic Stability of Equilibria," *Econometrica*, 54, 1986.  
Kreps, D. and R. Wilson, "Sequential Equilibria," *Econometrica*, 540 , 1982.  
Selten, R., "A Reexamination of the Perfectness Concept for Equilibrium Points

of Extensive Form Games," *International Journal of Game Theory*, 4, 1975.  
<http://econweb.umd.edu/~vincent/econ703/MTLec3.pdf>

#### 4. Games of Incomplete Information, Bayesian Nash Equilibrium

- o Bayesian Games, Bayesian Nash Equilibria.
- o The Revelation Principle.
- o Harsanyi and Myerson
  - FT (Chapter 6)
  - Athey, S. "Single-crossing properties ....", *Econometrica* , 2001.
  - Harsanyi, J., "Games of Incomplete Information Played by Bayesian Players," *Management Science*, 14 , 1967-68.
  - Milgrom, P. and C.Shannon, "Monotone comparative statics", *Econometrica* , 1994.
  - MacAdams, D., "Isotone equilibrium in games....", *Econometrica* , 2003.
  - Reny, "On the existence of monotone pure-strategy equilibria in Bayesian games", *Econometrica*, 2011.
  - <http://econweb.umd.edu/~vincent/econ703/MTLec4.pdf>

#### 5. Implementation: The Mechanism Design Approach

- o Myerson and Incentive Compatibility in One-Dimension.
  - FT (Chapter 7)
  - Myerson, R., "Mechanism Design by an Informed Principle," *Econometrica*, 51(6), 1983.
  - <http://econweb.umd.edu/~vincent/econ703/MTLec5.pdf>

#### 6. Applications of Mechanism Design

- o Optimal Bargaining.
- o Auctions and the Revenue Equivalence Theorem.
- o Bilateral Trade.
- o Regulation of a Monopolist.
  - FT (Chapter 7)
  - Baron, D. and R. Myerson, "Regulating a Monopolist with Unknown Costs," *Econometrica* , 50(4) 1982.
  - Myerson, R., "Incentive Compatibility and the Bargaining Problem," *Econometrica*, 1979.
  - Myerson, R., "Optimal Auction Design," *Mathematics of Operations Research*, 6 ,1981.
  - Myerson, R., and M. Satterthwaite, "Efficient Mechanisms for Bilateral Trade," *Journal of Economic Theory*, 29, 1983.
  - <http://econweb.umd.edu/~vincent/econ703/MTLec6.pdf>

#### 7. Multi-Dimensional Mechanism Design

- o Multi-Dimensional Incentive Compatibility -- Rochet.
- o Manelli - Vincent, DDT.
  - Aliprantis, C. and K.Border,K, *Infinite Dimensional Analysis: A Hitchhikers Guide*. Springer , 1999}
  - Armstrong, M., "Multi-Product Non-linear Pricing," *Econometrica*, 64(1), 1996.
  - Daskalakis, C., Deckelbaun, A. and C. Tzamos, "Strong Duality for a Multiple-

- Good Monoplist" *Econometrica*, 85(3), 2017.
- Edwards, C.H. Jr., *Advanced Calculus of Several Variables*, Dover Publications, 1994.
- Luenberger, D., *Optimization by Vector Space Methods*, New York: John Wiley & Sons, 1969.
- Manelli A. and A. Kleiner., "Strong Duality and Monopoly Pricing," *Econometrica*, 2019.
- Manelli A. and D. Vincent., "Bundling as an Optimal Mechanism for a Multi-Good Monoplist," *Journal of Economic Theory*, 46(2), 2006.
- Manelli A. and D. Vincent., "Multi-Dimensional Mechanism Design, Revenue Maximization and the Multi-Good Monoplist," *Journal of Economic Theory*, 46(2), 2007.
- McAfee, R. P. and J. McMillan., "Multi-Dimensional Incentive Compatibility and Mechanism Design," *Journal of Economic Theory*, 46(2), 1988.
- Rochet, J.-C., "The Taxation Principle and Multi-time Hamilton-Jacobi Equations," *Journal of Mathematical Economics*, 14(2), 1985.
- Rockafellar, R.T., *Convex Analysis*, Princeton: Princeton University Press, 1970.  
<http://econweb.umd.edu/~vincent/econ703/MTLec7.pdf>

## 8. Dominant Strategy Implementation

- o One Dimension: Manelli-Vincent, Gershkov, et. al.
- o Multi-dimensions.
  - Border, K., "Implementation of reduced form auctions: A geometric approach," *Econometrica*, 59(4), 1991, pp.1175-1187.
  - Cremer, J. and R. McLean, "Full extraction of the surplus in Bayesian and dominant strategy auctions", *Econometrica*, 56, pp.1247-1257, 1988.
  - d'Aspremont, C., and L. A. Gerard-Varet, "Incentives and incomplete information", *Journal of Public Economics*, 11, pp.25-45; 1979,
  - Gershkov A., Goeree, J., Kushnir, A., B. Moldovanu and X. Shi, "On the equivalence of Bayesian and dominant strategy implementation," *Econometrica*, 18, 2013, pp. 197-220.
  - Manelli, A., and D. Vincent, "Bayesian and dominant-strategy implementation in the independent private-values model," *Econometrica* 137, 2010, pp. 153-185
  - Manelli, A., and D. Vincent, "Dominant-strategy and Bayesian Incentive Compatibility in the Multi-Object Trading Environment," *Journal of Mathematical Economics*, 82, pp. 214-226, 2019.
  - Matthews, S., "On the implementability of reduced form auctions," *Econometrica* 52, 1984, pp. 1519-1522.
  - Williams, S., "A characterization of efficient, Bayesian incentive compatible mechanisms," *Economic Theory* 14, 1999, pp. 155-180.  
<http://econweb.umd.edu/~vincent/econ703/MTLec8.pdf>

## 9. Nash Bargaining: Nash in Nash Approach

- o Nash Bargaining and the 'Nash Program'.
- o Nash-in-Nash Bargaining and Multi-lateral Negotiations.
  - Collard-Wexler, Alan, Gowrisankaran, G., and R. Lee., "Nash-in-Nash Bargaining: A Micro-foundation for Applied Work", *Journal of Political Economy* (2019).
  - Crawford, G. and A. Yurucoglu, "The Welfare Effects of Bundling in Multi-channel Television Markets", *American Economic Review*, 102(2) (2012), pp. 643-685.

Horn, H. and A. Wolinsky, "Bilateral Monopolies and Incentives for Mergers", *Rand Journal of Economics*, 19(3) (1988): 408-419.  
McAfee, P. and M. Schwartz, "Opportunism in Multi-lateral Vertical Contracting", *American Economic Review* 84(1), (1994): 210-230.  
Nash, J., "The Bargaining Problem", *Econometrica* 18(2), (1950), pp. 155-162.  
Vincent, Daniel R., "[Multilateral Negotiations and Opportunism](#)", working paper, 2022.  
Whinston, M., *Lectures in Anti-trust Theory*, (2006),: Chapter 4.  
<http://econweb.umd.edu/~vincent/econ703/MTLec9.pdf>

UMD's policies on graduate courses and graduate student rights and responsibilities can be found here: [Course Related Policies | The University of Maryland Graduate School \(umd.edu\)](#)" .