Syllabus, Eco 701 (Advanced microeconomic theory)

MWF 1pm-1:50pm, B&E room 214

Course description: This is a second-semester PhD-level course in microeconomics. The first-semester course discussed consumer and producer theory; this course will discuss game theory and information economics.

Contact info: My name is Jeremy Sandford, and I am an assistant professor in the economics department at UK. Please call me Jeremy. My email address is jeremy.sandford@uky.edu. My website is jasandford.com. It has a detailed schedule, which I will update after each class, and information on homeworks and exams.

Office meetings: I will have one regular office hour for this course, from 3-4pm on Tuesdays. I will also be in my office throughout the week, and so I am available to meet with you as needed to discuss homeworks, lectures, problems understanding readings, etc. I view office meetings as an important part of the course, and expect them to be used efficiently and often.

Homework: There will be approximately 7-10 lightly graded homework assignments. The grade will be based both on correctness of a subset of assigned problems as well as my subjective assessment of the effort you put into the homework.

You will spend most of your time for this course on the homeworks. They will be hard. You should work in study groups to compare answers and try to reach more correct answers together. You should come talk to me about the problems after this process has played out. It is in completing practice problems, both assigned and unassigned, that you will learn the material and prepare yourself for exams.

Since this is a Ph.D. course, I will leave the responsibility for ensuring that you take the homeworks seriously to you; there is no reason to remain enrolled in the course if you are not going to spend an appropriate amount of time working on homeworks.

Exams: There will be two midterm exams and one final exam. The first midterm will be on Friday, February 17 from 1pm-4pm. The second midterm will be Friday, March 30, from 1pm-4pm. The final exam is Monday, April 30th from 8am-10am. The midterm exam times are subject to change to accomodate student course schedules; they will be definitively fixed within the first week of classes. Once they are fixed, it is not possible to take any exam at a different time, short of debilitating extenuating circumstances discussed as far in advance as possible with me. The most likely outcome of missing an exam for such a reason would be receiving a grade of incomplete this semester, and having a chance to take next year's corresponding Eco 701 exam for this semester's credit.

Course materials: The required book is "Microeconomic Theory," by Andreu Mas-Collel, Michael Whinston, and Jerry Green. This is not always an easy book to read; nonetheless, by the time you take the final exam and prelim, you need to be intimately familiar with the 6 chapters covered in this class.

It may sometimes be useful to get a different perspective; undergraduate books on game theory may be able to fill in some blanks on the big picture. The book "Games of Strategy," by Dixit, Skeath, and Riley is the best I know of. There are also good advanced undergrad books such as "An Introduction to Game Theory" by Osborne and "Game Theory for Applied Economists," by Gibbons.

Though Mas-Collel has no real competitors as a first-year graduate economics textbook, there are other graduate-level general microeconomics books; their sections on game theory may be useful to you as supplemental reading. "Advanced Microeconomic Theory" by Jehle and Reny is particularly good. "Microeconomic Analisys," by Varian, was used as commonly as the Mas-Collel text is now 20 years ago, and is still a good reference. It's treatment of the topics in this course, however, is somewhat meager.

Grading: Course grades will be determined by a weighting of homework assignments (10%), two midterms (30% each), and one final exam (30%).

Econ PhD students will receive course grades as follows:

- **A:** Excellent work, and your performance in this course suggests that you are likely to pass prelims and become a successful grad student.
- **B:** Acceptable work, but your performance in this class suggests there is room for improvement before you are ready to pass prelims and otherwise excel as a grad student at UK.
- **C:** Work suggestive of general confusion, and your performance in this course suggests you are not yet on a path that will lead to your passing prelims and thriving as a UK grad student.
- **F:** Your performance suggests that you are not serious about becoming a competent economist

Students who are not econ PhD students may be graded on a different scale, depending on their background (i.e. I would expect more out of a finance PhD student than an undergraduate). Roughly, the standard I will apply is A for "would be an excellent econ grad student to have at UK" B for "strong effort, and good results given constraints" and C for "didn't work out very well".

Time commitment: We will be covering 6 chapters of a difficult and technical book, and you will completing 7-10 homeworks, in addition to studying for the exams and prelims. As such, this will be a time-intensive course. A student who gets an excellent course grade/prelim result will have spent at least 10 hours/week working on this course outside of class, and most likely considerably more.

Academic dishonesty: I will pursue the maximum penalty for any cheating on exams.

Topics Covered

Topic	Subtopics	reading
Games	Normal form games Extensive form games strategies	MWG 7
Solution concepts for normal form games	Dominance Iterated strict dominance Rationalizability Nash equilibrium The minmax theorem	MWG 8A-8D
Refinements of Nash equilibrium	Subgame perfect equilibrium Perfect Bayesian equilibrium Sequential equilibrium	MWG 8F, 9A-9C
Bayesian games	Asymmetric information Bayesian games Signaling games	MWG 8E, 9D
Repeated games	Repeated prisoner's dilemma One-shot deviation principle Folk theorems	MWG 12.A
Oligopoly models	Static Cournot, Stackelberg, and Bertrand models Repeated interaction in oligopolies Entry and strategic considerations	MWG 12
Applied models of asymmetric information	Adverse selection Signalling and screening	MWG 13
Principal-agent problems	Basic principal-agent model Mechanism design	MWG 14

Each topic will take from 1-5 class meetings. This list is preliminary. It is quite likely that we will not cover every topic listed above, and that we will cover topics which are not listed. I will maintain an updated schedule on my website, jasandford.com, which will list the actual topic on each class day, as well as any additional readings that may be required.