

# Course Syllabus ECON 4301 Game Theory

## Course Information

ECON 4301.001  
Game Theory  
Spring 2013  
Tue, Thurs 2:30-3:45 pm  
Room: JSOM 2.803

## Professor Contact Information

Sneha Bakshi  
Office: GR 3.314  
Office Phone: TBD  
Email: [s.bakshi@utdallas.edu](mailto:s.bakshi@utdallas.edu)  
Office Hours: Thursday 4-6 pm

You can also meet me by prior appointment or walk-in if you see me in my office.

## Course Pre-requisites, Co-requisites, and/or Other Restrictions

1. A *genuine* interest and curiosity to learn game theory plus a willingness to work hard.
2. You should have completed ECON 3310 before you take this course.

This is an introductory course to game theory and its application in economic theory and does not require you to already know game theory. However, the course will assume you have a good knowledge of algebra and calculus.

## Course Description

Game theory is used extensively in economic thinking to better understand strategic behavior. Not limited to economics, the last three decades have seen the spread of game theory to applications in the fields of political science, international relations, industrial organization, business administration, law, biology, and more.

Strategic behavior involves careful decision making in interactive scenarios between rational agents who are well aware of the dependence of interactions. The course will pave a way to learn to analyze such strategic interaction and decision making.

Although this is an introductory course on game theory, it will cover a substantial amount of the methods and topics in the field. To follow the course therefore will require careful and deep understanding of the subtle ideas introduced in class. The exams will then be a test of how well the student has grasped the concepts of game theory, and how effectively the student can apply these concepts to problems.

## **Student Learning Objectives/Outcomes**

This course aims to train students in the logic and strategic decision making involved in the theory of games. From the classification of games the course will move onto important definitions and concepts of game theory and teach students to solve strategic games between two and more agents in non-cooperative scenario.

Students will learn to analyze and solve both simultaneous-moves and sequential-moves games and will be familiarized with different solution concepts like minimax, Nash equilibrium, dominant strategy equilibrium, Subgame perfect equilibrium, etc. They will also learn different methods to solve games, like backward induction, rationalizability, best responses, dominance and elimination of strategies, cell-by-cell outcome examination, etc.

The knowledge will then be extended to mixed strategy equilibria, and to repeated games. Applications of game theory in voting, bargaining, and collective action will follow so students recognize and understand game theory in the world around them.

Students will be expected to absorb and apply the concepts and ideas that constitute these various game types and their solutions, and apply them to the problems at hand.

## **Required Textbooks and Materials**

***Games of Strategy***, A. Dixit, S. Skeath & D. Reiley, 3<sup>rd</sup> edition (W.W. Norton & Co. 2009)

Relevant handouts from other book chapters and journal articles may also be handed out in class, keeping in mind the progress and ability of students.

## **Assignments and Academic Calendar (Subject to change)**

### **I. Introduction**

Fundamental Concepts, Definitions, and Classification of Games.  
Chapters 1, 2 (Dixit, Skeath & Reiley) and Lecture.

### **II. Games with Sequential moves**

Game tree representation, Actions & Strategies, Advantage in moving first or last, Backward Induction.  
Chapter 3 (Dixit, Skeath & Reiley) and Lecture.

### **III. Simultaneous moves Games (Pure strategies)**

Normal form representation, Nash equilibrium, Dominance, Minimax solution concept for Zero-sum Games, Rationalizability, Multiple equilibria, No equilibria, Discrete and Continuous strategies, 3-player games.  
Chapters 4, 5 (Dixit, Skeath & Reiley) and Lecture.

### **IV. Simultaneous and Sequential moves Games**

Converting game trees to Normal form, and vice versa. Changing order of moves, Games with both Sequential and Simultaneous moves.  
Chapter 6 (Dixit, Skeath & Reiley) and Lecture.

