The George Washington University
Department of Mathematics
Math 1007-10: Mathematics and Politics
Fall 2011
Tu, Th 9:35a.m.–10:50p.m.
Corcoran Hall (725 21st Street), Room 101

Professor
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Th 3:00–4:15p.m.

Textbook

Syllabus
Part on Voting
Chapter 1. Two Candidates
Chapter 2. Social Choice Functions
Chapter 3. Criteria for Social Choice
Chapter 4. Which Methods are Good?
Chapter 5. Arrow’s Theorem

Part on Electoral College
Chapter 19. Weighted Voting
Chapter 20. Whose Advantage?
Part on Apportionment
Chapter 7. Hamilton’s Method
Chapter 8. Divisor Method
Chapter 9. Criteria and Impossibility
Chapter 12. History of Apportionment in the United States

Learning Outcomes
As a result of completing this course students should be able to:

1. Summarize various social choice functions, identify the voting criteria they satisfy and explain why;
2. Design and analyze examples illustrating Arrow’s Theorem that there is no perfect way to settle elections involving at least three candidates;
3. Summarize various apportionment methods, identify the apportionment criteria they satisfy and explain why;
4. Design and analyze examples illustrating the theorem of Balinski and Young that there is no perfect way of assigning a whole number of representatives to states according to their populations.

Grading
Final Exam (cumulative two-hour exam): 30%
The final exam will be scheduled by the University during the final exam period.
Midterm Exam, Thursday, October 27, 2011: 15%
Three Graded Take-Home Assignments: 15% (5% each)
You will get two weeks to work on each assignment. No late homework will be accepted. The solutions to homework problems are expected to be your own work.
Quiz #1, Thursday, September 15, 2011: 10%
Quiz #2, Thursday, October 6, 2011: 10%
Quiz #3, Thursday, November 10, 2010: 10%
Quiz #4, Thursday, December 1, 2011: 10%
For letter grades: 90% will be at least A-, 80% will be at least B-, 65% will be at least C-, and 50% will be at least D-.

Absence policy
If you must be away from class on a given day on which graded work is due, please contact the professor before class and explain the need for your absence. In such a situation, your absence can be excused, although there will not be any opportunities to make-up missed work. Work missed owing to excused absence will not count against a student’s grade. Still, students are responsible for learning the material that is covered, even if they cannot be in class.