

Poli Sci 4638: Social Choice Theory

Washington University
Department of Political Science
Fall 2026
Mon/Wed 2:30–3:50pm
Class location: Seigle 301

Instructor: Keith E. Schnakenberg
Email: keschnak@wustl.edu
Web: <http://keith-schnakenberg.com/>
Office Hours: Thursday 2:30–3:50pm
Office: Seigle 241

This 3 credit hour course provides a rigorous introduction to the field of social choice theory, which studies how groups with diverse preferences make collective decisions. Specifically, we will study the mathematical and normative properties of *preference aggregation rules* which may include majority rule, unanimity rule, and many others. After successfully participating in this course, students should be able to do the following:

- Understand the concepts of preferences, utility, and rationality in the context of social scientific models, recognize the limitations and strengths of these concepts as they relate to reasoning about politics, and identify deviations from rationality
- Describe individual preferences and the properties of preferences using formal mathematical language
- Demonstrate a formal understanding of preference aggregation rules and choice rules, along with formal properties of these rules such as transitivity, strategy proofness, Pareto consistency, and so on.
- Work through elementary mathematical proofs in the context of social choice models.

The course, like the field of social choice theory, will make heavy use of mathematics and formal logic, though I will assume no prior mathematical knowledge.

Texts, Materials, and Supplies

Reading. There is no required textbook for this course. My lecture notes will serve as a text for the course. That said, I will draw very heavily from *Positive Political Theory I* and *Positive Political Theory II* by Austen-Smith and Banks. The electronic version of both books is available as a PDF from the library website (simply search for the titles). I recommend that you keep these handy. I will list the relevant chapter and sections next to each topic in the syllabus to enable you to follow along in that text.

Course Requirements & Grading

The main graded components of the course are two exams and regular “workshops” (explained below). The contribution of these components is as follows.

Final Grade Breakdown:

- Midterm 35% of final grade

- Final Exam 35% of final grade
- Workshops 30% of final grade

Late work will not be accepted, since solutions to problems will be discussed in class. Makeup exams will be offered if students reach out to schedule them well in advance of the exam or in case of illness or emergencies that arise on exam day.

Grading Scale:

93–100	A
90–92	A–
87–89	B+
83–86	B
80–82	B–
77–79	C+
73–76	C
70–72	C–
67–69	D+
63–66	D
60–62	D–
Below 60	F

Academic integrity. I place a high value on academic integrity and follow the school’s academic integrity policies. Examples of violations of academic integrity that are relevant to this course are unauthorized collaboration, presenting another person’s work as your own, and undisclosed use of artificial intelligence.

Assignments and Homework

Your grade is based on workshops and two in-class exams. These will provide chances to demonstrate your mastery of course objectives by creatively solving problems. The structure of the assignments and coursework is explained in more detail below.

Workshops. Most Wednesdays are workshops rather than lectures. Each workshop has three parts: a preparation assignment you complete before class and bring with you, the in-class work itself, and a worksheet you hand in at the end of the hour. Your workshop grade is 30 points for the preparation assignment, 50 points for the worksheet handed in at the end, and 20 points for participation.¹ Preparation is graded on whether you engaged with the problems in order to prepare for participation, not on whether you solved them; a serious account of where you got stuck earns full marks. Because two of the three parts happen in the room, workshops cannot be made up. Every workshop is equally weighted in your final grade.

Exams. The exams consist of a midterm and a final. The midterm will cover the material from the first half of the course. The final will cover material from the second half of the course, as opposed to a cumulative exam. The material in the exams will be similar to the workshops, though adjusted so that they can be completed in the context of a timed exam.

¹The measurement of participation depends on the details of the workshop. I will distribute a rubric in advance of each workshop.

Artificial intelligence usage. There is only one part of this course where you could plausibly use generative AI, and that is the workshop preparation assignments. Everything else happens in the classroom without a computer. You may use AI on the workshop preparation assignments though you must disclose it when you do. That said, you should use these tools sparingly and probably not at all, for the following reason: the purpose of the preparation assignments is to prepare you to engage in the in-class workshop by increasing your understanding and bringing to light what you do not understand. AI is terrible for this purpose. It cannot reveal which steps you understand or do not understand. It does not know! I do not think there is a good way to learn this material without struggling with it a little bit.

Attendance

I do not take attendance but as a practical matter you cannot do well in this class without good attendance. You will get a zero on any workshop for which you are not in attendance. Of course, reasonable accommodations will be made when you miss a workshop for a good reason.

Laptop policy

Laptops and tablets are allowed in class during lectures. However, it is not practical to type notes during lectures so you will need either a pen/pencil and paper or a tablet and stylus. During exams and workshops you must close your laptops.

Course Schedule

Section references are to Austen-Smith and Banks, Positive Political Theory I and II. They indicate where the material comes from and where you can read more; they are not assigned reading. The course is self-contained in the posted lecture notes.

