

26:711:685
Professor Michael H. Rothkopf
Wednesdays, 10 am to 12:50

Procurement Auctions
Spring 2007
Englehard 301

Plan for the Class as of January 11

While we may have a guest lecturer or a trip to an auction, typical classes will involve a lecture and one or two short student presentations. Class preparation will involve some assigned reading and some optional reading. The student presentations will be a summary of some part of the optional reading. Over the course of the semester, each student will have chances to make such presentations. Students are encouraged to volunteer for presentations on topics of particular interest to them. In the absence of a volunteer, I will assign a non-volunteer.

There will be a mid-term, tentatively scheduled for February 28 covering material covered through February 21. Students will write a term paper on a mutually agreeable topic related to auctions. Proposals for paper topics are due March 21, but can be presented earlier. Students will discuss their papers in our last class on April 25. Class attendance is expected. There is a conference at DIMACS on the Busch Campus in Piscataway on March 22 and 23 dealing with models of auctions with transaction costs. Attendance is free for Rutgers graduate students. Students are encouraged, but not required, to attend. There will be no final exam. A student's grade will depend upon class participation including presentations, the midterm, and the term paper.

There is no text, but there is a lot of reading. I will try to supply copies to the class at least of required papers and copies of optional papers at least to volunteer presenters. I will try to see to it that copies of relevant books are made available in the library. The tentative schedule below and the tentative readings on the following pages are indeed quite tentative. The actual schedule and assignments will evolve and not be finalized until the week before the class.

Tentative Schedule for the Class

January 17	Introduction to Class and to Auctions
January 24	High Theory of Auctions
January 31	Modeling Auctions
February 7	Vickrey Auctions
February 14	Rule Bending and Cheating in Auctions
February 21	Sociology of Auctions
February 28	Midterm Exam; Sequential Auctions
March 7	Visit to an Auction?
March 14	Spring Break
March 21	Transaction costs in auctions
March 22, 23	DIMACS Conference on Models of Auctions with Transaction Costs
March 28	Auctions of multiple items
April 4	Industrial Procurement Auctions
April 11	Electricity Procurement Auctions
April 18	Selected Auction Topics: Charity Auctions, Discrete bids, Subsidizing
April 25	Wrap-up Class, Discussion of Student Papers

Tentative Readings

1/17 Introduction to auctions

Required

Michael H. Rothkopf and Sunju Park, "An Elementary Introduction to Auctions," *Interfaces* **31**(6), pp. 83-97, 2001.

Optional

Cassady, Ralph, Jr. *Auctions and Auctioneering*, Berkeley: University of California Press, 1967.

Klemper, Paul, *Auctions: Theory and Practice*, Princeton, Princeton University Press, 2004.

Michael H. Rothkopf and Richard Engelbrecht-Wiggans, "Innovative Approaches to Competitive Mineral Leasing," *Resources and Energy* **14**, pp. 233-248, 1992.

1/24 The High Theory of Auctions

Required

McAfee, R. P., and J. McMillan, Auctions and Bidding," *Journal of Economic Literature* **25**, pp. 699-783, 1987.

Capen, Edward, Robert Clapp and William Campbell, "Bidding in High Risk Situations," *Journal of Petroleum Technology* **23**, pp. 641-653, 1971.

Optional

Ronald M. Harstad and Michael H. Rothkopf, "An 'Alternating Recognition' Model of English Auctions," *Management Science* **46**, pp. 1-12, 2000.

Ronald M. Harstad, Michael H. Rothkopf, and Keith Waehrer, "Efficiency in Auctions When Bidders Have Private Information About Competitors," *Advances in Applied Micro-Economics, Volume 6*, Michael Baye, Ed., JAI Press, pp. 1-13, 1996.

Vijay Krishna: *Auction Theory*, Academic Press, San Diego, 2002.

Myerson, Roger B., 1981, "Optimal Auction Design," *Mathematics of Operations Research* **6**, pp. 58-73.

1/31 Modeling Auctions

Required

Michael H. Rothkopf and Ronald Harstad, "Modeling Competitive Bidding: A Critical Essay," *Management Science* **40**, pp. 364-384, 1994.

