

## Philosophy 323 / Mathematics 306 "Advanced Logic" (Set Theory)

In order to avoid scheduling conflicts, the two 50-minute lectures per week will be "asynchronous" or pre-recorded, usually divided into 25-minute long segments, so they may be listened to any time during the week at the student's convenience. Some may go a bit overtime, as would not be possible for classroom lectures. They will nonetheless be recorded "live" with no retakes, like real classroom lectures, and so will inevitably include some slips. There will be no video with the audio recordings, but there will be for each a fairly detailed hand-out to reduce or eliminate any need for taking notes. Be sure to have the handout open when listening. For technical reasons there may be a few seconds "dead air" with no sound at the beginning of a recording.

The single 50-minute precept per week has been left "time TBD [to be determined]". We may have to divide into two sections meeting at different hours, especially since some students will not be on campus and will even be in different time zones. The precept meetings will be on Zoom: please join with both audio and video, and make sure your computer sound is not muted. There will be time in precepts for student Q&A, but feel free to e-mail me questions at any time, and I will try to answer within 24 hours.

The textbook is by Robert Vaught, *Set Theory: An Introduction*, to be supplemented with an MS of my own on *Models of Set Theory*, to be distributed in pdf. The book has been ordered through Labyrinth, and Amazon has a page for it with links to other sellers. [https://www.amazon.com/Set-Theory-Introduction-Neuaufgabe-Broschiert-dp-0817632387/dp/0817632387/ref=mt\\_other?encoding=UTF8&me=&qid=](https://www.amazon.com/Set-Theory-Introduction-Neuaufgabe-Broschiert-dp-0817632387/dp/0817632387/ref=mt_other?encoding=UTF8&me=&qid=) Because some students may have trouble procuring the book, I will distribute a pdf of a scan in chapter-length bits, beginning with the front matter (including a table of contents and introduction) and back matter (with an appendix that can be ignored and a bibliography, plus an index and solutions to selected problems that should not be overlooked). Each lecture except the first and last is loosely keyed to a portion of the readings. Ideally, the student should skim over the relevant chapter before listening to the lecture (which will touch on highlights, add some supplementary information in digressions, but not always go over proofs in detail), and then read the text portion closely.

Set theory, like any mathematical subject, can only be learned by working problems. Precepts will mainly be devoted to discussing sample problems from the text, each ideally to be presented by a student "volunteer". What will matter for me in evaluating student precept participation will be effort on these problems, whether or not the effort ends by arriving at a correct solution. The problems will be from the text and students should be sure to look at the sample solutions in the back of the book to see the style in which solutions should be written up. Any result appearing in the book before the statement of what is to be proved in a given problem may be assumed if useful for that proof. A separate syllabus document will indicate the problems as well as the lectures for each week.

There will be one problem set to be written up every two weeks. These will generally be independent of the book and develop side topics. I will circulate a partial write-up of one problem from the set. The student should write up four of the six problems in each set (one of which may be the problem whose write-up I have begun as a sample). Results of an earlier problem may be assumed and used in a later problem whether or not you have written up the earlier problem. Each paper should end with the words "This paper represents my own work in accordance with University regulations" (note the exact wording, and absence of any allusion to the honor system, which applies only to in-class examinations; the relevant regulations are in *Rights, Rules, Responsibilities*). In short, these are to be individual, not collaborative, assignments.

It is highly desirable for a student assigned a presentation to circulate, perhaps by an e-mail sent out at precept time, at least a sketch of the solution. (Note that, even if we were meeting physically, University "social distancing" rules would prohibit students moving around to write on the board.) Word <sup>TM</sup> will suffice, making use of the "Advanced Symbol" command on the "Insert" menu and the Symbol font. Please do not send TEX code: if you use TEX, convert for circulating. Please send simple e-mails with simple attachments (preferably with Word format converted to pdf format before transmission), avoiding "Google docs" or other

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fancy, error-prone delivery systems. As an alternative to production by key-board, material may be hand-written and scanned, or simply photographed with a smart phone.