



UNIVERSITY OF CALGARY
FACULTY OF ARTS
Department of Philosophy

PHIL 567.7 Lec 01

Advanced Topics in Philosophy of Science: Philosophy of Mathematics

Winter Term 2020

**T 17:00–19:45, Social Sciences 1253
online only as of March 16, 2020**

Course Outline

Instructor: [Richard Zach](#) (he/him)
Email: rzach@ucalgary.ca
Office: Social Sciences 1230
Office Hours: on Zoom by appointment
Phone: (403) 220–3170

During the COVID-19 outbreak, email and D2L will be the preferred communication channel. Papers will be submitted on D2L. Please screenshot the D2L submitted field or sent email when submitting work electronically in case of systems issues.

Please keep the following in mind:

1. Please ensure that “Phil 567” or some other clearly identifying term occurs in the subject line. Otherwise there is a strong possibility that your message will be deleted unread as spam.
2. If you email to make an appointment please indicate the times when you are available.
3. Please make sure your first and last names are clearly included in the body of any email message.
4. We will not respond to email after 7pm or on weekends.

If you do not have access to email an need to get in touch, call 403) 220–3170, leave a message with your phone number, and I will call you back.

Course information

The philosophy of mathematics deals with, as its name suggests, philosophical issues that are raised by mathematics. Perhaps the most important difference between mathematics and the other sciences is that mathematics deals with entirely abstract concepts (such as number, set, function). Mathematicians do not conduct experiments to confirm their hypotheses, they find proofs. One important issue then, for instance, is clarifying the role of proofs in mathematics, and with it, the nature of mathematical knowledge. Another issue is the question of the status of mathematical objects—do they inhabit some Platonic realm of mathematical objects, are they constructions of the mind, or are there perhaps, strictly speaking, no mathematical objects, are they fictitious? In the course of discussing these issues, we will first focus on three important schools of thought: logicism, intuitionism, and formalism. These schools are associated with, respectively, Gottlob Frege and Bertrand Russell, Immanuel Kant and L. E. J. Brouwer, and with David Hilbert. In the second half of the course, we will study some of the more recent developments in the philosophy of mathematics (after 1950). This includes the debate about the metaphysics of mathematical objects, in particular, whether there are any (realism) or not (nominalism), and the status of mathematical truths; structuralism in mathematics; mathematical explanation; empiricist and naturalist approaches to mathematics; philosophy of computation.

Prerequisites

Two previous courses in Philosophy, one of which must be PHIL 201, PHIL 395, PHIL 421, PHIL 423, PHIL 461, PHIL 463, PHIL 467, PHIL 481 or PHIL 483 and one of which must be a 400 or higher level course; or consent of the Department. Due to the nature of the course, I will be very open to waiving prerequisites, especially if you have advanced training in logic (such as PHIL 379 or 479) or in mathematics. Please email rzach@ucalgary.ca if you would like to take the course but do not have the listed prerequisites.

Although Phil 279 (Logic I) and 379 (Logic II) are not formally prerequisites, you will have a hard time in this course if you have not at least taken Logic I. Obtaining a background in logic (at least Phil 279, preferably 379) is therefore highly recommended.

Course objectives

By the end of the course, you should be able to ...

1. present and critically assess major positions and views in the philosophy

- of mathematics in written and oral form.
2. clearly formulate clarificatory questions and objections to written presentations of philosophical positions.
 3. formulate responses to objections and adjudicate between different philosophical views.
 4. make use of online and library resources to find literature relevant to the course material.
 5. take constructive feedback on written work presented in a public setting.

Required readings

Readings will be made available electronically via D2L.

Course website

The course has a [D2L/Brightspace](#) site. You will find course readings, assignments, grades, and a discussion board there. Any updates, including revisions to office hours, course schedule, and deadlines, will be posted there. **To make sure you don't miss a deadline or an important update, please review your [notification settings](#).**

Assessment Components

There will be no registrar-scheduled final exam.