**Exam #1 (Date: February 26<sup>th</sup> 2013)**

**V. Simultaneous moves games (Mixed strategies)**

Mixing to keep the opponent guessing, Mixing in non-Zero-sum games, Expected values & utility, Mixing with 3 strategies.

Chapters 7, 8, Appendix of 7 on Probability & Expected Utility (Dixit, Skeath & Reiley) and Lecture.

**VI. Prisoners' Dilemma, Repeated Games and Collective Action**

Finite and Infinite repetition, Leadership, Folk Theorem, Application: Price Matching, Collective Action and Inaction.

Chapters 11, 12 (Dixit, Skeath & Reiley) and Lecture.

**Exam #2 (Date: March 28<sup>th</sup> 2013)**

**VII. Strategic Moves**

Credibility, Commitments, Threats, Promises, Burning Bridges.

Chapter 10 (Dixit, Skeath & Reiley), Handout from *Strategy of Conflict*, T. C. Schelling and Lecture.

**VIII. Application: Voting**

Voting Rules, Paradoxes, Strategic Manipulation.

Chapter 16 (Dixit, Skeath & Reiley) and Lecture.

**IX. Application: Bargaining**

Nash Bargaining Solution, Ultimatum game, Alternating-offers game, Threat Points, Bargaining Shares.

Chapter 18 (Dixit, Skeath & Reiley) and Lecture.

**Final Exam/Exam #3 (Date: May 7<sup>th</sup> 2013 in JSOM 2.903 at 2:00pm)**

**Evaluation & Grading Policy**

Grade Distribution:

Homework Assignments	25%
Exam #1	25%
Exam #2	25%
Exam #3	25%

**Attendance:** Class attendance is very important in this course because understanding Game Theory needs one on one student teacher communication. To emphasize this point, **upto 5 bonus points will be awarded in the weeks before every exam for attendance as long as the student does not miss (nor is late, nor leaves before class is over) more than one class.** These bonus points will be added to your

exam grades. I expect honesty regarding this and therefore **for every class that you enter late, see me after class so I keep a record of late coming. Also if for some reason you have to leave a class early, let me know in advance** so I keep a record.

Homework Assignments will be handed out in class. **If a student is missing from class when a Homework assignment is handed out, it is the student's responsibility to ask for the Assignment and submit it by the deadline.**

All Homework Assignments and Exams will be based on the material taught in class and/or on the material in the book chapters assigned.

Exams 2 & 3 will not be cumulative but the understanding of the material in them will require clarity with previous material.

**Grade Evaluation Scale:** A grade of less than 55% is an F. Everything above 55% will be evaluated on a curve according to class performance and will be awarded a letter grade of A, B, or C on the performance scale.

### **Course & Instructor Policies**

**No make-up exams.**

**Any absence from an exam that is not excused will result in a grade of zero.** For an absence to be excused, the student must supply the appropriate documentation and give advance notification. By advanced notification, the professor must be notified at least a full day (or more) prior to the exam date if possible. Note well, that notification by email or by phone the night before the exam or on exam day does not constitute sufficient advanced notification for most cases. For the *extreme* case where such advanced notification is not feasible, the student must not only supply the appropriate documentation for the absence itself, but must also supply the appropriate documentation related to his or her failure to notify the professor in a timely manner. Excused absences are granted only for medical or family emergencies (severe personal illness or injury, death of a parent, etc) and since no make-ups are given, the student's grade will be determined by adjusting the appropriate weights for the remaining exams or by giving a final cumulative exam. **More specifically, if a student misses (and is excused for genuine reasons) exam 1 or exam 2, the weight of the student's grade on the missed exam will be transferred to exam 3. If a student misses both exams 1 & 2 (and is excused for genuine reasons), for which the probability is really really small, then the student will have to take a final cumulative exam on the day of the final/exam 3.**

**There are no exemptions from taking the final exam/exam #3. Missing the final exam/exam #3 will result in a grade of 0.**

The same policy as specified above, also applies to the turning in of assignments when they are due. Homework is due in class on the assigned date. **Late and unexcused homework will not be accepted.**

**No make-up credit or special consideration for any student.**

**Attendance is not required but is highly recommended for success in the course.** Bonus points for attendance are explained above. Announcements will be made in class. All students are responsible for

all announcements made in class and a student's absence from class does not excuse him/her from being aware of the announcements. The student is responsible for keeping track of everything covered in class, of handouts given in class, and of all instructions/announcements made in class.