Unit 0 Logic and proof basics

Aug 24 (M) Introduction to course and social choice theory; pre-test²

Aug 26 (W) Statements, connectives, and implication; converse, inverse, and contrapositive; necessary and sufficient conditions; quantifiers and their negations

Aug 31 (M) Definitions, lemmas, and theorems; direct proof, proof by contraposition, proof by contradiction, proof by cases; disproof by counterexample

Unit 1 Choice and preference

Sep 2 (W) WORKSHOP: proof practice; sets, binary relations, and their properties

Sep 7 (M) *Labor Day — no class*

²The pre-test is diagnostic, anonymous, and ungraded. The purpose is to help me plan the logic and proof lectures.

- Sep 9 (W)** Preference relations; completeness, transitivity, quasi-transitivity, and acyclicity; utility representation on finite sets *ASB I, §1.1, Def. 1.2*
- Sep 14 (M)** Maximal sets and the existence of best elements; acyclicity as the weakest rationality condition; money pumps. Voting rules and how they fail: plurality, runoff, Borda, approval, and pairwise majority *ASB I, Thm. 1.1*
- Sep 16 (W)** WORKSHOP: snack election with various voting rules

Unit 2 Preference aggregation and Arrow's theorem

- Sep 21 (M)** Preference profiles; aggregation rules and social welfare functions *ASB I, §2.1, Defs. 2.1–2.2*
- Sep 23 (W)** WORKSHOP: Condorcet's paradox
- Sep 28 (M)** Arrow's conditions: unrestricted domain, weak Pareto, independence of irrelevant alternatives, non-dictatorship *ASB I, §2.1, Def. 2.3*
- Sep 30 (W)** WORKSHOP: finding rules that violate each condition
- Oct 5 (M)** *Fall Break — no class*
- Oct 7 (W)** Arrow's theorem; semidecisive and decisive coalitions *ASB I, §2.1, Thm. 2.1, Defs. 2.4–2.5*
- Oct 12 (M)** Proof of Arrow's theorem, part I: field expansion *ASB I, Lem. 2.1*
- Oct 14 (W)** WORKSHOP: reconstructing the field expansion lemma
- Oct 19 (M)** Proof of Arrow's theorem, part II: completing the proof *ASB I, §2.1*
- Oct 21 (W)** WORKSHOP: rebuilding the whole proof; midterm review
- Oct 26 (M)** Arrow's theorem interpretation; weakening collective rationality; oligarchies and veto players *ASB I, §§2.3, 2.6*
- Oct 28 (W)** **Midterm Exam**

Unit 3 Simple rules and majority rule

- Nov 2 (M)** Simple rules, voting rules, and q -rules; May's theorem *ASB I, §§3.1, 3.5*
- Nov 4 (W)** WORKSHOP: dropping May's axioms one at a time; midterm returned

Unit 4 Restricting preferences

- Nov 9 (M)** Single-peaked preferences; Black's median voter theorem *ASB I, §§4.1–4.3, Thm. 4.4*
- Nov 11 (W)** WORKSHOP: which profiles are single-peaked, and where the median voter theorem stops

Unit 5 Strategy-proofness

- Nov 16 (M)** Collective choice functions; manipulation and strategy-proofness; the Gibbard–Satterthwaite theorem stated *ASB II, §2.1, Defs. 2.1–2.3, Thm. 2.1*
- Nov 18 (W)** WORKSHOP: two voters, three alternatives, thirty-six profiles *ASB II, Ex. 2.2*
- Nov 23 (M)** Review and consolidation
- Nov 25 (W)** *Thanksgiving Break — no class*
- Nov 30 (M)** Proof of Gibbard–Satterthwaite, part I: strategy-proofness implies unanimity *ASB II, Lem. 2.1*
- Dec 2 (W)** Proof of Gibbard–Satterthwaite, part II: building an Arrovian rule from a strategy-proof one. *ASB II, Lem. 2.2, §2.1*
- Dec 7 (M)** Arrow and Gibbard–Satterthwaite as the same theorem; strategy-proofness on single-peaked domains; I bring snacks from September 16 election, review *ASB II, §§2.3–2.4, Thms. 2.3–2.4*
- Dec 14** **Final Exam**

University-Wide Guidelines & Policies

Reporting Sexual Assault and Harassment

If a student discusses or discloses an instance of sexual assault, sex discrimination, sexual harassment, dating violence, domestic violence or stalking, or if a faculty member otherwise observes or becomes aware of such an allegation, the faculty member will keep the information as private as possible they are required to immediately report it to the Department Chair or Dean or directly to the Gender Equity and Title IX Compliance Office at (314) 935-3393 or titleix@wustl.edu. They will also offer available resources, including confidential support resources through the Relationship and Sexual Violence Prevention (RSVP) at 314-935-3445. Additionally, you can report incidents or complaints to the Office of Student Conduct and Community Standards or by contacting WUPD at (314) 935-5555 or your local law enforcement agency. See: Gender Equity and Title IX Compliance Office.

