Course Syllabus

LB 492, section 007 : The Mathematics of Politics

Classroom:	Akers 133
Time:	Tu, Th; 10:20 a.m. - 12:10 p.m.
Instructor:	Robert W. Bell
Office:	W-32 Holmes Hall
Office hours:	Tu, Th; 9 a.m. - 10 a.m. and by appointment
E-mail:	rbell@math.msu.edu
Course web page:	http://www.math.msu.edu/∼robertbe/LB492SP09.html

Required Textbooks:

1. A. Taylor & A. Pacelli, *Mathematics and Politics: Strategy, Voting, Power and Proof*, Second Edition, Springer, New York, 2008.
2. D. Saari, *Chaotic Elections: A Mathematician Looks at Voting*, American Mathematical Society, Washington D. C., 2001.

Topics:

1. Social Choice: Is the plurality winner the prefered choice?
2. Yes – No Voting: What are the winning coalitions for passing legislation?
3. Political Power: How much power does the state of Michigan have?
4. Conflict: When is it in your best interest to cooperate with an adversary?
5. Fairness: Fair is fair, right?
6. Escalation: How do you fight a cold war without self-destructing?
7. Mathematical Theorems in Social Choice Theory

(Topics 1-6 correspond to chapters of Taylor & Pacelli; the last topic refers the book by Saari.)

Grading Criteria:

1. Attendance: 30 points
2. Participation and Preparedness: 20 points
3. Term Papers (2): 30 points
4. Formal Presentation: 10 points
5. Briggs Symposium Presentation or Poster: 10 points

Grading Scale: Total the above scores, round to the nearest integer, and use the following scale: 0-59: 0.0, 60-64: 1.0, 65-69: 1.5, 70-74: 2.0, 75-79: 2.5, 80-84: 3.0, 85-89: 3.5, 90-100: 4.0.

Grading Details:

1. **Attendance:** If you miss 3-4 classes, you lose 5 points. If you miss 5-6 classes, you lose 10, if you miss 7-8 classes you lose 20, and if you have missed class nine times (*Bueller: nine times...*), then you forfeit all 30 points of your attendance grade.

2. **Participation and Preparedness:** You are expected to regularly contribute to class discussions, particpate in group activities, and arrive for class having completed the required reading assignment. At the end of every week (except weeks 7, 9, 14, and 15; see the schedule below) I will e-mail you a rating of "excellent", "good", "satisfactory", "poor", or "unacceptable". Each rating of unacceptable will result in a loss of 2 points from the 20 allotted. Each rating of excellent will result in a gain of 1 percentage point to your total. Thus, you begin with 20 points and may finish with a total of 31, or you may finish with a total of -2.

3. **Term Papers:** The first term paper must be on a topic from one of chapters 8 thru 12 of the text by Taylor & Pacelli. We will not discuss these chapters formally in class. Rather, these are topics that you may choose to study independently or as a group. There will be time in week 7 to discuss these topics with me individually during class time. You are to submit a draft version of your paper one week prior to the due date. A draft will consist, at minimum, of an outline, an introduction, and a list of references.

   The second term paper can be on a topic of your choosing (subject to my advance approval). As with the first term paper, there will be class time available to discuss your topic with me individually and you are required to submit a draft version one week before the due date.

   Both term papers should contain between 1000 and 2000 words of text plus a bibliography and any visuals you think are appropriate.

   Plagiarism will not be tolerated. You will receive a score of zero if you are found to have used another's work as your own without giving proper credit. Further, it is unacceptable to quote large sections of text in a term paper of this length. You will be heavily penalized for this poor stylistic choice.

4. **Formal Presentation:** You are to form groups of at least 2 persons and no more than 4. Your group should consist of students who have selected the same chapter from among chapters 8 thru 12 of the text by Taylor & Pacelli. Your presentation should last 20 minutes. Not every member is required to speak so long as you can document each members role in the creation process. The presentations will occur during class in week 9. You are encouraged use material from your first term paper as part of this presentation. After your presentation, there will be at most 5 minutes for questions, followed by a 2 minute break. We should be able to have four presentations per class day.

5. **Briggs Symposiusum:** On April 28, our class will participate in the annual Spring Lyman Briggs Research Symposium. Our classroom will be open to the LBC public, and we will give a series of presentations. As with the formal presentation, you are to pair up or form a group of at most 4 persons. You may present a topic from the course of your choosing in the form of either a formal presenation or a poster. In either case, you will be required to answer questions from the public (including your classmates).

Schedule:

Date	Week	Reading assignment / Event
01/12	1	Chapter 1 of T&P
01/19	2	Chapter 2 of T&P
01/26	3	Chpater 3 of T&P
02/02	4	Chapter 4 of T&P
02/09	5	Chapter 5 of T&P
02/16	6	Chapter 6 of T&P
02/23	7	Read one chapter from 8-12 of T&P; individual / group meetings
03/02	8	Chapter 7 of T&P; submit draft version of paper
03/09	πe	Spring break
03/16	9	Formal presentations; Term papers due on Tuesday
03/23	10	Chapters 1 and 2 of Saari
03/30	11	Chapter 3 of Saari
04/06	12	Chapter 4 of Saari; no class on 04/07
04/13	13	Chapter 5 of Saari
04/20	14	Prepare for Symposium and final term paper; individual / group meetings
04/27	15	Briggs Symposium on 04/28
05/04	∞	Final term paper due on 05/05

Some advice: You may find the reading assignments quite difficult. When the reading becomes difficult to follow, push yourself to read a little more or even skip ahead to a section that catches your interest. Always, keep pencil and paper nearby to verify calculations or to work through statements which the author states without giving the details. Often, the author will provide more illuminating details in the paragraphs that immediately follow.

It is commonplace for the reading to include a number of exercises or puzzles either in the middle of the text or at the end of a section or chapter. These should not be glossed over. You should attempt as many exercises as interest you and fit your schedule. If none interest you, then you should consider taking a different course. If you find that you do not have enough time to attempt any of the exercises, then you need to allot more time to reading and

preparing for class. The majority of our class discussion time will be spent analyzing mathematical problems that are introduced in the reading.

We will also discuss current and historical events that are connected to the topics of the course. You are encouraged to suggest topics of current or historical importance that fall within the scope of this course.

Most importanly, if you ever find yourself feeling somewhat isolated or lost, then please, please make an appointment to meet with me or simply stop by during my office hours. My office hours are listed on the front page of this syllabus. The best way to contact me is via e-mail at rbell@math.msu.edu.