Disturbing behavior in class will **NOT** be tolerated as it is disrespectful of fellow students and the learning environment.

Students are required to bring their student ID for every Exam.

If these policies are unacceptable or if you feel that you are unable to meet these requirements, then you should not take this course.

## **University Policies and Procedures for Students**

### **Incomplete Grade Policy**

As per university policy, incomplete grades will be granted only for work unavoidably missed at the semester's end and only if 70% of the course work has been completed. An incomplete grade must be resolved within eight (8) weeks from the first day of the subsequent long semester. If the required work to complete the course and to remove the incomplete grade is not submitted by the specified deadline, the incomplete grade is changed automatically to a grade of F.

### **Student Conduct & Discipline**

The University of Texas System and The University of Texas at Dallas have rules and regulations for the orderly and efficient conduct of their business. It is the responsibility of each student and each student organization to be knowledgeable about the rules and regulations which govern student conduct and activities. General information on student conduct and discipline is contained in the UTD publication, A to Z Guide, which is provided to all registered students each academic year.

The University of Texas at Dallas administers student discipline within the procedures of recognized and established due process. Procedures are defined and described in the Rules and Regulations, Series 50000, Board of Regents, The University of Texas System, and in Title V, Rules on Student Services and Activities of the university's Handbook of Operating Procedures. Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations (SU 1.602, 972/883-6391).

A student at the university neither loses the rights nor escapes the responsibilities of citizenship. He or she is expected to obey federal, state, and local laws as well as the Regents' Rules, university regulations, and administrative rules. Students are subject to discipline for violating the standards of conduct whether such conduct takes place on or off campus, or whether civil or criminal penalties are also imposed for such conduct.

### **Academic Integrity**

The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrate a high standard of individual honor in his or her scholastic work.

Scholastic dishonesty includes, but is not limited to, statements, acts or omissions related to applications for enrollment or the award of a degree, and/or the submission as one's own work or material that is not one's own. As a general rule, scholastic dishonesty involves one of the following acts:

cheating, plagiarism, collusion and/or falsifying academic records. Students suspected of academic dishonesty are subject to disciplinary proceedings.

Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the university's policy on plagiarism (see general catalog for details).

### **Email Use**

The University of Texas at Dallas recognizes the value and efficiency of communication between faculty/staff and students through electronic mail. At the same time, email raises some issues concerning security and the identity of each individual in an email exchange. The university encourages all official student email correspondence be sent only to a student's U.T. Dallas email address and that faculty and staff consider email from students official only if it originates from a UTD student account. This allows the university to maintain a high degree of confidence in the identity of all individual corresponding and the security of the transmitted information. UTD furnishes each student with a free email account that is to be used in all communication with university personnel. The Department of Information Resources at U.T. Dallas provides a method for students to have their U.T. Dallas mail forwarded to other accounts.

### **Withdrawal from Class**

The administration of this institution has set deadlines for withdrawal of any college-level courses. These dates and times are published in that semester's course catalog. Administration procedures must be followed. It is the student's responsibility to handle withdrawal requirements from any class. In other words, I cannot drop or withdraw any student. You must do the proper paperwork to ensure that you will not receive a final grade of "F" in a course if you choose not to attend the class once you are enrolled.

### **Student Grievance Procedures**

Procedures for student grievances are found in Title V, Rules on Student Services and Activities, of the university's Handbook of Operating Procedures.

