Math 036 – Insights into Mathematics

Syllabus for Fall 2019 University Park residential section.

Contact Information:

**Instructor:** Dr. Andrew Baxter  (Associate Teaching Professor, Math Dept)
**Office:** McAllister Building, Office 6  (Lowest floor. Same floor as Post Office.)
**Office Hours:** Office hours are set aside for visits from students.  I like getting visitors.
   Mondays 2:15 - 3:15pm.  Wednesdays 9 - 10am.  Fridays 1:15-2:15pm
   Additional times are available by appointment, including evening hours via Zoom.
**Email:** amb69@psu.edu or Canvas email.  I will attempt to reply to any message within 24 hours.  If you do not receive a reply within 48 hours, you are encouraged to send me another message.

Course Resources

**Textbook:** There is no required textbook for this course.  All course readings and homework will be posted in digital formats on Canvas.
**Calculator:** You will be allowed a non-programmable calculator, such as the TI-30X IIS.  Any basic 4-function calculator will suffice.  Check with the instructor if you are unsure.
**Website:** There will be a Canvas site for this course.  Announcements and relevant course material will be posted there, including handouts and other readings.  Some assignments will be submitted through Canvas.

Course Attributes and Objectives

**Prerequisite:** one unit of algebra or MATH 004
**General Education Objectives:** This course satisfies the General Education Learning Objectives for Critical and Analytical Thinking and Key Literacies.  It counts as 3 credits for Quantification (GQ) requirements.

**Learning Objectives:** A student who has successfully completed the course will have demonstrated the following.

1. Execute and explain a variety of voting systems and compare their relative merits and drawbacks.
2. Analyze a social choice function (i.e., voting system) according to a variety of fairness criteria (e.g. Pareto condition), as well as susceptibility to manipulation by dishonest voting.
3. Analyze a weighted voting scheme according to the relevant amounts of power each voter has.
4. Execute and explain a variety of fair division schemes and compare their relative merits and drawbacks.
5. Analyze a given fair division scheme for issues of envy, equitability, and pareto-optimality.
6. Execute and explain a variety of apportionment methods, and compare their relative merits and drawbacks.
7. Analyze a given apportionment method for its susceptibility to paradoxes and the quota condition.
8. Apply the above concepts to novel contexts in democracy, such as redistricting or candidate selection in political parties.

**Course Grades**

There will be 300 points possible for this course. These will be distributed in the following manner:

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tests (4)</td>
<td>50 each, for 200 total</td>
</tr>
<tr>
<td>Quizzes</td>
<td>50</td>
</tr>
<tr>
<td>Engagement</td>
<td>50</td>
</tr>
</tbody>
</table>

Tests will be given in class through the semester, with four tests total for the semester. The fourth test will be given during finals week, but will not be cumulative.

Each Quiz will be offered either in-class or through Canvas. These will be 10-20 minutes in length and will be related to homework problems, material discussed during previous lectures, and reading done in preparation for class. These quizzes will be announced beforehand via Canvas, usually two class periods in advance. Quizzes are intended to encourage you to keep up your preparation (and reward you for doing so). A missed in-class quiz may be made-up through a take-home assignment upon request.

Engagement will be based on participating in an array of opportunities, both in and out of class. Opportunities include student hour visits, minute papers, names-from-a-hat, and participating in online surveys and discussions. Points accrued in this way will be added to the Engagement score to a maximum of 50 points.

**Tests** will be given in class through the semester, with four tests total for the semester. Tests will be done during normal class time, although there may be some take-home component to be turned in the following class period. If you miss class on the day of the test, you may take a make-up test. It is expected that you email the instructor as soon as you know you will miss a test, preferably no later than 24 hours of the testing period.
Make-up tests are scheduled on a case-by-case basis, and should be taken within one week unless circumstances make this impossible.

