GVPT 399A – FALL 2009

GAME THEORY

Instructor: Piotr Swistak, TYD 1140 G, tel. 405-4149, email: pswistak@gvpt.umd.edu
Office hours: Mondays and Wednesdays 12:00pm-1:00pm, TYD 1140 G, or send me an email and we will meet at any time that is convenient for you.
Lectures: SQH 1117, Thursdays 3:30pm - 6:15pm.
Teaching Assistants: Luke Lindberg and Samuel Mukiibi and Josh Schenker will be our TAs. Luke will be available for help on Mondays 3:30pm—4:30pm in TYD 2108; Sam will be available on Tuesdays 5:00pm—6:00pm in TYD 0102, and Josh on Thursdays 11:00am—12:00pm in COL 3114. They will start their help hours the week of Sep14. Their email addresses are: lukejlindberg@gmail.com, samuel.mukiibi@gmail.com and jsschenker@umd.edu.

Three important points to keep in mind: (1) this class in **UNLIKE ANY OTHER POLITICAL SCIENCE** class you might have taken, (2) game theory is a branch of **MATHEMATICS** (Recall "A Beautiful Mind"?), (3) I tend to explain things in my own way rather than follow a textbook, hence **ATTENDING** classes (from what students tell me) is very useful, if not necessary.

This is an introductory course in game theory, a field of applied mathematics. Game theory is a general theory of behavior and as such is of interest to the social sciences. It has long been used in all social sciences, but its impact of the last two decades has been extraordinary and unprecedented. My plan is to give you a reasonably comprehensive introduction to modern game theory. We will cover theory of preferences (ordinal utility), expected utility theory, and a variety of solutions concepts including iterated dominance, Nash equilibria, subgame perfect equilibria, evolutionary equilibria and others. Please keep in mind that much of the material will be mathematical and students who are not perfectly comfortable with basic algebra, or are averse to mathematics, may find this class prohibitive. What is more important, though, they will certainly find this class not to their liking.

Materials for this class (e.g., syllabus, lecture notes, homework assignments, etc) will be posted, throughout the semester, on https://elms.umd.edu

READINGS

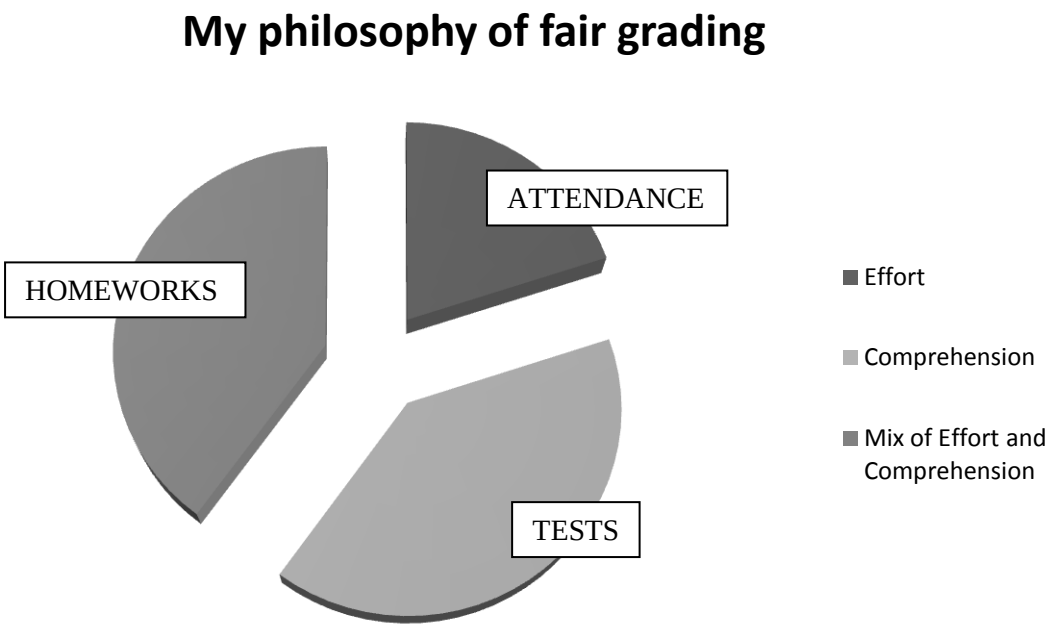
Books:

Avinash Dixit and Susan Skeath, *Games of Strategy*, Norton, 2004 (required)
Joel Watson, *Strategy*, Norton, 2002, (excerpts on ELMS)
Robert Axelrod, *The Evolution of Cooperation*, Basic Books, 1984.

Other readings: David Kreps, *Notes on the Theory of Choice*, Westview Press, 1988,and papers by Bendor and Swistak are on ELMS.

WARNING
Much of the material will be mathematical—**students who are not perfectly comfortable with basic mathematics/simple algebra may find this class prohibitive.**

GRADING



MANDATORY GRADING

TESTS (40%): There will be four mandatory tests.

For each test there will be an optional make-up that will allow you to improve your grade. A make-up will have a form of a conversation with me in which you will explain to me the nature of your mistakes on the test and show me (solve an ad hoc problem or two) that you understand the concepts and are able to use them. "Make-ups" will count as 50% of your test grade. (Assume, for example, that your score on Test 1 was 70% and you want to improve it by taking a make-up. Suppose that your score on the make-up test is 100%. In that case your total score for Test 2 will be determined as: 0.5*70% + 0.5*100% = 85%.) The average of the four test grades will count as 40% of your grade.

HOMEWORKS (40%): There will be (about) eight homeworks I will ask you to turn in. I will grade them for correctness but points will also be taken off for incomplete sloppy explanations. I will be posting homework solutions on the web, so late submissions will not be accepted and a missing homework will count as 0 towards your homework average. The average of your homework grades (all homeworks carry the same weight) will count as 40% of your grade.

PARTICIPATION (20%): Your attendance, expressed as percentage of classes you have attended, will count 20%.

DATES, DEADLINES AND COMMUNICATION: I will communicate with you by email and through ELMS. All homework deadlines, dates of upcoming tests (I will warn you two weeks before the test) and other important things will be communicated that way.

EXTRA CREDIT

There are two additional ways to improve your grade:

CLASS PERFORMANCE: Class performance, measured by individual and group competitions, will count as follows: All extra credits you have accumulated, if any, will be classified into three categories: top, middle and low. Students in the top category will get an extra 3%, middle 2% and low 1%.

FINAL EXAM (Saturday, December 19, 10:30am–12:30pm in our regular classroom): An optional way to improve your grade is by taking the final exam. Final exam will count for 50% of your test grade. For example, suppose that you take four tests and your average test score is 86%. In that case if you decide not to take the final exam, your class grade will be calculated with the 86% test average counting as 40% of your class grade. If, however, you take the final and score 94% on it, your class grade will be calculated with 0.5*86% + 0.5*94% = 90% counting as 40% of your class grade.

OTHER ISSUES

CRIB SHEET: While all testing is closed book, your are allowed to have a **crib sheet—**a single standard size sheet of paper with whatever information you want to put on it.

SPECIAL PROBLEMS AND SITUATIONS: If you have any problems, e.g., medical, that can affect your performance in class you should let me know immediately. We may be able to resolve the problem if you come and tell me about it in advance.

MISSING A TEST will **not** be **allowed** except for extraordinary circumstances like medical emergencies, jury duty, etc, for which I will ask you to supply relevant documents (from the physician, court, etc). You have to inform me about such emergencies immediately and **no later than a week after** the missed test. If you neglect to document your absence within a week, I will assign zero points to a missed test; there will be no appeals.

LECTURES VERSUS READINGS: A good part of the material will not be contained in the readings and will only be presented in class. Most of the readings are not a substitute for what we do in class—they are **supplementary**. Attending classes, for all I know from past generations, seems necessary to do well in this course.