In attempting to resolve any student grievance regarding grades, evaluations, or other fulfillments of academic responsibility, it is the obligation of the student first to make a serious effort to resolve the matter with the instructor, supervisor, administrator, or committee with whom the grievance originates (hereafter called "the respondent"). Individual faculty members retain primary responsibility for assigning grades and evaluations. If the matter cannot be resolved at that level, the grievance must be submitted in writing to the respondent with a copy of the respondent's School Dean. If the matter is not resolved by the written response provided by the respondent, the student may submit a written appeal to the School Dean. If the grievance is not resolved by the School Dean's decision, the student may make a written appeal to the Dean of Graduate or Undergraduate Education, and the dean will appoint and convene an Academic Appeals Panel. The decision of the Academic Appeals Panel is final. The results of the academic appeals process will be distributed to all involved parties.

### **Disability Services**

The goal of Disability Services is to provide students with disabilities educational opportunities equal to those of their non-disabled peers. Disability Services is located in room 1.610 in the Student Union. Office hours are Monday and Thursday, 8:30 a.m. to 6:30 p.m.; Tuesday and Wednesday, 8:30 a.m. to 7:30 p.m.; and Friday, 8:30 a.m. to 5:30 p.m.

The contact information for the Office of Disability Services is:

Student AccessAbility  
800 W. Campbell Rd., SSB32  
Richardson, TX 75080  
Phone: (972) 883-6561

Essentially, the law requires that colleges and universities make those reasonable adjustments necessary to eliminate discrimination on the basis of disability. For example, it may be necessary to remove classroom prohibitions against tape recorders or animals (in the case of dog guides) for students who are blind. Occasionally an assignment requirement may be substituted (for example, a research paper versus an oral presentation for a student who is hearing impaired). Classes enrolled students with mobility impairments may have to be rescheduled in accessible facilities. The college or university may need to provide special services such as registration, note-taking, or mobility assistance.

It is the student's responsibility to notify his or her professors of the need for such an accommodation. Disability Services provides students with letters to present to faculty members to verify that the student has a disability and needs accommodations. Individuals requiring special accommodation should contact the professor after class or during office hours.

### **Religious Holy Days**

The University of Texas at Dallas will excuse a student from class or other required activities for the travel to and observance of a religious holy day for a religion whose places of worship are exempt from property tax under Section 11.20, Tax Code, Texas Code Annotated.

The student is encouraged to notify the instructor or activity sponsor as soon as possible regarding the absence, preferably in advance of the assignment. The student, so excused, will be allowed to take the exam or complete the assignment within a reasonable time after the absence: a period equal to the length of the absence, up to a maximum of one week. A student who notifies the instructor and completes any missed exam or assignment may not be penalized for the absence. A student who fails to complete the exam or assignment within the prescribed period may receive a failing grade for that exam or assignment.

If a student or an instructor disagrees about the nature of the absence [i.e., for the purpose of observing a religious holy day] or if there is similar disagreement about whether the student has been given a reasonable time to complete any missed assignments or examinations, either the student or the instructor may request a ruling from the chief executive officer of the institution, or his or her designee. The chief executive officer or designee must take into account the legislative intent of TEC 51.911(b), and the student and instructor will abide by the decision of the chief executive officer or designee.

Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations.

The University of Texas at Dallas provides a number of other policies and procedures designed to provide students with a safe and supportive learning environment. Brief summaries of the policies and procedures are provided for you at <http://go.utdallas.edu/syllabus-policies> and include information about technical support, field trip policies, off-campus activities (not applicable in this course).

You may also seek further information at these websites:

<http://www.utdallas.edu/judicialaffairs/UTDJudicialAffairs-HOPV.html>

<http://www.utsystem.edu/ogc/intellectualproperty/copypol2.htm>

<http://www.utdallas.edu/disability/documentation/index.html>

***These descriptions and Timelines are subject to change at the discretion of the Professor.***