Philosophy of Mathematics
Course Syllabus
Phil 383, Fall 2015

Basic Course Information

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Logic Lab: UH 047, see http://philosophy.csusb.edu/logicLab.html
Office hrs: MWF 12:00 – 1:10 and by appointment (or try me anytime I am in)
Meetings: MWF 1:20 – 2:30, UH 249

Brief Description

You have, presumably, been introduced to mathematics at some level, where basic mathematical truths are taken to be obvious. But there is something fundamentally mysterious about mathematical claims which seem to be about numbers located neither in space nor in time. The mystery is compounded as we broaden our view to higher mathematics, where claims not only seem to concern non-spatial and non-temporal objects, but infinite collections of such objects as well. We shall examine philosophical accounts developed to remove these mysteries and clarify the grounds for mathematical truth. The accounts studied will be those given by both historical and contemporary thinkers, and include logicism, formalism, intuitionism, platonism, fictionalism and structuralism. Ours is not a course in logic or mathematics! Rather we shall think about the grounds of this discipline, and so about the very grounds of what may seem itself fundamental to science and thought more generally.

Course Expectations

In addition to the standard GE prerequisites for upper division philosophy, this course has Phil 200 and Math 110 (or consent of instructor) as prerequisites. Thus we do not assume any sophisticated content in logic or mathematics – but rather a basic familiarity with “what it is like” to work problems in logic and mathematics. In a small and advanced class such as this, it goes without saying that each of us specially depends upon the others for the quality and nature of class interaction. So I’ll leave off comments about homework, attendance, phones and the like simply to depend on your honor and good judgement.
Texts

Readings are from Shapiro, *Thinking About Mathematics*, and Benacerraf & Putnam eds., *Philosophy of Mathematics: Selected Readings* 2nd edition, each available in the Bookstore. Additional readings are included in a supplementary packet to be distributed in class.

Grading

Grades are based homework (15%), midterm exam (20%), final exam (25%), and paper project (40%); there is also some opportunity to obtain extra credit.

*Homework*: Homework (15% of the grade) is of two types. First, 3-4 page reaction papers corresponding to different reading units in the course. These are to develop some issue from reading, and then a question or critique. These papers will be graded on a 0 – 5 point scale, with scores of 4 – 5 reserved for ones that generate a significant question or critique, and lower if your paper remains at the level of summary. Second, there will be occasional short exercises assigned in class. These will be mostly based on lecture and are meant to solidify understanding of basic concepts. Such assignments will be scored on the same 0 – 5 point scale, though it will take two of these to count the same as a reaction paper.

There is no makeup for this component of the grade apart from compelling, continuing, and documented reasons. Thus the homework component of the grade samples regular effort and attendance. However, the homework score is calculated by dividing points earned by 5 less than points possible; the effect is to forgive one missing reaction paper (or two short assignments) – or, if all assignments are worked, to award the points as extra credit.

*Midterm and Final*: The midterm (20% of the grade) and final (25% of the grade) are comprehensive take-home examinations of material from lectures and reading. The final will be due at the regular exam period (F 12/11). The midterm will be given according to the attached schedule.

*Paper project*: There are two options for the paper project.

(i) You may choose to do two short (5-6 page) papers on topics to be assigned in class. These topics will be closely related to lecture and reading; no outside reading will be required. Each paper will be worth 20% of the total grade. For the first there will be the opportunity to rewrite; if this option is chosen, the first draft will count for 5% of the total grade, and the second 15%.

(ii) If your score on the midterm is at least 80%, you may choose to write a single (10-12 page) paper. Any such paper should have as its focus a topic grounded in our syllabus or texts – though it might go beyond those sources. Your focus will be some one chapter or article together with a published criticism of it. The paper is due in three installments, to coincide with the 3 due dates of option (i): first, a 5 page start to your paper, in which you set up the positions of your authors and so the issues to be discussed; second, a version of your complete paper;
and third, the final version. Your topic and reading must be approved by Prof Roy by the date of the first paper assignment. So you can be thinking about it (and talking with Prof Roy) up to then. Then the drafts count 5%, 5%, and 30%.

*Note: The topics and readings of this course are mostly “classics” – following the bibliography and notes from our readings are obvious paths to sources and interesting contrast papers. Also, *Philosopher’s Index*, available through the Library and also linked from the front of Prof’s Roy’s webpage, is a good way to track down published reactions.