Optional

Michael H. Rothkopf, "A Model of Rational Competitive Bidding," *Management Science* **15**, pp. 362-373, 1969.

Michael H. Rothkopf, "On Multiplicative Bidding Strategies," *Operations Research* **28**, pp. 570-575, 1980.

Michael H. Rothkopf, "Equilibrium Linear Bidding Strategies," *Operations Research* **28**, pp. 576-583, 1980.

Michael H. Rothkopf, "On Misusing Auctions to Value Stranded Assets," *The Electricity Journal* **10**(10), pp. 10-17, December, 1997.

Michael H. Rothkopf, "Valuing Stranded Costs: Can You Sell Your Lunch and Eat It Too?" *The Electricity Journal* **11**(3), pp.3-5, April, 1998.

2/7 Vickrey Auctions

Required

Michael H. Rothkopf, Thomas J. Teisberg and Edward P. Kahn, "Why Are Vickrey Auctions Rare?," *Journal of Political Economy* **98**, pp. 94-109, 1990.

Optional

P. G. Bradford, S. Park, M. H. Rothkopf, "Protocol Completion Incentive Problems in Cryptographic Vickrey Auctions," The Seventh International Conference on Electronic Commerce Research (ICECR-7), 55-64, 2004.

Michael H. Rothkopf and Ronald M. Harstad, "Two Models of Bid-Taker Cheating in Vickrey Auctions," *Journal of Business* **68**, pp. 257-267, 1995.

2/14 Rule Bending and Cheating in Auctions

Required

"Bending and Breaking the Auction Rules"

Robinson, Mark S., 1985, "Collusion and the Choice of Auction," *Rand Journal of Economics* **16**, pp., 141-145.

Feynman, Richard P., 1985, "Surely Your're Joking, Mr. Feynman!": *Adventures of a Curious Character*, New York: W. W. Norton & Co., pp. 300-301.

Optional

Graham, Daniel and Robert Marshall, 1987, "Collusive Behavior at Single-Object Second-Price and English Auctions," *Journal of Political Economy* **95**, pp. 1217-1239.

Ronald M. Harstad and Michael H. Rothkopf, "Withdrawable Bids as Winner's Curse Insurance," *Operations Research*, **43**, pp. 983-994, 1995.

Michael H. Rothkopf, "On Auctions with Withdrawable Winning Bids," *Marketing Science* **10**, pp. 40-57, 1991.

2/21 Sociology of Auctions

Required

Smith, Charles W., *Auctions, the Social Determination of Value*, Berkeley, University of California Press, 1990, Chapters 1 to 4.

Optional

Smith, Charles W., *Auctions, the Social Determination of Value*, Berkeley, University of California Press, 1990, Chapters 5 to 7.

2/28 Sequential Auctions

Required

Shmuel S. Oren and Michael H. Rothkopf, "Optimal Bidding in Sequential Auctions," *Operations Research* **23**, pp. 1080-1090, 1975.

Michael H. Rothkopf, "Daily Repetition: A Neglected Factor in the Analysis of Electricity Auctions," *The Electricity Journal* **12**(3), pp. 60-70, April 1999.

Optional

Hausch, Donald B., "Multi-object Auctions: Sequential vs. Simultaneous Sales," *Management Science* **32**, pp. 1599-1610 and Michael H. Rothkopf, Elmer Dougherty and Marshall Rose, "Comment on 'Multi-Object Auctions: Sequential vs. Simultaneous Sales,'" *Management Science* **32**, pp. 1611-1612, 1986.

3/21 Transaction Costs in Auctions

Required

Harstad, Ronald M., 1990, "Alternative Common-Value Auction Procedures: Revenue Comparisons with Free Entry," *Journal of Political Economy* **98**, pp. 421-429.

Optional

Octavian Carare and Michael H. Rothkopf, "Slow Dutch Auctions," *Management Science* **51**, pp. 365-373, 2005.

Simmonds, Kenneth, and Stuart Slater, 1978, "The Number of Estimators: A Critical Decision for Marketing Under Competitive Bidding," *Journal of Marketing Research* **15**, pp. 203-213.