Please don't use **NOTE(NET)BOOKS/LAPTOPS** in class.

UNIVERSITY POLICIES

ACADEMIC INTEGRITY: The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit http://www.studenthonorcouncil.umd.edu/whatis.html.

MEDICAL EMERGENCIES: Campus Senate policy requires students who are absent due to illness/injury to furnish documentary support to the instructor. I require students to contact me by email or by phone prior to class time in which you indicate that you have an illness or an injury. You must provide written documentation verifying your illness/injury immediately upon your return to class. You will not be allowed to turn in missed assignments or make up quizzes, tests, papers, etc. if you have not provided this documentation. Documentation not presented to me in a timely manner will not be accepted. In addition, if it is found that you have falsified the documentation provided, I will refer you to the University's Student Conduct Office.

SCHEDULE OF READINGS, HOMEWORKS AND TESTS

WEEK 1 (Sept. 3)

Introduction: Examples of Topics, Methods, and Solutions

For next week please read Dixit and Skeath, Appendix: Probability and Expected Utility (pp. 221-232.)

WEEK 2 (Sept. 10) HWK 1 posted; due Sept 17.

Choice under Certainty: Theory of Preferences

For next week please read Dixit and Skeath Chapter1 and pages 7-9 from D. Kreps' "Theory of Choice." Also, Raymond Wilder's "The Axiomatic Method" is recommended on the topic of theory construction.

WEEK 3 (Sept. 17)

Choice under Uncertainty: Von Neumann-Morgenstern Expected Utility Theory and the Foundation of Game Theory

For next week please read Dixit and Skeath Chapter 2 and pages 1-6 from D. Kreps' "Theory of Choice."

WEEK 4 (Sept. 24) HWK 2 posted; due Oct 1.

Game Theory: Primitive Terms, their Properties and Interpretations

For next week please read Dixit and Skeath Chapter 3 (pages 45-61 are on ELMS.)

WEEK 5 (Oct. 1)

Sequential Games and Rollback Equilibria

For next week please read Dixit and Skeath Chapter 4 (pages 83-114 are on ELMS.)

WEEK 6 (Oct. 8) Test 1 on HWKS 1&2. HWK 3 posted; due Oct 15.

Simultaneous-Move Games: Dominance Solvability and Nash Equilibria

For next week please read Dixit and Skeath Chapter 7 and 8 (pages 185-216 are on ELMS.)

WEEK 7 (Oct. 15) HWK 4 posted; due Oct 22.

Simultaneous-Move Games: Mixed Strategies

For next week please read Dixit and Skeath Chapters 6 (Watson Chapters 14, 15 and 16 recommended).

WEEK 8 (Oct. 22)

Mixed Strategies (cont.) and Sequential versus Simultaneous-Move Games and Subgame-Perfect Equilibria

For next week please read Dixit and Skeath Chapter 11 (pages 345-356 are on ELMS; also Watson Chapter 22 is recommended.)

WEEK 9 (Oct. 29) Test 2 on HWKS 3&4. HWK 5 posted; due Nov 5.

Repeated Games

For next week please read Axelrod Part I and II.

WEEK 10 (Nov. 5) HWK 6 posted; due Nov 12.

Folk Theorem

For next week please read Axelrod Part III, IV and V.

WEEK 11 (Nov. 12)

Evolutionary Games

For next week please read Dixit and Skeath Chapter 13.

WEEK 13 (Nov. 19) Test 3 on HWKS 5&6. HWK 7 posted; due Dec 3.

The Evolutionarily Stable Strategies and the Evolution of Cooperation

For next week please read Bendor and Swistak (1997).

WEEK12 (Nov. 26)

THANKSGIVING BREAK

WEEK 14 (Dec. 3) HWK 8 posted; due Dec 10.

The Evolution of Social Structure

For next week please read Bendor and Swistak (2001).

WEEK 15 (Dec. 10) Test 4 on HWKS 7&8.

The Evolution of Norms