**GVPT 390 – SPRING 2017**

**GAME THEORY**

Professor Piotr Swistak, Department of Government and Politics and the Applied Mathematics, Statistics and Scientific Computation Program, office TYD 1140 G, tel. 405-4149, email: pswistak@umd.edu

**Office hours:** Tuesdays and Thursdays 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:** TYD 1101, Tuesdays 2:00pm - 4:45pm.

**Teaching Assistants:** TBA

**IMPORTANT: THIS DOCUMENT MAY BE UPDATED THROUGHOUT THE SEMESTER. PLEASE CONSULT FREQUENTLY.**

Three important points to keep in mind: (1) this class is **UNLIKE ANY OTHER POLITICAL SCIENCE** classes you might have taken, (2) game theory is a branch of **MATHEMATICS** (please see “A Beautiful Mind” movie; it is about game theory, in a sense), (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 it is also a part of social science. While it has long been used in all social sciences, its impact of the last three decades has been extraordinary and unprecedented. My objective is to provide a reasonably comprehensive introduction to modern game theory. We will cover theory of preferences, 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 the material is mathematical and students who are not comfortable with basic algebra, or are averse to mathematics, may find this class prohibitive and, most certainly, not to their liking. (I have had semesters where the set of students enrolled in this class at the end of the semester was half of what it was at the beginning.)
READINGS  Books:

SELECTED READINGS ON ELMS
Since publishers allow access to about 25% of copyrighted materials I took the liberty of scanning some of the required readings and posting them on ELMS. My selection is arbitrary and includes what I thought may be the most difficult parts of the material. These excerpts do not and cannot substitute for the entire assigned reading.

WARNING
Material in this class is mathematical—students are assumed to know basic mathematics/simple algebra at the high school level.

MANDATORY GRADING
TESTS (50%):  There will be four mandatory tests.  You are allowed to have a single page crib sheet for each test and exam.  You cannot, however, use textbooks or any other notes.  Calculators are allowed.  The average of the four test grades will count as 50% of your class grade.

HOMEWORKS (35%):  There will be seven homeworks.  I will grade them for correctness but points will also be subtracted for incomplete or sloppy explanations.  I will post 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 35% of your grade.

PARTICIPATION (15%):  Your attendance, expressed as percentage of classes you have attended, will count 15%.

DATES, DEADLINES AND COMMUNICATION:  I will use ELMS/CANVAS email system to inform you about posted files, homework deadlines, upcoming tests, etc.  Please make sure that your email address as listed with ELMS is current and working.

EXTRA CREDIT
One notorious problem that leaves everyone upset are borderline grades.  89%, for instance, is a B+ while 90% is an A-.  This feels unreasonable, to say the least, and in my opinion it is both unreasonable and unfair.  To solve this problem we will use two tie-breaking tools: extra credit points for in-class competitions and the final exam.
CLASS PERFORMANCE—THE EXTRA CREDIT POINTS: Class performance, measured by in-
class competitions, will count as follows: All extra credit points you have accumulated, if any, will be
classified into four categories. Students in the top category will get an extra 3%, second highest, 2%,
third highest, 1%, and lowest, 0%.

FINAL EXAM (TBA): 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 you have taken all 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 50% of your class grade. If, however, you take the final exam and
score 94% on it, your class grade will be calculated with 0.5*86% + 0.5*94% = 90% counting as 50% of
your class grade.

PERCENTAGE GRADES WILL TRANSLATE INTO LETTER GRADES as follows: A- for 90-92%, A for 93-96%, A+ for 97% up; and analogously for B (80’s), C (70’s) and D (60’s).

OTHER ISSUES

CRIB SHEET: All testing is closed book but you ARE ALLOWED to have a crib sheet—a single
standard size sheet of paper with whatever information you want to put on it (both sides.)

SPECIAL PROBLEMS AND SITUATIONS: If you have any situation, e.g., medical, that can affect
your performance in class you should let me know immediately and no later than a week after it happens.
I may be able to solve the problem but only if you tell me about it early enough.

MISSING A TEST will not be allowed except for extraordinary circumstances like medical
emergencies, jury duty, etc, for which, as our university requires, you will have 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. For this reason you should not think about the readings as a substitute
for what we do in class—consider them supplementary. Attending classes, for all I know from the past,
seems necessary to do well in this course.

Please don’t use NOTE (NET) BOOKS/LAPTOPS, PHONES and other electronic devices 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
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 (Jan. 31)
Introduction: Examples of Topics, Methods, and Solutions
Related readings: Raymond Wilder, pages 1621-1640 (on ELMS.)

WEEK 2 (Feb. 7) HWK 1 posted
Choice under Certainty: Theory of Preferences
Related readings: Dixit, Skeath and Reiley Chapter 1 and Kreps, pages 7-11 (for those who like it short and mathematical) and Williams pages 47 and 49-50 (for those who want something less mathematical than Kreps.)

WEEK 3 (Feb. 14) HWK 1 due; HWK 2 posted
Choice under Uncertainty: Von Neumann-Morgenstern Expected Utility Theory and the Foundation of Game Theory
Related readings: pages 1-6 from D. Kreps’ “A Course in Microeconomic Theory” or Williams pages 63-68 (for those who want something less mathematical than Kreps.)

WEEK 4 (Feb. 21) HWK 2 due
Game Theory: Primitive Terms, their Properties and Interpretations
Related readings: Dixit, Skeath and Reiley Chapter 2 (excerpts from previous edition are on ELMS.)

WEEK 5 (Feb. 28)
Sequential Games and Rollback Equilibria
Related readings: Dixit, Skeath and Reiley Chapter 3 (excerpts from previous edition are on ELMS.)
WEEK 6 (Mar. 7)  Test 1 on HWKS 1 & 2;  HWK 3 posted
Simultaneous-Move Games: Dominance Solvability and Nash Equilibria
Related readings: Dixit, Skeath and Reiley Chapter 4 (excerpts from previous edition are on ELMS.)

WEEK 8 (Mar. 14)  HWK 3 due;  HWK 4 posted
Simultaneous-Move Games: Mixed Strategies
Related readings: Dixit, Skeath and Reiley Chapter 7 (Watson Chapters 14, 15 and 16 recommended).

WEEK 7 (Mar. 21)
SPRING BREAK

WEEK 9 (Mar. 28)  HWK 4 due
Mixed Strategies (cont.) and Sequential versus Simultaneous-Move Games and Subgame-Perfect Equilibria
Related readings: Dixit, Skeath and Reiley Chapter 7 and 8 (excerpts from previous edition are on ELMS) also Watson Chapter 22 is recommended.

WEEK 10 (Apr. 4)  Test 2 on HWKS 3 & 4;  HWK 5 posted
Repeated Games
Related readings: Dixit, Skeath and Reiley Chapter 11 and Watson Chapter 22 and Axelrod Part I.

WEEK 11 (Apr. 11)  HWK 5 due;  HWK 6 posted
Folk Theorem
Related readings: Axelrod Part I and readings from the previous week continued.

WEEK 12 (Apr. 18)  HWK 6 due
Evolutionary Games
Related readings: Dixit, Skeath and Reiley Chapter 13 and Axelrod Part II and III.
WEEK 13 (Apr. 25)  Test 3 on HWK 5&6;        HWK 7 posted

The Evolutionarily Stable Strategies and the Evolution of Cooperation

Related readings: Bendor and Swistak (1997).

WEEK 14 (May 2)  HW 7 due

The Evolution of Norms

Related readings: Bendor and Swistak (2001).

WEEK 15 (May 9)  Test 4 on HWK 7

The Evolution of Social Structure