Disability Resources (DR)

WashU supports the right of all enrolled students to an equitable educational opportunity and strives to create an inclusive learning environment. In the event the physical or online environment results in barriers to the inclusion of a student due to a disability, they should notify the instructor as soon as possible.

Disabled students requiring adjustments to equitably complete expectations in this course should contact WashU’s Disability Resources (DR) and engage in a process for determining and commu-

nicating reasonable accommodations. Because accommodations are not applied retroactively, DR recommends initiating requests prior to, or at the beginning of, the academic term to avoid delays in accessing accommodations once classes begin. Once established, responsibility for disability-related accommodations and access is shared by Disability Resources, faculty, and the student.

Disability Resources: www.disability.wustl.edu; 314-935-5970.

Statement on Military Service Leave

WashU recognizes that students serving in the U.S. Armed Forces and their family members may encounter situations where military service forces them to withdraw from a course of study, sometimes with little notice. Students may contact the Office of Military and Veteran Services at (314) 935-2609 or veterans@wustl.edu and their academic dean for guidance and assistance. See: [Policy for Military Students](#).

Preferred Name and Personal Pronouns

WashU recognizes that many students prefer to use names other than their legal ones to identify themselves. In addition, in order to affirm each person's gender identity and lived experiences, it is important that we ask and check in with others about pronouns. This simple effort can make a profound difference in a person's experience of safety, respect, and support. See: [Pronouns Information and Preferred Name](#).

Emergency Preparedness

Before an emergency, familiarize yourself with the building(s) that you frequent. Know the layout, including exit locations, stairwells and the Emergency Assembly Point (EAP). Review the "Quick Guide for Emergencies" that is found near the door in many classrooms and main lobby areas of buildings for specific emergency information and instructions. For additional Information and EAP maps, visit <https://emergency.wustl.edu>. To ensure that you receive emergency notifications, make sure your information and cell phone number is updated in SIS, and/or download the WashU Safe app and enable notifications.

To report an emergency:

- Danforth Campus: (314) 935-5555
- School of Medicine Campus: (314) 362-4357
- North/West/South and Off Campus: 911 then (314) 935-5555

Academic Integrity

Effective learning, teaching and research all depend upon the ability of members of the academic community to trust one another and to trust the integrity of work that is submitted for academic credit or conducted in the wider arena of scholarly research. Such an atmosphere of mutual trust

fosters the free exchange of ideas and enables all members of the community to achieve their highest potential.

In all academic work, the ideas and contributions of others (including generative artificial intelligence) must be appropriately acknowledged and work that is presented as original must be, in fact, original. Faculty, students and administrative staff all share the responsibility of ensuring the honesty and fairness of the intellectual environment at WashU.

For additional details on the university-wide Undergraduate Academic Integrity policy, please see: [Undergraduate Student Academic Integrity Policy](#).

Academic integrity is a serious offense that may lead to warning, probation, suspension, or expulsion from the University. All instances of academic integrity allegations will be reported to Academic Integrity in the Office of the Provost, who will hold an initial meeting and then determine next steps with the student. For more information on the academic integrity policy, procedures, frequently asked questions, and who to contact, visit Academic Integrity in the Office of the Provost. The academic integrity policy, process, and information listed there applies to undergraduate students enrolled in all Schools and programs and master's level students in the McKelvey School of Engineering, the Sam Fox School of Design and Visual Arts, and the School of Continuing and Professional Studies. For all other programs, please see the Contacts page.

In all cases of academic integrity violations, the instructor shall make an academic judgment about the student's grade on that work and in that course and this academic judgment shall not be considered a sanction for prohibited conduct under this policy.

Resources for Students

Confidential Resources for Incidents of Sexual Assault, Sex Discrimination, Sexual Harassment, Dating Violence, Domestic Violence, or Stalking

WashU is committed to offering reasonable academic supportive measures (e.g. a no-contact order, course changes) to students who are victims of relationship or sexual violence, regardless of whether they seek a formal investigation or criminal charges. If a student needs to explore options for medical care, other services, or reporting, or would like to receive individual counseling services, there are free, confidential support resources and professional counseling services available through the Relationship and Sexual Violence Prevention (RSVP) Center. If you need to request such support, please contact RSVP to schedule an appointment with a confidential and licensed counselor. Although information shared with counselors is confidential, requests for supportive measures will be coordinated with the appropriate University administrators and faculty. The RSVP Center is located in Seigle Hall, Suite 435, and can be reached at rsvpcenter@wustl.edu or (314) 935-3445. For after-hours emergency response services, call the Sexual Assault and Rape Anonymous Helpline (SARAH) at (314) 935-8080 during the academic year, or (314) 935-5555 and ask to speak with an RSVP Center Counselor on call. See: RSVP Center.