3/28 Auctions of Multiple Items

Required

Aleksandar Pekec and Michael H. Rothkopf, "Combinatorial Auction Design," *Management Science* **49**, pp. 1485-1503, 2003.

Optional

Cramton, Peter, Yoav Shoam, and Richard Steinberg, *Combinatorial Auctions*, Cambridge, Mass.: MIT Press, 2006.

Sunju Park and Michael H. Rothkopf, "Auctions with Bidder-Determined Combinations," *European Journal of Operations Research* **161**, pp. 399-415, 2005.

Michael H. Rothkopf, "Bidding in Simultaneous Auctions with a Constraint on Exposure," *Operations Research* **25**, pp. 620-629, 1977.

Michael H. Rothkopf, Aleksandar Pekec and Ronald M. Harstad, "Computationally Manageable Combinatorial Auctions," *Management Science* **44**, pp. 1131-1147, 1998.

Michael H. Rothkopf, "Thirteen Reasons the Vickrey-Clarke-Groves Process is Not Practical," forthcoming in *Operations Research*.

4/4 Procurement Auctions

Required

Michael H. Rothkopf and Andrew B. Whinston, "On E-Auctions for Procurement Operations," forthcoming in *Production and Operations Management*, 2007.

Hohner *et al.*, 2003, "Combinatorial and Quantity Discount Auctions with Mutual Benefits," *Interfaces* **33**, 23-35.

Sandholm, *et al.*, 2006, "Changing the Game in Strategic Sourcing at Proctor & Gamble: Expressive Competition Enabled by Optimization," *Interfaces* **36**, 55-68.

Optional

Jap, Sandy D., "Online Reverse Auctions: Issues, Themes and Prospects for the Future," *Journal of the Academy of Marketing Science*, **30**(4), 506-25, 2002.

Metty, *et al.*, 2005, Reinventing the Supplier Negotiation Process at Motorola, *Interfaces* **35**, 7-23.

Sheffi, 2004, "Combinatorial Auctions in the Procurement of Transportation Services," *Interfaces* **34**, 245-252.

Stark, Robert, "Unbalanced Highway Contracting" *Operational Research Quarterly* **25**, pp. 373-388, 1974. (and related material)

4/11 Electricity Procurement Auctions

Required

Benjamin F. Hobbs, Michael H. Rothkopf, Laurel C. Hyde, and Richard P. O'Neill, "Evaluation of a Truthful Revelation Auction for Energy Markets with Nonconcave Benefits," *Journal of Regulatory Economics* **18**(1), pp. 5-32, 2000.

Optional

Wedad Elmaghraby, Richard O'Neill, Michael H. Rothkopf, William R. Stewart, Jr., "Pricing and Efficiency in 'Lumpy' Energy Markets," *The Electricity Journal*, June **17**(5), pp. 54-64, 2004.

Richard P. O'Neill, Udi Helman, Benjamin F. Hobbs, William R. Stewart, Jr. and Michael H. Rothkopf, "A Joint Energy and transmission Rights Auction: Proposal and Properties," *IEEE Transactions on Power Systems* **17**, pp. 1058-1067, 2002.

Richard O'Neill, Udi Helman, Ross Baldick, William Stewart, and Michael Rothkopf, "Contingent Transmission Rights in the Standard Market Design," *IEEE Transactions on Power Systems* **18**, pp. 1331-1337, 2003.

Richard P. O'Neill, Paul M. Sotkiewicz, Benjamin F. Hobbs, Michael H. Rothkopf, and William R. Stewart, Jr., "Efficient Market-Clearing Prices in Markets with Nonconvexities," *European Journal of Operations Research* **164**, pp. 269-285, 2005.

Richard O'Neill, Udi Helman, Ross Baldick, William Stewart, and Michael Rothkopf, "Dispatchable Transmission in RTO Markets," *IEEE Transactions on Power Systems* **20**, pp.171-179, 2005.

Michael H. Rothkopf, "Controlling Market Power in Short-Term Electricity Auctions," *The Electricity Journal* **15**(10), pp. 15-24, October 2002.