**Quizzes** will be offered in both in-class and online formats. Each will be 10-20 minutes in length and will be related to homework problems, material discussed during previous lectures, and reading done in preparation for class. In-class quizzes will be announced beforehand via Canvas, usually two class periods in advance. Quizzes are intended to incentivize good study habits, and to provide opportunities to identify misunderstandings. If you must miss an in-class quiz, you may complete a take-home assignment to replace the score. Requests for replacement assignments must be made in person or by email no later than 24 hours after the quiz is administered.

**Engagement** will be based on participating in an array of opportunities, both in and out of class. Opportunities include office hour visits, minute papers, names-from-a-hat, and participating in surveys and discussions. Each opportunity will be worth 2½ points. Points accrued in this way will be added to the Engagement score, up to a maximum of 50 points.

I will record and post all grades on Canvas. It is the student's responsibility to check that their grades are recorded accurately.

Minimum cut offs for each grade listed below, based on a total of 300 points.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Minimum Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>279</td>
</tr>
<tr>
<td>A-</td>
<td>270</td>
</tr>
<tr>
<td>B</td>
<td>249</td>
</tr>
<tr>
<td>B-</td>
<td>240</td>
</tr>
<tr>
<td>C</td>
<td>210</td>
</tr>
<tr>
<td>C+</td>
<td>226</td>
</tr>
<tr>
<td>D</td>
<td>180</td>
</tr>
<tr>
<td>B+</td>
<td>261</td>
</tr>
<tr>
<td>C</td>
<td>226</td>
</tr>
<tr>
<td>D</td>
<td>180</td>
</tr>
<tr>
<td>F</td>
<td>0</td>
</tr>
</tbody>
</table>

**Miscellaneous Course Policies**

**Attendance:** You are expected to attend every lecture. It should be obvious that attending all classes is extremely beneficial to you. In addition to the near-daily checks. Seeing the material presented in a lecture is extremely helpful as well as having your questions answered in class, and hearing other students' questions. A great deal of in-class work will also take place, allowing you invaluable practice on skills directly related to this course. Finally, regular attendance keeps the material fresh in your mind and demonstrates good stewardship of your time and money.

**Decorum:** I expect you to treat me and your fellow students with respect. Breaches of decorum include texting during class, using a laptop during lecture to do things unrelated to class, sleeping during lecture, getting out of your seat frequently, and other disruptive or distracting behavior. I reserve the right to impose sanctions on those students committing egregious breaches of decorum, such as negating that day's Check.
Making up tests: If you miss a test with an official excuse (such as illness or official university business) then you may take a makeup exam without penalty if you notify me with your official excuse before the date and time of the exam. This notification may be performed in person or via email. If you miss an exam without an official excuse, then you may take the makeup exam but with an automatic 15-point deduction.

The following do not qualify as official excuses: personal business such as travel, employment, weddings, graduations, attending concerts, attending sporting events, Greek rush events, forgetting the date of the exam.

Academic Integrity: Academic integrity is the pursuit of scholarly activity in an open, honest, and responsible manner. Academic integrity is a basic guiding principle for all academic activity at The Pennsylvania State University, and all members of the University community are expected to act in accordance with this principle. Consistent with this expectation, the University's Code of Conduct states that all students should act with personal integrity, respect other students' dignity, rights, and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts.

Academic integrity includes a commitment not to engage in or tolerate acts of falsification, misrepresentation, or deception. Such acts of dishonesty violate the fundamental ethical principles of the University community and compromise the worth of work completed by others.

Based on the University's Faculty Senate Policy 49-20 (available online at https://senate.psu.edu/policies-and-rules-for-undergraduate-students/47-00-48-00-and-49-00-grades/#49-20), a range of academic sanctions may be taken against a student who engages in academic dishonesty.

Learning Disabilities: Penn State welcomes students with disabilities into the University's educational programs. Every Penn State campus has an office for students with disabilities. The Student Disability Resources website provides contact information and more: http://equity.psu.edu/student-disability-resources/.

In order to receive consideration for reasonable accommodations, you must contact the appropriate disability services office at the campus where you are currently enrolled, participate in an intake interview, and provide documentation. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with an accommodation letter. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. You must follow this process for every semester that you request accommodations.