

## DESIGNED MARKETS

We will discuss the design and use of markets and other institutions to solve problems of matching and resource allocation. We will first focus on matching markets such as the match between residents and hospitals, and the operation of match-making websites. We will then look at resource allocation in environments in which transfers are not used such as allocation of school seats to students, and kidneys to transplant patients. The last part of the course will focus on allocation with transfers, that is on auctions, including online auctions and treasury auctions. We will ask how market participants can optimize their actions (and hence outcome) in such markets. We will also look at the choices designers of such markets face. We will look at both case studies of markets and economic models of them.

### PREREQUISITES AND ADMINISTRATIVE REQUIREMENTS

The course is targeted to the students in the business economics program and relies on the standard business economics prerequisites. Some parts of the class will require familiarity with calculus, basic probability, and some amount of symbol manipulation.

You need to enroll in both 106D and 106DL.

### CONTACT INFORMATION AND OFFICE HOURS

My office hours are on Tuesday 10-11am and Thursday 9-10am in Bunche 9371 (my office). My e-mail is [pycia@econ.ucla.edu](mailto:pycia@econ.ucla.edu). If you choose to e-mail me or one of the TAs, please put ECON106D as part of the subject line.

We have three Teaching Assistants for this course:

Omer Ali <[omer.ali@ucla.edu](mailto:omer.ali@ucla.edu)>

Office Hours: Monday 9am-11am, Alper Room (Bunche Hall 2265)

Tiago Caruso <[caruso@ucla.edu](mailto:caruso@ucla.edu)>

Office Hours: Friday 3–5pm in Bunche 2249

Byeong-hyeon Jeong <[bh.jeong1985@gmail.com](mailto:bh.jeong1985@gmail.com)>

Office Hours: Wed. 10:00–12:00 in Alper Room (Bunche Hall 2265)

Omer Ali is primarily in charge of helping you write the class paper. In particular, questions about class paper will have priority during Omer's office hours. Please direct questions about the class paper to him, or to me. Tiago Caruso and Byeong-hyeon Jeong are the first point of contact on questions regarding problem sets and exams.

### FEEDBACK

Please offer your feedback as we go along. In particular, if some idea how to make the class better for you crosses your mind during one of our lecture meetings, please jot it down on a piece of paper and pass it along to me (for instance, you may leave it on the table while leaving, give it to me, or pass it through a teaching assistant or a colleague).

## CLASS LOGISTICS

There are two **106D lecture** series:

Lecture 1: Monday and Wednesday, 2:00-3:15pm, Dodd 161.

Lecture 2: Monday and Wednesday, 3:30-4:45pm, Dodd 161.

I will keep both series of 106D lectures (as well as 106DL meetings and sections) as parallel as possible. You can attend a different lecture series than you are registered for, provided there is space in the classroom. However, please take your midterm in the series you are registered for. If this is not possible, and you would like to take the midterm with the other series, you *must* discuss such a swap with me in advance of the midterm.

The lab part of the course (**106DL**) consists of Friday lab meetings with guest speakers, a lab conference, and Friday sections.

**Lab Meetings.** We will host alumni and other UCLA affiliates during Friday lab meetings in Dodd 121 (at 10am and at 11am). Most of our guests will have practical experience of market design problems discussed in class. We are currently scheduling the visits; see the speakers' handout for the list of guests who already confirmed their visits. One of the meetings will be devoted to preparation before the Economics in Action Conference. Please follow class announcements as some of the lab meetings might be cancelled by the visitors.

**Lab Conference.** On Friday of week 9 we will run an "Economics in Action Conference." Please make effort to attend the conference; to even out the time commitment there will be no lab meetings with alumni during Week 7, Week 9 (the week of the conference), and at least one other week. The conference is coordinated by Partnership UCLA (Katrina Davy and Deborah Lin) on behalf of several economics courses, and many UCLA alumni will attend. During the first two hours of the conference we will run several parallel sessions of presentations of your class papers. The presentations are voluntary and primarily intended as an opportunity for you to obtain feedback from the alumni present (the presentation scores, assigned by the alumni, will also factor into your final score from the course, see below).

Groups that would like to present need to obtain prior authorization; the authorization is based on the class paper proposal. The last part of the conference will allow you to network with the alumni. To give you a sense of the conference, I have posted a tentative program of the conference as well as schedules of lab conferences from Winter 2014 on the class website.

**Lab sections.** Lab sections will focus on the discussion of optional problem sets. They will be conducted on a weekly basis starting the 2<sup>nd</sup> week of the quarter. Because of the lab conference we may need to cancel some of the lab sections in Week 9.

## READINGS

There is no required textbook for the class.

**Class website.** Course materials such as slides, handouts, and problem sets will be posted on the class website, <https://moodle2.sscnet.ucla.edu/course/view/15S-ECON106D-1>.

