Controversy, Paradox, Perplexity and the Idea of the Infinite

We encounter the infinite everywhere in our everyday speech: the infinitely large, the infinitely small, infinitely long duration in time, infinitely powerful, infinitely wise. But what, really, does it mean to be infinite? Is any actually existing thing really infinite? This course will explore the role that the notion of the infinite plays in such diverse disciplines as philosophy, theology, mathematics, logic, physics, and computer science. We will examine both the different kinds of problems that arise in the distinct contexts of these disciplines, and how these diverse disciplines have affected and influenced each other with respect to the concept of infinity. The course will be both historical and topical, as we examine how the concept of “infinite” was transformed from originally meaning “indefinite”, or lacking definition, and thus as entailing imperfection, into a concept that entailed transcendent super-excellent perfection; how Aristotle’s distinction between potential and actual infinity led to the solution of a number of problems concerning time, space, and motion; how the development of the notion of the infinitesimal in the 17th century led directly to the discovery of the calculus by Newton and Leibniz; and how Georg Cantor’s controversial claim that infinite sets come in different sizes was initially more welcomed by theologians than by other mathematicians.

Textbooks:

- Tobias Dantzig, Number: The Language of Science (Plume, 2007)
- Aristotle, Physics, Books III and IV (Oxford Clarendon, 1983)
- Carl B. Boyer, The History of the Calculus and Its Conceptual Development (Dover, 1959)
- Richard Sorabji, Time, Creation and the Continuum (University Of Chicago Press, 2006)
- Mary Tiles, The Philosophy of Set Theory: An Historical Introduction to Cantor's Paradise (Dover, 2004)

Additional reading materials will be available on e-reserve.

Requirements:

Active participation in our classroom discussion, informed by a knowledge of the assigned readings, is expected and required.

In addition, students will be required to write:
• 4 position papers: These will be based on the readings to be examined in each class session. Students may choose whichever reading they wish to respond to. However, two are due before midterms and two after (but before the end of the semester). These are short typed written papers (2 pages) in which the student responds to, takes issue with, or argues why they do or do not support the position or argument of the author being discussed. These will be read in class.

• 1 short essay (5-8 pages, or 1500-2000 words in length) due before midterms

• 1 substantial, research-oriented term paper, 15-20 pages (5000-8000 words) in length due at the end of the semester. A preliminary term paper project proposal is due at least three weeks before the term paper itself is due. Students are invited and encouraged to discuss their term paper ideas with their instructors.

Grades

Grades are a pedagogical tool used to motivate students to apply consistent and sincere effort throughout the course. The course grade is meant to reflect the student’s level of mastery of the material, as appropriate for the level of the course, at the end of the semester. While this is an inexact science, the following guidelines will be used:

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Percentage of Course Grade</th>
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<tr>
<td>Position papers:</td>
<td>30% of the course grade collectively</td>
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<tr>
<td>Midterm Essay:</td>
<td>20% of course grade</td>
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<tr>
<td>Term paper:</td>
<td>50% of course grade</td>
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We will not allow for a course grade of “Incomplete”. A letter grade (A-F) will be submitted for each student based upon the work that has been turned in by the end of the semester. No exceptions. If you find that you are having difficulty getting work done, then you need to speak with me early in the semester in order that we might arrange for the appropriate remedial measures.

Attendance Policy

The College’s Attendance Policy will be strictly enforced. Two unexcused absences will result in a “Max-Cut” warning; additional absences will result in suspension from the course. Student should be advised that the BA Seminar is a graduation requirement. Suspension from the course due to attendance deficiency will therefore adversely affect one’s prospects for timely graduation.

Academic Honesty:

The College’s Policy on Academic Honesty will be vigorously enforced. Please consult your Student Handbook for details. Any and all instances of academic dishonesty, especially plagiarism and including downloading essays or articles or portions thereof from the internet, will be immediately reported to the Dean of Academic Affairs for disciplinary action. Paying, or otherwise having, others to compose, complete, revise, or polish papers for you and turning them in as your own work is fraudulent, and will be treated as a violation of the College’s policy on Academic Honesty. The only permissible exception to this is if you work with either (i) student tutors or (ii) the adult tutors employed by the College at the Win Commons. The penalties for Academic Dishonesty range from a grade of ‘F’ for the course to suspension and even expulsion from the College.
**Computer Use in the Classroom**

Although computers with access to the internet can be useful for acquiring facts that can helpfully inform our discussions, computers with access to the internet are too often a distraction, which both diminishes the quality of our discussion and makes it difficult for me to assess and evaluate students’ understanding the material being discussed.

Therefore all computer use in the classroom is strictly prohibited, with the following exceptions:

1. On occasion, the instructor may deem it useful to check some matter of fact upon which our discussion depends. The instructor will then invite students who have their computers to do a quick search online to see if the relevant information is available. After the relevant material has been acquired and reported, the computers will then be put away.

2. I recognize that some students might have a learning or physical disability that prevents them from taking notes in the conventional manner (pen and paper) and that a laptop computer facilitates their capacity to take notes. Computer use in such circumstance is permitted, but if and only if such learning or physical disability is documented and reported to Sue Lyon, the Associate Dean of Academic Affairs, who will then inform me of the student’s documented need to make use of this tool for notetaking. Computer use in the classroom will remain prohibited for this purpose unless and until this requirement is fulfilled.

Apart from these two exceptions, computers will otherwise be closed, off the table, and otherwise not accessed by students during our class meetings.