

## Math 710: The Mathematics of Social Choice

Quantitative and Logical Reasoning GCR

In FUNG 222, MW 12:30 to 1:45

CRN: 36363

There is a fascinating, rich, and not-widely-known theory of social choice that illustrates the way mathematical reasoning addresses problems of the real world. The problem of apportionment is a familiar example from the political arena where a mathematical treatment is available and where a theorem is known that asserts the impossibility of solving the problem subject to certain axioms about avoiding paradoxes. Another such problem is that of deciding elections when voters submit a list of their preferences. Then there is the theory of voting power in block voting schemes like our electoral college. In addition, several areas of mathematics impinge on the theories about decision-making and social choice.

The recent election debacle and the newly-released census and apportionment numbers make these topics very timely. Students will devise their own axiom schemes to impose on the apportionment process and then develop a process that guarantees that these axioms are satisfied. Simulations during class would be used to test these schemes. In addition, students will meet with those involved in apportionment, elections, and redistricting policy.

The course is targeted toward students of the liberal arts and is an ideal choice for a student interested in majoring in political science. It satisfies part of the Quantitative and logical reasoning GCR.

**Dan Ullman** is Professor of Mathematics and current Chair of the Department of Mathematics. He has taught at GW for 16 years.