This basic idea of this course is to simultaneously address two things it’s worthwhile for philosophy students to know about.

1. Roughly, a **paradox** is an argument from premises that seem clearly correct, via inferences that seem clearly valid, to a conclusion that seems clearly unacceptable. Paradoxes of various sorts have been an important driver of philosophical (and mathematical and scientific) innovation since the earliest days of systematic human thought. Many ancient paradoxes are well-known under that description, for instance Zeno’s paradox, the liar’s paradox, the sorites paradox (aka the paradox of the heap). Kant famously considers some “antinomies of pure reason” that are perhaps less commonly described as paradoxes, including the infinitude of space, the problem of free will and the existence of god. Other examples include Meno’s paradox, the problem of evil and the paradoxes of omnipotence.

In the last 150 years, paradoxes have proliferated in philosophy and science. Consider this very partial list. The discovery of Russell’s paradox (and Cantor’s paradox, the Buralli-Forti paradox, and others) precipitated a crisis in the foundations of mathematics in the early 20th Century, by showing that supposedly self-evident principles were actually self-contradictory, and so presumably as false as it’s possible to be. Other mathematical paradoxes (e.g., the Banach-Tarski paradox and Skolem’s paradox) call for reconsideration of what were taken to be clear and well-understood notions. The liar’s paradox returned to centre stage with the development of formal theories of meaning. Thanks to developments in physics, Schrödinger’s cat became the most discussed pet in undergraduate philosophy courses, while the Einstein-Rosen-Podulski paradox occupied many graduate seminars. Decision theory includes venerable paradoxes like the St. Petersburg paradox and Condorcet’s paradox (aka the voter’s paradox), and 20th Century discoveries such as Allais’ paradox, Newcombe’s paradox, and Arrow’s theorem. Philosophers have devoted considerable attention to the paradox of analysis, the surprise exam paradox, Moore’s paradox, the knowability paradox, and many more.

2. There are many discussions in the contemporary philosophical literature---in epistemology, ethics, philosophy of language, metaphysics, philosophy of mathematics,
and others---in which it is simply presumed that readers will be familiar with the workings some-or-other non-standard logic. Consequently even many professional philosophers are left standing on the sidelines, unable to take part in some of the most interesting discussions in important areas of philosophy. Worse, some try to take part without knowing what they’re talking about, and look silly when they do.

We will bring these two strands together by considering one sort of response that has been offered by various philosophers to various paradoxes, namely those that suggest that the lesson of the paradox is that we were wrong about logic. That is, most of the debates we will look at involve authors suggesting that we are wrong in our understanding of what constitutes correct reasoning---they are, we might say, revisionist about logic. We will study a small number of philosophically significant paradoxes where such revisionist approaches have been advanced. The lessons learned here, though, will be useful for considering approaches to paradox, and more generally for approaching any interesting philosophical problem, in other areas of philosophy.

The class will include students with a variety of different backgrounds, both in terms of familiarity with formal logic and exposure to the philosophical considerations relevant to the debates we will consider. We will therefore devote some effort to making sure that people have a chance to fill in background as we go along. We will presuppose that students have taken a first course in formal logic (e.g., Philosophy 240, Pure Math 330, Computer Science 245), and so are familiar with the basics of classical propositional logic and have at least some familiarity with predicate logic.

Goals:
As befits a course with a two-strand motivation, the course has a two part primary goal. The goal is to enable students to develop the skills and knowledge they need to take part in philosophical disputes that require both philosophical background and technical knowledge and facility. The course will therefore acquaint students with some key readings in areas of active philosophical dispute and to practice their philosophical skills, but will also acquaint them with some philosophically important non-standard logics and provide them with some of the technical skills and background needed to effectively take part in discussions in which these logics feature.

This larger goal subsumes some more basic goals:

- Good work in areas of philosophy like the ones we consider is technically well informed, but does not hide an absence of ideas behind technical machinery. The course will provide opportunities for students to develop a sense for how to use technical tools when, but only when, they are needed.
- Professional philosophers must be able to work effectively both orally and in writing. The class will provide an opportunity for students to develop skills of both sorts.
- The philosophical discussions we will consider often involve comparisons between different logical systems. The systems most students learn in a first course in logic are
specially designed for classical logic. Students will be introduced to some tools for comparing logical systems.