Late papers will be accepted up to the last day of instruction with a 5% deduction and up to the final exam with a 10% deduction. Nothing will be accepted after the final exam. Exceptions require some exceptional circumstance (not “I have a lot to do”) and prior approval of the instructor.

Notes: All grades are recorded numerically. In general, 90% or over is an ‘A’, 80% or over is a ‘B’, etc. Your instructor reserves the right to lower this scale in calculation of final grades (as 89% or over an ‘A’ etc.); ordinarily this does not happen.

Writing is one of the most important things you “take away” from a course or degree in philosophy. And a course like this is impossible if you fall behind conceptually. In case of special difficulties (especially on papers) I reserve the right to impose requirements including prior submission of outlines, notes from the Writing Center, Logic Lab or the like.

You are encouraged to discuss anything, especially homework and reading with other students, the instructor, and/or assistants in the Logic Lab or Writing Center (for the Writing Center see [http://www-ugs.csusb.edu/wc/](http://www-ugs.csusb.edu/wc/)). With this said, all written work, especially papers and exams, is to be your own. Academic honesty is always essential, and particularly so in the give-and-take of philosophy, where the *project* is to work through and clarify your own views. Plagiarism will result in an automatic F for an assignment, and up to an F for the course along with standard University discipline. If you have any questions or concerns, feel free to talk things over with me. See also the “Writing Guide” and very nice discussion, “What is Plagiarism” from my website [http://philosophy.csusb.edu/~troy/courses.htm](http://philosophy.csusb.edu/~troy/courses.htm) and also the section on plagiarism in the CSUSB Bulletin at [http://bulletin.csusb.edu/academic-regulations/](http://bulletin.csusb.edu/academic-regulations/).

The payoff

Anyone in this class already has some commitment to philosophy – to the problems of philosophy, to its value as a mental discipline. This course fulfills a requirement in the logic minor, so you may already have some commitment to the special questions in philosophy of logic and mathematics. Beyond that, topics in philosophy of mathematics put into dramatic focus questions that pervade philosophical metaphysics and epistemology more generally. And mathematics itself pervades ordinary life and science. So this class raises questions that matter beyond the narrow confines of mathematics and logic.
The details

There are no adds after the census date. See detailed policies for adding and dropping classes in the CSUSB Bulletin at http://bulletin.csusb.edu/academic-regulations/. If you are in need of accommodation for a disability in order to participate in this class, please contact Services to Students with Disabilities at UH 183 (909) 537-5238. Individuals with disabilities should prepare for an emergency ahead of time by instructing a classmate and the instructor. If you require assistance in the event of an emergency, you are advised to establish a buddy system with a buddy and alternate buddy in the class.

Everyone should receive messages from their CSUSB e-mail. If CSUSB is not your regular address, you can set it to forward messages to your regular address.

Order of Instruction (tentative!)

Background

1. General logic
   Roy, from “Natural Derivations for Priest”*
   Roy, from “Making Sense of Relevant Semantics”*

2. General math
   Shapiro, Chapter 1,2
   Mumma, “Proofs, Pictures and Euclid”*

3. History
   Shapiro, Chapter 3,4

Classic Positions

1. Logicism
   Shapiro, Chapter 5
   Russell, from Introduction to Mathematical Philosophy
   Frege, “The concept of number”

   - Midterm Exam

2. Intuitionism(??)
   Shapiro, Chapter 6
   Heyting, “Disputation”
   Dummett, “The philosophical basis of intuitionist logic”

3. Formalism
   Shapiro, Chapter 7
   Hilbert, “On the infinite”
   Von Neumann “The formalist foundations of Mathematics”
   Curry, “Remarks on the definition and nature of math”

Contemporary Views
1. Platonist indispensability  Shapiro, Chapter 8  
   Putnam, from *Philosophy of Logic*  
   Benacerraf, “Mathematical truth”

2. Fictionalist nominalism  Shapiro, Chapter 9  
   Field, “Realism and anti-realism about mathematics”*

3. Varieties of structuralism  Shapiro, Chapter 10  
   Benacerraf, “What numbers could not be”  
   Parsons, “The structuralist view of mathematical objects”*  
   Roy, from *On What There Is* (on G. Hellman)*


- Final Exam

*On handout