

MTH 109/PSC 109

Politics and Mathematics

Professor Dean Clark

Office: Chafee 810

Phone: X-4457

e-mail: dclark@uri.edu

COURSE DESCRIPTION

- Was the muddled presidential election of 2000 a result of “hanging chads” and “dimpled ballots,” or are there hidden mathematical structures that can cause doubt about an election outcome? Could it happen again? (Depend on it!)
- When is there inherent doubt about “what the voters really want?” Is democracy (in the sense of reflecting the will of the people) even possible?
- How are the irrationality behind both the arms race of the 1980’s and the head-to-head confrontation of the Cuban missile crisis tied together?
- One reasonable calculation suggests that the president has 4% of the power in the United States federal system while another suggests that the president controls 77% of the power. What are these measures and why do they differ so radically?

Although there are no prerequisites for this course beyond college-track high school mathematics, the ideas are interesting and challenging, and students should be prepared to think carefully and precisely. Gen ed requirements at URI now make experience with technology in mathematics *mandatory* (in this case, experience with symbolic manipulation software).

Text: Alan D. Taylor, *Mathematics and Politics*, Strategy, Voting, Power and Proof, Springer-Verlag, 1995. **Purchase optional. Six copies on reserve in the Library.**

Mathematical Software: *LiveMath Maker*. Available on all the PC’s in the Library basement lab. No previous experience assumed; classroom demonstrations will be given.

GRADING, HOMEWORK AND ATTENDANCE

Exams are open book and open notes. Students are encouraged to work together on the homework problems from the text. Joint work on computer assignments is prohibited.

- One mandatory computer assignment: 100 points
- Three one hour exams: 100 points each
- Attendance: 100 points (see explanation, below)
- Extra Credit: several computer projects

Attendance is mandatory. A *documented* absence is one accompanied by prior notification or is due to a weather emergency. After the fact, a medical or legal document, mechanic’s bill, or evidence of a personal or family emergency will suffice. If you know that you will be absent for a legitimate reason you must e-mail me about it in advance. **You are granted 2 undocumented absences without penalty.** The third and additional undocumented absences will result in a loss of 25 points per absence from your 100-point attendance credit, i.e., you may lose up to 20% of your grade through nonattendance. **Non-exam credit will not be applied if you fail every exam,** i.e., you cannot pass the course based simply on attendance and computer assignments.

<u>Week</u>	<u>Events</u>	<u>Homework Problems to be Announced in Class</u>
Sept 5	Classes begin	<i>Conflict: Introduction to Game Theory: Taylor, Chapter 2</i>
Sept 12		Chapter 2
Sept 19	9/20 last day to add	<i>Models of Deterrence: Chapter 7.4-7.6</i>
Sept 26		Discussion of the homework problems of Chapters 2 and 7 <i>Computer assignment due on the day of Exam 1.</i>
Oct 3	Exam 1	<i>Yes-No Voting: Chapter 3</i>
Oct 10	Columbus Day	Chapter 3
Oct 17	Midsemester	Discussion of the homework problems of Chapters 3
Oct 24		<i>Political Power: Chapter 4</i>
Oct 31	11/1 last day to drop	Chapter 4
Nov 7		Discussion of the homework problems of Chapters 4
Nov 14	Exam 2	<i>Social Choice: Chapter 5</i>
Nov 21	Thanksgiving 11/24-11/27	Chapter 5
Nov 28		Chapter 5 <i>Arrow's Impossibility Theorem: Ch.10 (Read Only)</i>
Dec 5	Exam 3	Discussion of the homework problems of Chapters 5 Cumulative Exam 3 on 12/9