On the class website, I will be also posting papers with case materials and other advanced readings that they develop the underlying theory at a more sophisticated level than we will attempt in this course. The readings will be optional, but they may be worth looking at, particularly if you develop an interest in some area of the course and/or want to study further. I expect to post the materials regularly after each class.

There are a few blogs containing materials related to this course. The most established among them is <http://marketdesigner.blogspot.com> run by Al Roth and Peter Coles.

## CLASS REQUIREMENTS

**Exams.** Final exam will be on Sunday, June 7, 2015, 8:00am-11:00am (joint for both lecture series); place to be determined. The final is cumulative. We will also have an in-class midterm on Wednesday during the 6<sup>th</sup> week of classes. The exams will test your analytical abilities in the context of economic models we discuss; the parts of the lectures devoted to case discussion are not going to be exam-relevant, but they can help you with your class papers. I will post last-year mid-term and final on class website. I will also post optional (and ungraded) problem sets approximately every other week.

Calculators: Calculators are not necessary at the exam. If you would like to use one, the calculator approved by the Economic Department for exams is Canon LS-100TS. At the Department's request the ASUCLA book stores carries this simple calculator.

**Class paper** is due with no exceptions on Monday of the 10th Week of the course. You are encouraged to work on the class paper in groups of up to seven students. A shorter (ungraded) proposal on what your group intend for the paper is due on Monday of the 5th Week of the course. The proposal is necessary for your group to present at the Economics in Action conference. Please indicate on the proposal whether your group would like to present at the conference.

The proposal and term paper are due in class at the beginning of the lecture on the due date. Groups that would like to have an experience of presenting their work will be able to do it. Details on what is expected from the paper, resources for the paper, and logistical details are provided in a separate note.

**Presentations.** We will schedule presentations of class papers for Week 9 Lab Conference ("Economics in Action") on Friday, May 29, 2015 (Week 9).

**Scoring.** The maximum score on each exam, paper, presentation will be 100. The final score will be computed as follows:

- 30% of the maximum score of term paper and final exam,
- 30% of the final exam score,
- 30% of the maximum score of midterm and final exam,
- 10% of the maximum score of term paper, final exam, and presentation.

Notice that the weight of a missed midterm will be shifted to the final exam. There is no need to obtain instructor's permission to miss a midterm. No make-up midterms will be given. The same applies to the term paper, and to the presentation. In particular, the presentations and class projects are optional but in some cases they can increase your final score.

When the final grade is just below the cut-off between two grades, I may take into account your participation in class discussions.

**Common Syllabus.** In matters not explicitly settled above, we will follow the provisions of the common syllabus of the department of economics. The common syllabus may be found at <http://www.econ.ucla.edu/undergraduate/?p=commonsyllabus>

## OUTLINE OF THE COURSE

Below is a list of topics we will see in the Monday-Wednesday lectures, in the order I expect we will discuss them. The dates are tentative: both the topics and dates may be adjusted over the course of the quarter to account for your interests and our time constraints. Of course, the exams will only test the material that we actually cover.

### PART 1 OF THE COURSE: MATCHING

- Week 1: Logistics for the Course and an Introduction to Market Design  
Case Study: National Residency Matching Program
- Week 2: Theory of two-sided matching: stability, Deferred Acceptance mechanism, efficiency and incentives (dominant strategies), Rural Hospital Theorem.  
Ungraded problem set posted.
- Week 3: Theory of two-sided matching (continued).  
Case Study: a re-appraisal of the National Residency Matching Program.

### PART 2 OF THE COURSE: ALLOCATION WITHOUT TRANSFERS

- Weeks 4: Theory of allocation without transfer: Deferred Acceptance, Serial Dictatorship, Top Trading Cycles, incentives and efficiency.  
Ungraded problem set posted.
- Week 5: Case Studies: Kidney Exchange and School Choice.  
Practice midterm posted.
- Week 6: Discussion of practice midterm (Monday) and in-class midterm (Wednesday).  
Note: the classrooms(s) in which we write midterm are going to be announced.

### PART 3 OF THE COURSE: AUCTIONS

- Week 7: Auctions: an introduction.  
Theory of auctions when bidders have complete information.
- Week 8: Theory of auctions when bidders have incomplete information: Bayesian Nash Equilibrium, second-price auctions, first-price auctions, revenue equivalence.  
Case Studies: eBay auctions, lumber auctions.  
Ungraded problem set posted.
- Week 9: Case Study: penny/entertainment auctions (Walbid, Swoopo, BidCactus, Beezid).  
Theory: how to design an auction? (revenue equivalence, optimal reserve prices).  
Ungraded problem set posted.
- Weeks 10: Case Studies: auctions of multiple objects (spectrum, treasuries, internet ads, wine cases).  
Practice final posted on Monday; discussed in class on Wednesday.