41977 ECON 309 C01: Economic Problems and Public Policies

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Summer 2017. Planetary Hall 126, 3 credits.
Jun 26 - Jul 29, MTWR, 1:30 pm - 3:35 pm.

Description

Economic problems in light of current and proposed public policies. Topics include environmental issues, international trade policies, and regulatory issues.

This is a two-part course. We will first cover welfare theory, to establish desired outcomes of public policy. Then we will focus on applications, designing (strategy-proof) mechanisms that help society arrive to outcomes suggested by welfare analysis.

The topics in the second part include education policy, problems of commons, fair division, collusion, price wars, political competition, congestion (e.g. airport slots), public procurement and auctions. We will look at concrete problems, but through tools provided by game theory and mechanism design. Additionally, we will use elements of computational and experimental economics and run agent-based simulations and experiments in class.

Learning Outcomes

This course is a synthesis course and an upper-division elective within economics.

Recommended Prerequisite: ECON 100 or 103 and 104 or permission of instructor.

The class is in two parts: (1) social welfare analysis and (2) mechanism design/voting. Loosely speaking, the first part is about objectives, the second one is about the modern theoretic and computational instruments.

Grading

- Quizzes 60%

- Presentations 40%

There will be quizzes at the beginning of the class for each big topic (one small problem). These are graded from 0 to 3. You can improve your grade by submitting corrections within a week after quiz is graded. Quizzes will be announced ahead of time and will usually involve direct application of what we studied that week.

The remaining 40% come from presentations. We will agree upon the format of these together and the requirements will be announced in class.

Attendance is highly encouraged, but, of course, will not be checked. However, there are no make-ups for quizzes.

Course outline

5 weeks, 4 days each. 20 classes for 2 hours total.

1. Course outline: economic problems.

$\boxed{\text{Applications}}$: Airports/Satellites slots, Education, FCC auctions, Queuing, Commons.

$\boxed{\text{Theory}}$: Private and public contracts. Distributive justice (the flute).

Brief overview of tools used by economists: (non)linear programming, cooperative and non-cooperative game theory, mechanism design, voting systems, transferable and non-transferable utility (TU, NTU) solutions, matchings, agent-based simulations.

Part 1: Targets: Social Welfare

2. Welfarism, agreements, decentralization and justice.

    (Health-care policy)

$\boxed{\text{Applications}}$: Penalizing productivity, Locating a hospital on a graph, Sharing a cake (chores or with altruism), Trolley problem.

$\boxed{\text{Theory}}$: Objectives of public policy, ex post and ex ante equality, "first-best", "second-best", Pareto-efficiency. Welfare theorems. Egalitarianism versus utilitarianism, maximin vs leximin.

See Moulin (Axioms), chapter 1 and Moulin (Fair Division), chapters 2-3.

3. Welfare orderings

$\boxed{\text{Theory}}$: Introduction to relations. Review of utility theory and ordinary concepts. Collective choice, preference aggregation. Moulin's "Argument in the restaurant".

$\boxed{\text{Applications}}$: Revealed preferences.

4. Externalities and public goods

    (Environmental policy)

$\boxed{\text{Applications}}$: Competitive equilibrium, optimal taxation.

5. Fair allocation of indivisible goods

    (Natural resources)

$\boxed{\text{Applications}}$: Envy-free teams (backyard ball-game problem).

$\boxed{\text{Theory}}$: fair division problems, "envy-freeness", cake-cutting problem revisited, balanced alternation.

Part 2a: Tools: Game theory and Mechanism Design

6. Introduction to game theory.

$\boxed{\text{Theory}}$: Definitions of games. Incomplete information, imperfect information games. Cooperation and decentralization.

$\boxed{\text{Experiment}}$: Repeated Prisoner's dilemma tournament.

7. Repeated games and reputation

    (Anti-trust)

$\boxed{\text{Theory}}$: Collusion, price wars and economic cycles.

See Chapter 6 in George Mailath, Larry Samuelson, "Repeated games and Reputations: Long-Run Relationships", Oxford University Press (2006).

8. Introduction to mechanism design

Application : Airport slot allocation.

Theory : Dominant strategy vs Bayesian implementation. IC and IR rules.

9. Auctions

(Procurement)

Theory : Introduction to Auction theory. Revenue equivalence result for uniform distribution. The procurement system.

Application : The "hacks": Cyrillics in procurement and signaling in FCC auction.

Experiment : All-pay auction.

10. Mechanism design with public goods

Theory : Collective action with public goods. Complexity and information aggregation problems. Satellites example. VCG mechanism for public goods.

11. Bargaining, impossibility results

(Trade policy)

Theory : Myerson-Satterthwaite theorem. Reverse of "Coase's theorem".

Application : Bargaining, externalities, environmental policies etc.

12. Education policy and signaling

(Education policy)

Theory : Extensive form games of incomplete information. Signaling.

Application : Signaling model of education.

13. Advanced mechanism design

Theory : AGV mechanism. Automated mechanism design.

Application : Sharing a painting example.

14. Commons. Cooperative game theory

Theory : TU and NTU games. Balanced games. Shapley value. Subsidy-freeness. Cost-sharing games and the core.