Bias Reporting and Support System (BRSS)

WashU has a non-punitive process through which students, faculty, staff, and community members who have experienced or witnessed incidents of bias, prejudice, or discrimination against a student

can report their experiences to the University's Bias Report and Support System (BRSS) team.

Center for Career Engagement (CCE)

The Center for Career Engagement provides one-on-one coaching, resources, programs and events to support the lifelong career success of all students and alumni. In addition to having your resume reviewed or fine-tuning your interviewing skills, the CCE invites you to work with us as partners at every stage of your career development as you reflect, learn and experiment. Our Certified Career Management Coaches will listen, ask questions, and provide resources to help you understand yourself, envision possibilities, prepare, search and apply, and engage in your career development.

You can select a career coach based on availability and alignment with one of our industry-aligned career communities or you can choose a career coach in the Career Exploration community.

To make an in-person or virtual appointment:

- Log in to Handshake
- Click Career Center (left side tool bar)
- Click Appointments.

The CCE is conveniently located in the Danforth University Center, Suite 110 with several additional office spaces across campus in Knight Hall 210, Bauer Hall 250, Steinberg Hall and Brown Hall.

Counseling and Psychological Services

The Center for Counseling and Psychological Services' professional staff members work with students to resolve personal and interpersonal difficulties, many of which can affect a student's academic experience. These include conflicts with or worry about friends or family, concerns about eating or drinking patterns, and feelings of anxiety, depression, and thoughts of suicide. Individual, Conjoint, and Group therapy are all provided in addition to referrals for off-campus support. Information can be found on the CCPS webpage.

The Division of Student Affairs also offers a telehealth program to students called TimelyCare. While students are encouraged to visit CCPS during business hours, this additional service also provides after-hours access to medical care and 24/7 access to mental telehealth care across the United States, with no cost at the time of the visit. 12 counseling visits are provided at no charge as well as a limited number of psychiatry appointments. Students who pay the Health and Wellness fee are eligible for this service.

Additionally, see the mental health services offered through the RSVP Center.

WashU Cares

WashU Cares specializes providing referrals and resources, both on, and off campus for mental health, medical health, financial and academic resources by using supportive case management.

WashU Cares also receives reports on students who may need help connecting to resources or whom a campus partner is concerned about. If you are concerned about a student or yourself, you can file a report here: <https://carestream.washu.edu>.

The Writing Center

The Writing Center offers free writing support to all WashU undergraduate and graduate students. Staff members will work with students on any kind of writing project, including essays, writing assignments, personal statements, theses, and dissertations. They can help at any stage of the process, including brainstorming, developing and clarifying an argument, organizing evidence, or improving style. Instead of simply editing or proofreading papers, the tutors will ask questions and have a conversation with the writer about their ideas and reasoning, allowing for a higher order revision of the work. They will also spend some time looking at sentence level patterns to teach students to edit their own work.

The Center is located in Mallinckrodt, and appointments are available days and evenings Sunday through Friday. Office staff hours are Monday through Friday 10:00am to 4:00pm. Students are seen primarily by appointment, with walk-ins accepted as the schedule allows. They also have dedicated walk-in hours for undergraduates on Tuesday and Wednesday afternoons. Both in-person and online appointments are available. To make an appointment, go to writingcenter.wustl.edu. Email: writing@wustl.edu.

The Learning Center

The Learning Center provides peer-led support programs, including course-specific mentoring and academic skills coaching (study and test-taking strategies, time management, etc.), that enhance undergraduate students' academic progress. Contact them at learningcenter@wustl.edu or visit ctl.wustl.edu/learningcenter to find out what support they may offer for your classes.

Center for Diversity and Inclusion (CDI)

The Center for Diversity and Inclusion (CDI) supports and advocates for all undergraduate, graduate, and professional school students. We foster belonging for all! Visit our website for more information and resources. The CDI consists of the following offices and is physically located in the Danforth University Center (DUC) Suite 150 and the Women's Building Room 102.

- Cross-Cultural Connections (CCxN) – DUC 150
- Office for International Student Engagement (OISE) – Women's Building 102
- Office for Religious, Spiritual and Ethical Life (ORSEL) – DUC 150
- Spectrum Office (LGBTQIA+ Support) – DUC 150

The Dialogue Across Difference (DxD) program at WashU prepares students to engage in dialogue across perspectives. Students use dialogue to understand each other and see differences as learning

opportunities. DxD offers 1 credit 8-week dialogue courses for undergraduate students and workshops and programs open to all graduate, undergraduate, and professional students. Visit us in DUC 340 or our website to learn more about DxD.