Price C. Watts, "Heresy? The Case Against Electricity Deregulation," *The Electricity Journal* **14**(4), pp. 19-24, May 2001.

4/18 Selected Topics on Auctions

Required

Michael H. Rothkopf and Ronald M. Harstad, "On the Role of Discrete Bid Levels in Oral Auctions," *European Journal of Operational Research* **74**, pp. 572-581, 1994.

Optional

E. David, A Rogers, N. R. Jennings, J. Schiff, S. Kraus, and M. H. Rothkopf, "Optimal Design of English Auctions with Discrete Bid Levels," forthcoming in the *ACM Transactions on Internet Technology*.

Peter T. L. Popkowski Leszczyc and Michael H. Rothkopf, "Charitable Intent and Bidding in Charity Auctions," draft.

Michael H. Rothkopf, Ronald M. Harstad and Yuhong Fu, "Is Subsidizing Inefficient Bidders Actually Costly?" *Management Science* **49**, pp. 71-84, 2003.

References:

Publications with which Professor Rothkopf was involved:

Papers:

1. Michael H. Rothkopf, "A Model of Rational Competitive Bidding," *Management Science* **15**, pp. 362-373, 1969.
4. Shmuel S. Oren and Michael H. Rothkopf, "Optimal Bidding in Sequential Auctions," *Operations Research* **23**, pp. 1080-1090, 1975.
5. Michael H. Rothkopf, "Bidding in Simultaneous Auctions with a Constraint on Exposure," *Operations Research* **25**, pp. 620-629, 1977.
7. Michael H. Rothkopf, "On Multiplicative Bidding Strategies," *Operations Research* **28**, pp. 570-575, 1980.
8. Michael H. Rothkopf, "Equilibrium Linear Bidding Strategies," *Operations Research* **28**, pp. 576-583, 1980.
11. Michael H. Rothkopf, Elmer Dougherty and Marshall Rose, "Comment on 'Multi-Object Auctions: Sequential vs. Simultaneous Sales,'" *Management Science* **32**, pp. 1611-1612, 1986.
12. Michael H. Rothkopf, Thomas J. Teisberg and Edward P. Kahn, "Why Are Vickrey Auctions Rare?," *Journal of Political Economy* **98**, pp. 94-109, 1990.
14. Michael H. Rothkopf, "On Auctions with Withdrawable Winning Bids," *Marketing Science* **10**, pp. 40-57, 1991.
15. Michael H. Rothkopf and Richard Engelbrecht-Wiggans, "Innovative Approaches to Competitive Mineral Leasing," *Resources and Energy* **14**, pp. 233-248, 1992.
16. Michael H. Rothkopf and Richard Engelbrecht-Wiggans, "Getting the Model Right: The Case of Competitive Bidding," *Interfaces* **23**, pp. 99-106, May-June 1993.
17. Michael H. Rothkopf and Ronald Harstad, "Modeling Competitive Bidding: A Critical Essay," *Management Science* **40**, pp. 364-384, 1994.
18. Michael H. Rothkopf and Ronald M. Harstad, "On the Role of Discrete Bid Levels in Oral Auctions," *European Journal of Operational Research* **74**, pp. 572-581, 1994.
19. Michael H. Rothkopf and Ronald M. Harstad, "Two Models of Bid-Taker Cheating in Vickrey Auctions," *Journal of Business* **68**, pp. 257-267, 1995.
20. Ronald M. Harstad and Michael H. Rothkopf, "Withdrawable Bids as Winner's Curse Insurance," *Operations Research*, **43**, pp. 983-994, 1995.
22. Michael H. Rothkopf, Aleksandar Pekec and Ronald M. Harstad, "Computationally Manageable Combinational Auctions," *Management Science* **44**, pp. 1131-1147, 1998.
23. Ronald M. Harstad and Michael H. Rothkopf, "An 'Alternating Recognition' Model of English Auctions," *Management Science* **46**, pp. 1-12, 2000.
24. Benjamin F. Hobbs, Michael H. Rothkopf, Laurel C. Hyde, and Richard P. O'Neill, "Evaluation of a Truthful Revelation Auction for Energy Markets with Nonconcave Benefits," *Journal of Regulatory Economics* **18**(1), pp. 5-32, 2000.
26. Michael H. Rothkopf and Sunju Park, "An Elementary Introduction to Auctions," *Interfaces* **31**(6), pp. 83-97, 2001.
28. Richard P. O'Neill, Udi Helman, Benjamin F. Hobbs, William R. Stewart, Jr, and Michael H. Rothkopf, "A Joint Energy and transmission Rights Auction: Proposal and Properties," *IEEE Transactions on Power Systems* **17**, pp. 1058-1067, 2002.