- **Reading and class engagement (40%). You have to show in-depth engagement with five of the weekly topics. This can be done by submitting a pre-class short writing assignment of 250 words (before March 13), or by earning 5 upvotes on posts and replies in a topic discussion forum.**
- A research paper (2500–4000 words max). It is worth 60% of your final grade (20% for the draft, 40% for the final paper).

The draft research paper will be due on **Wednesday, April 8**. The final paper will be due on the last day of exams, i.e., **April 29**.

The aim of the short writing assignments is to get you engaged with the readings before they are discussed in class. A short writing assignment consists in a one-page writeup of something you think of while you do the reading. It can be a question together with an attempted answer, a worry, a short note on a connection between the reading for that week and some other topic (from this or another class). Ideally, it would be something that can form the basis of a discussion in class.

After March 13, you may submit such writing assignments as posts on the D2L course material discussion board, but there is no deadline and assessment will be determined by upvotes on this and other posts and replies by you on the topic.

Evaluation

Your final paper will receive a letter grade reflecting the level of mastery of the material shown by the work you submit. The meanings of letter grades are defined in the *Calendar*, for written work, they amount roughly to the following criteria:

- A** Excellent—superior performance, showing comprehensive understanding of subject matter. (Your writing is clear and concise; your assignments make obvious that your understanding of the issues and arguments is correct and complete; you show superior ability in representing and assessing others’ philosophical arguments; you show significant ability for original philosophical thinking).
- B** Good—clearly above average performance with knowledge of subject matter generally complete. (You show a good grasp of the assigned reading; but either your writing is not perfectly clear or your assignments are largely only expository and don’t show the critical ability required for an A).
- C** Satisfactory—basic understanding of the subject matter. (Your work shows that you’ve worked through the reading and attended class, but your assignments misrepresent the arguments we’re discussing, or your criticisms are off the mark.)
- D** Minimal pass—marginal performance. (Your work is unclear or confused; or you grossly misrepresent the arguments we’re discussing.)
- F** Fail—Unsatisfactory performance. (Your work fails to show that you’ve made a serious attempt at coming to grips with the material; or your writing borders on the incomprehensible.)

In computing your final grade, your marks will be converted to grade points and averaged according to the weights given above. The correspondence of letter grades with grade points is defined in the *Calendar* (A = 4, B = 3, C = 2, D = 1, F = 0). “Slash” grades are possible with grade point values 0.5

below the higher grade (e.g., A/B = 3.5). For short writing assignments and presentation, a “pass” will receive 4 grade points, a fail, 0.

The final grade will be the letter grade corresponding to the weighted average of your assignments, paper, presentation, and participation plus a margin of 0.1. For the final grade, +’s and –’s are possible, too; as defined in the *Calendar*, +/- adds/subtracts 0.3 grade points. In other words, a course average of 3.9 or higher receives an A; between 3.6 and 3.9, an A–; between 3.2 and 3.6, a B+; between 2.9 and 3.2, a B; and so on. There is no D– grade; to earn a D you require a course average of at least 0.9. The A+ grade is reserved for “truly outstanding” performance.

Course policies

Late policy. A final paper handed in late will be penalized by the equivalent of one grade point per calendar day. A short writing assignment handed in late will be penalized by one half grade point for every two hours (or part thereof) it is late (i.e., it will receive a 3.5 if handed in after 6pm but before 8pm, a 3.0 if handed in before 10pm, etc.).

Important departmental, faculty, and university information

Academic accommodations. It is the student’s responsibility to request academic accommodations according to the University policies and procedures. The student accommodation policy can be found at: ucalgary.ca/policies/files/policies/student-accommodation-policy.pdf

Students seeking an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities.pdf

Students needing an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to their instructor.