- We will investigate, from both semantic and proof theoretic points of view, the philosophically salient features of some important non-classical logical systems.
- We will discuss the philosophical motivations and applications of each system.

Achieving these goals will also provide collateral benefits. Two key benefits are: (1) The technical tools we will be working with are useful in many other applications, and (2) Mastering this material will involve improving your ability to give rigorous, cogent arguments. The benefits if you go on in philosophy are enormous. But the ability to think and argue clearly is a skill that helps you in any field where clear thinking is an asset.

Outcomes:
By the end of the course, students should be able to:

- Identify a number of different accounts of the nature of paradox and what is involved in the resolution of a paradox, and rationally defend a particular account.
- Clearly articulate the paradoxes investigated in the course and the relationships between the various proposed resolutions to those paradoxes considered in the course.
- Demonstrate the skills involved in effective presentation of philosophical arguments, both orally and in writing.
- Prove things using and about various non-classical logics.
- Effectively and appropriately apply the tools of formal logic in philosophical argumentation.

Class Format:
The formal materials will require more lecturing than is common in many upper year or graduate philosophy courses. This will especially be the case in the first few weeks of the term as some “logical preliminaries” are covered. However, even here we will endeavor to make things as interactive as possible.

Students will be expected to have done at least a preliminary reading of the materials in advance of class, and to come with some questions or some thoughts that can be shared in the discussions—and everyone will be expected to do her/his part to make sure that discussions are productive and respectful of everyone’s contribution.

For most sessions, there will be one or two students doing a short presentation related to the readings for that week. Part of the student’s assignment is to “lead the discussion” for a while after the presentation. This will be easier to do, of course, if other students show up ready to take part in the discussion.
Readings and Schedule:
The readings listed here are either available using the “Get it at Waterloo” facility on the UWaterloo Library's web site, or refer to notes that will be posted on the courses Learn page. Additional “course notes” will be added to the Learn page as the term progresses, often to clarify technical issues discussed but not made sufficiently clear in the readings.

Week 1 (January 9) Introduction to the course. No readings.

Week 2 (January 16) Logical Preliminaries, part 1: Some review, maybe something new. [Send your presentation preferences via the Learn page!]
Readings: Course notes 1.

Week 3 (January 23) Logical Preliminaries, part 2: Steps into new terrain; What is a paradox? Readings:
- Course notes 2.

Week 4 (January 30) Vagueness and Sorites, part 1. Readings:
- Peter Unger, “There are no Ordinary Things,” Synthese 41 (1979) 117-54.

Week 5 (February 6) Vagueness and Sorites, part 2. Readings:

Week 6 (February 13) First half: Test 1. (90 minutes). Second half: Paraconsistency and Dialetheism in formal Logics.
Readings: Course notes.

Week 7: (February 27) Vagueness and Sorites, part 3. Readings:
Week 8 (March 6) The Knowability Paradox, part 1. Readings:

Week 9 (March 13) The Knowability Paradox, part 2. Readings:

Week 10 (March 20) Liars, Weak and Strong. [Term paper topic proposal due] Readings:

Week 11: (March 27) First half: Test 2 (90 minutes). Second half: Is paraconsistency crazy? Readings:

Week 12: (April 3)
  - J.C. Beall, “Free of Attachments,” forthcoming in *Nous*. (If not yet in print by the time of the class, a recent version can be downloaded from Beall’s website *entailments.net*.
  - J.C. Beall, “Shrieking Against Gluts: the solution to the ‘just true’ problem,” forthcoming in *Analysis*. (Similarly, available on Beall’s web site if not in print by April.)

April 10: UG term papers due

April 17: Grad term papers due

Prerequisites:
(a) Logical: A first course in formal logic, such as Philosophy 240 or Pure Math 330. Some material covered will, of course, be formal, but will not presuppose familiarity with high-level
mathematics of any sort. Because of the diverse, and usually Arts-based, backgrounds of most students, we will often work from the ground up (though we will try to move briskly). Students with an extensive logical background may find some of this slow going.