29. Michael H. Rothkopf, Ronald M. Harstad and Yuhong Fu, "Is Subsidizing Inefficient Bidders Actually Costly?" *Management Science* **49**, pp. 71-84, 2003.
30. Aleksandar Pekec and Michael H. Rothkopf, "Combinatorial Auction Design," *Management Science* **49**, pp. 1485-1503, 2003.
31. Richard O'Neill, Udi Helman, Ross Baldick, William Stewart, and Michael Rothkopf, "Contingent Transmission Rights in the Standard Market Design," *IEEE Transactions on Power Systems* **18**, pp. 1331-1337, 2003.
32. Sunju Park and Michael H. Rothkopf, "Auctions with Bidder-Determined Combinations," *European Journal of Operations Research* **161**, pp. 399-415, 2005.
33. Richard P. O'Neill, Paul M. Sotkiewicz, Benjamin F. Hobbs, Michael H. Rothkopf, and William R. Stewart, Jr., "Efficient Market-Clearing Prices in Markets with Nonconvexities," *European Journal of Operations Research* **164**, pp. 269-285, 2005.
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35. Octavian Carare and Michael H. Rothkopf, "Slow Dutch Auctions," *Management Science* **51**, pp. 365-373, 2005.
37. Michael H. Rothkopf and Andrew B. Whinston, "On E-Auctions for Procurement Operations," forthcoming in *Production and Operations Management*, 2007.
38. Michael H. Rothkopf, "Thirteen Reasons the Vickrey-Clarke-Groves Process is Not Practical," forthcoming in *Operations Research*.

Book Chapters

- C5. Ronald M. Harstad, Michael H. Rothkopf, and Keith Waehrer, "Efficiency in Auctions When Bidders Have Private Information About Competitors," *Advances in Applied Micro-Economics, Volume 6*, Michael Baye, Ed., JAI Press, pp. 1-13, 1996.
- C9. Michael H. Rothkopf and Coleman Bazelon, "Combinatorial Interlicense Competition: Spectrum Deregulation without Confiscation or Giveaways," *Obtaining the Best from Regulation and Competition*, Michael Crew and Menachem Spiegel, eds., Boston, MA: Kluwer Academic Publishers, pp. 135-159, 2005.
- C10. P. G. Bradford, S. Park, M. H. Rothkopf, "Protocol Completion Incentive Problems in Cryptographic Vickrey Auctions," The Seventh International Conference on Electronic Commerce Research (ICECR-7), 55-64, 2004.
- C11. Aleksander Pekec and Michael H. Rothkopf, "Non-computational Approaches to Mitigating Computational Problems in Combinatorial Auctions," *Combinatorial Auctions*, Peter Cramton, Yoav Shoham, and Richard Steinberg, Eds., Cambridge, MA, MIT Press, pp. 395-411, 2005.

Other Publications

- O5. Michael H. Rothkopf, "On Misusing Auctions to Value Stranded Assets," *The Electricity Journal* **10**(10), pp. 10-17, December, 1997.
- O6. Michael H. Rothkopf, "Valuing Stranded Costs: Can You Sell Your Lunch and Eat it Too?" *The Electricity Journal* **11**(3), pp. 3-5, April, 1998
- O7. Michael H. Rothkopf, "Daily Repetition: A Neglected Factor in the Analysis of Electricity Auctions," *The Electricity Journal* **12**(3), pp. 60-70, April 1999.