Absence or missed course assessments. Students who are absent from class assessments (tests, participation activities, or other assignments) should inform their instructors as soon as possible. Instructors may request that evidence in the form of documentation be provided. If the reason provided for the absence is acceptable, instructors may decide that any arrangements made can

take forms other than make-up tests or assignments. For example, the weight of a missed grade may be added to another assignment or test. For information on possible forms of documentation, including statutory declarations, please see: ucalgary.ca/pubs/calendar/current/m-1.html

Student support and resources. Full details and information about the following resources can be found at ucalgary.ca/registrar/registration/course-outlines

- Wellness and Mental Health Resources
- Student Success Centre
- Student Ombuds Office
- Student Union (SU) Information
- Graduate Students' Association (GSA) Information
- Emergency Evacuation/Assembly Points
- Safewalk

Academic Advising. If you are a student in the Faculty of Arts, you can speak to an academic advisor in the Arts Students' Centre about course planning, course selection, registration, program progression and more. Visit the Faculty of Arts website at arts.ucalgary.ca/advising for contact details and information regarding common academic concerns.

For questions specific to the philosophy program, please visit phil.ucalgary.ca. Further academic guidance is available by contacting David Dick (Undergraduate Program Director, dgdick@ucalgary.ca) or Jeremy Fantl (Honours Advisor, jfantl@ucalgary.ca). If you have questions regarding registration, please email Rebecca Lesser (Undergraduate Program Administrator, phildept@ucalgary.ca).

Writing assessment and support. The assessment of all written assignments—and, to a lesser extent, written exam responses—is based in part on writing skills. This includes correctness (grammar, punctuation, sentence structure, etc.), as well as general clarity and organization. Research papers must include a thorough and accurate citation of sources. Students are also encouraged to use Writing Support Services for assistance (one-on-one appointments, drop-in support and writing workshops). For more information, and other services offered by the Student Success Centre, please visit ucalgary.ca/ssc.

Online resources and electronic devices. Important information and communication about this course may be posted on D2L (Desire2Learn), UCalgary's online learning management system. Visit ucalgary.service-now.com/it for how-to information and technical assistance.

The use of laptop and mobile devices is acceptable when used in a manner appropriate to the course and classroom activities. The use of devices must be exclusively for instructional purposes, and without disruption to the instructor or fellow students. In particular, students are to refrain from accessing websites that may be distracting for fellow learners (e.g. personal emails, Facebook, YouTube), watching movies, or playing games. Devices should be set to silent mode during lectures. Audio or video recording of lectures is not permitted without the written permission of the instructor. Students are responsible for being aware of the University's Internet and email use policy, which can be found at: ucalgary.ca/policies/files/policies/electronic-communications-policy.pdf Students violating this policy are subject to discipline under the University of Calgary's Non-Academic Misconduct policy.

Academic misconduct/honesty. Cheating or plagiarism on any assignment or examination is as an extremely serious academic offense, the penalty for which will be an F on the assignment or an F in the course, and possibly a disciplinary sanction such as probation, suspension, or expulsion. For information on academic misconduct and its consequences, please see the University of Calgary Calendar at: ucalgary.ca/pubs/calendar/current/k.html

Intellectual honesty requires that your work include adequate referencing to sources. Plagiarism occurs when you do not acknowledge or correctly reference your sources. If you have questions about referencing, please consult your instructor.

University policies. The Instructor Intellectual Property Policy is available at: ucalgary.ca/policies/files/policies/Intellectual%20Property%20Policy.pdf Course materials created by professor(s) (including course outlines, presentations, assignments, and exams) remain the intellectual property of the professor(s). These materials may *not* be reproduced, redistributed or copied without the explicit consent of the professor. The posting of course materials to third party websites such as note-sharing sites without permission is prohibited. Sharing of extracts of these course materials with other students enrolled in the course at the same time may be allowed under fair dealing.

The University of Calgary is under the jurisdiction of the provincial Freedom of Information and Protection of Privacy (FOIP) Act, as outlined at ucalgary.ca/legalservices/foip. The instructor (or TA) must return graded assignments *directly* to the student UNLESS written permission to do otherwise has been provided.

All students are required to read the University of Calgary policy on Acceptable Use of Material Protected by Copyright (ucalgary.ca/policies/files/policies/acceptable-use-of-material-protected-by-copyright.pdf) and requirements of the copyright act (laws-lois.justice.gc.ca/eng/acts/C-42/index.html).