(b) Philosophical: We will assume that students have taken some philosophy courses, and so have some familiarity with the mechanics of producing good philosophy papers and with some of the basic ideas fundamental to the discipline.

Students in the course by special permission who do not have these prerequisites can still succeed, but are responsible for ensuring that the gaps in their backgrounds are filled in as necessary. Talk to the prof for ideas about how to do so.

**Evaluation:**

The class includes both graduate and undergraduate students. The requirements for the two categories of students are similar, but the graduate students will be required to produce a more substantial (“conference style”) paper at the end of the term. There will be two tests (in class). These will be designed to measure students’ progress towards the more informational of the intended outcomes for the course---have you mastered the key concepts? Do you understand the logical tools we are using, and the differences between the logical systems? Each student will also do a brief in-class presentation of an argument of her/his own, and will write a term paper.

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<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>In class tests</td>
<td>40%</td>
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<tr>
<td>Presentation (see description on Learn)</td>
<td>20%</td>
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<tr>
<td>Term paper (5-6 pages for Undergrads, 10-12 for Grads)</td>
<td>40%</td>
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**Collaboration:**

When it comes to philosophical work, formal or otherwise, it often is helpful to discuss particular questions with peers. I want to encourage you to discuss the material in the course, and to learn from one another. However, evaluation is an individual business in this class .... the rule is that it’s fine to work together on exercises, when studying for exams, when discussing the readings for the course, and so on. And, of course, the most important collaboration you can do is to do the readings each week and participate in the class discussions.

**But for any material that you are presenting or handing in for evaluation students are expected to work independently.** Handing the work in for evaluation shall be understood as involving the claim that it is something you have worked out yourself, and that you have not relied on somebody else for the ideas, to proofread your work, or in some other way to improve it for you.
Late Policies:
There are two deadlines in this course: one for the paper proposal, the other for the term paper. Deadlines are deadlines, so meet them. Late work will be penalized at a rate of 10% for each day late for the final paper, and 5% of the mark on the final paper for each day the paper proposal is late. Extensions are possible in the case of legitimate excuses that could not reasonably have been anticipated and worked around---sudden illness, bereavement, and so on.

Extensions must be arranged with the instructor as soon as it becomes clear to the student that a piece of work will be late and the excuse is legitimate. Similarly, if you will be absent on the day of a test or when you are scheduled to do a presentation, get in touch with me as soon as you can, preferably in advance. In all cases, including serious illness, appropriate documentation establishing the truth of the excuse is required---the reason for this rule is simply to remove the need for me to make judgements about whether I believe a particular student or not, and so risk unfairly demanding proof from some students but not others. For illness, normally a doctor’s note or similar documentation is required (and not, as one student once produced for me, a letter from your mom).

The Faculty of Arts requires that the information below appear on all course outlines. Please be sure you are familiar with it.

Cross-listed course: Please note that a cross-listed course will count in all respective averages no matter under which rubric it has been taken. For example, a PHIL/PSCI cross-list will count in a Philosophy major average, even if the course was taken under the Political Science rubric.

Academic Integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo are expected to promote honesty, trust, fairness, respect and responsibility.

Discipline: A student is expected to know what constitutes academic integrity, to avoid committing academic offences, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about “rules” for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offenses and types of penalties, students should refer to Policy 71 - Student Discipline, https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-71

Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70 - Student Petitions and Grievances, Section 4, https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-70
**Appeals:** A student may appeal the finding and/or penalty in a decision made under Policy 70 - Student Petitions and Grievances (other than regarding a petition) or Policy 71 - Student Discipline if a ground for an appeal can be established. Read Policy 72 - Student Appeals, [https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-72](https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-72)

**Academic Integrity website (Arts):** [http://arts.uwaterloo.ca/arts/ugrad/academic_responsibility.html](http://arts.uwaterloo.ca/arts/ugrad/academic_responsibility.html)

**Academic Integrity Office (UW):** [http://uwaterloo.ca/academicintegrity/](http://uwaterloo.ca/academicintegrity/)

**Accommodation for Students with Disabilities:** Note for students with disabilities: [AccessAbility Services](http://uwaterloo.ca/accessability), located in Needles Hall, Room 1132, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the AccessAbility at the beginning of each academic term.