- O16. Michael H. Rothkopf, "Controlling Market Power in Short-Term Electricity Auctions," *The Electricity Journal* 15(10), pp. 15-24, October 2002.
- O19. Wedad Elmaghraby, Richard O'Neill, Michael H. Rothkopf, William R. Stewart, Jr., "Pricing and Efficiency in 'Lumpy' Energy Markets," *The Electricity Journal*, June 17(5), pp. 54-64, 2004.

Reports and drafts:

- D1. Michael H. Rothkopf and Coleman Bazelon, "Interlicense Competition: Spectrum Deregulation without Confiscation or Giveaways," New America Foundation, 2003; available at http://www.newamerica.net/Download_Docs/pdfs/Pub_File_1329_1.pdf.
- D2. Peter T. L. Popkowski Leszczyc and Michael H. Rothkopf, "Charitable Intent and Bidding in Charity Auctions."
- D3. E. David, A Rogers, N. R. Jennings, J. Schiff, S. Kraus, and M. H. Rothkopf, "Optimal Design of English Auctions with Discrete Bid Levels."

Other References:

- R1 Capen, Edward, Robert Clapp and William Campbell, "Bidding in High Risk Situations," *Journal of Petroleum Technology* 23, pp. 641-653, 1971.
- R2 Cassady, Ralph, Jr. *Auctions and Auctioneering*, Berkeley: University of California Press, 1967.
- R3 Cramton, Peter, Yoav Shoam, and Richard Steinberg, *Combinatorial Auctions*, Cambridge, Mass.: MIT Press, 2006.
- R4 Feynman, Richard P., 1985, "*Surely Your're Joking, Mr. Feynman!*": *Adventures of a Curious Character*, New York: W. W. Norton & Co., pp. 300-301.
- R5 Graham, Daniel, and Robert Marshall, 1987, "Collusive Behavior at Single-Object Second-Price and English Auctions," *Journal of Political Economy* 95, pp. 1217-1239.
- R6 Harstad, Ronald M., 1990, "Alternative Common-Value Auction Procedures: Revenue Comparisons with Free Entry," *Journal of Political Economy* 98, pp. 421-429.
- R7 Hausch, Donald B., "Multi-object Auctions: Sequential vs. Simultaneous Sales," *Management Science* 32, pp. 1599-1610.
- R8 Hohner *et al.*, 2003, "Combinatorial and Quantity Discount Auctions with Mutual Benefits," *Interfaces* 33, 23-35.
- R9 Jap, Sandy D., "Online Reverse Auctions: Issues, Themes and Prospects for the Future," *Journal of the Academy of Marketing Science*, 30(4), 506-25, 2002
- R10 Klemper, Paul, *Auctions: Theory and Practice*, Princeton, Princeton University Press, 2004
- R11 Vijay Krishna: *Auction Theory*, Academic Press, San Diego, 2002.
- R12 McAfee, R. P., and J. McMillan, Auctions and Bidding," *Journal of Economic Literature* 25, pp. 699-783, 1987.
- R13 Metty, *et al.*, 2005, Reinventing the Supplier Negotiation Process at Motorola, *Interfaces* 35, 7-23.
- R14 Myerson, Roger B., 1981, "Optimal Auction Design," *Mathematics of Operations Research* 6, pp. 58-73.

- R15 Robinson, Mark S., 1985, "Collusion and the Choice of Auction," *Rand Journal of Economics* **16**, pp., 141-145.
- R16 Sandholm, *et al.*, 2006, "Changing the Game in Strategic Sourcing at Proctor & Gamble: Expressive Competition Enabled by Optimization, *Interfaces* **36**, 55-68.
- R17 Sheffi, 2004, "Combinatorial Auctions in the Procurement of Transportation Services," *Interfaces* **34**, 245-252.
- R18 Simmonds, Kenneth, and Stuart Slater, 1978, "The Number of Estimators: A Critical Decision for Marketing Under Competitive Bidding," *Journal of Marketing Research* **15**, pp. 203-213.
- R19 Smith, Charles W., *Auctions, the Social Determination of Value*, Berkeley, University of California Press, 1990.
- R20 Stark, Robert, "Unbalanced Highway Contracting" *Operational Research Quarterly* **25**, pp. 373-388, 1974.