Application : NTU cost-sharing (Greg Leo's model). Application : Mail distribution.
See Moulin (Fair Division), ch. 6.

PART 2B: TOOLS: VOTING AND ADDITIONAL TOPICS

15. Voting, non-strategic social choice

How do we decide on policies?
Theory : Borda, runoff, plurality, range voting (relative utilitarianism). Condorcet paradox.

16. Strategic voting and applications

(Immigration policy, media, politics)
Theory : Hotelling / Downs model, Agent-based simulation in NetLogo.

Applications : media, regime change.

17. Additional topics

Brief introduction to matching theory (with applications to Education and Health).

Readings

There are no required textbooks. There will be more recommended readings for individual topics on Blackboard. I intend to make lectures self-contained, so using only what is available online should be enough.

At least Rubinstein and Klemperer textbooks are available online for free on authors' websites - these books are in **bold**.

Social welfare and collective choice

- Hervé Moulin, "Axioms of cooperative decision making", Cambridge University Press (1988)

- Hervé Moulin, "Fair Division and Collective Welfare", MIT Press (2003).

- Hervé Moulin, "Cooperative Microeconomics: A Game-Theoretic Introduction", Princeton Legacy Library (1995)

- Jean-Jacques Laffont, "Fundamentals of Public Economics", MIT Press (revised 2008)

- Handbook of Computational Social Choice, edited by Felix Brandt (2016)

Game theory and Mechanism design

- **Electronic version of "A Course in Game Theory" by Martin J. Osborne and Ariel Rubinstein, Massachusetts Institute of Technology**

- Robert Gibbons, "Game Theory for Applied Economists", Princeton University Press (1992) (but in fact 1958)

- Drew Fudenberg, Jean Tirole "Game Theory", MIT Press (1991)

- (graduate) Andreu Mas-Colell, Michael D. Whinston, Jerry R. Green, "Microeconomic Theory", Oxford University Press (1995)

- George Mailath, Larry Samuelson, "Repeated games and Reputations: Long-Run Relationships", Oxford University Press (2006)

Auction theory:

- **Paul Klemperer, "Auctions: Theory and Practice", The Toulouse Lectures in Economics**

There is a virtual book: `http://www.nuff.ox.ac.uk/users/klemperer/VirtualBook/VirtualBookCoverSheet.asp`

Course policies

Course Expectations

Lecture materials are mostly self-contained, but it is expected that students are able to look up referenced materials to check or improve their understanding. This class requires some prior exposure to mathematics and algebra. If you find yourself struggling with the material at any time, please make an appointment with me, I can help.

GMU policies

Electronic Devices

Regarding electronic devices (such as laptops, cell phones, etc.), please be respectful of your peers and your instructor and do not engage in activities that are unrelated to class. Such disruptions show a lack of professionalism. If disruptions are interrupting other studentsâĂŹ learning, you may be asked to leave the classroom.

Communication

Students must use their MasonLive email account to receive important University information, including messages related to this class. See http://masonlive.gmu.edu for more information.

Honor Code

Students are expected to abide by the Honor Code in its entirety in completing all requirements for this course. The Honor Code parameters will differ depending on the assignment and will be clearly explained for each assignment. If at any time you are unsure about the Honor Code implications for a particular assignment, ask for clarification.

- Students must adhere to the guidelines of the Mason Honor Code (see http://oai.gmu.edu/the-mason-honor-code/).

- Students must follow the university policy for Responsible Use of Computing

  (see http://universitypolicy.gmu.edu/policies/responsible-use-of-computing/).

- Students are responsible for the content of university communications sent to their Mason email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students solely through their Mason email account.

- If you are a student with a disability and you need academic accommodations, please see me and contact Disability Services at 993-2474, http://ds.gmu.edu. All academic accommodations must be arranged through Disability Services.

- Students must follow the university policy stating that all sound emitting devices shall be turned off during class unless otherwise authorized by the instructor.

Campus Resources

- Support for submission of assignments to Tk20 should be directed to tk20help@gmu.edu or https://cehd.gmu.edu/aero/t Questions or concerns regarding use of Blackboard should be directed to http://coursessupport.gmu.edu/.

- The Writing Center staff provides a variety of resources and services (e.g., tutoring, workshops, writing guides, handbooks) intended to support students as they work to construct and share knowledge through writing (see http://writingcenter.gmu.edu/).

- The Counseling and Psychological Services (CAPS) staff consists of professional counseling and clinical psychologists, social workers, and counselors who offer a wide range of services (e.g., individual and group counseling, workshops and outreach programs) to enhance students' personal experience and academic performance (see http://caps.gmu.edu/).

- The Student Support and Advocacy Center staff helps students develop and maintain healthy lifestyles through confidential one-on-one support as well as through interactive programs and resources. Some of the topics they address are healthy relationships, stress management, nutrition, sexual assault, drug and alcohol use, and sexual health (see http://ssac.gmu.edu/). Students in need of these services may contact the office by phone (703-993-3686). Concerned students, faculty and staff may also make a referral to express concern for the safety or well-being of a Mason student or the community by going to http://ssac.gmu.edu/make-a-referral/.