

# Phil 370: Theoretical Logic

## Syllabus

Instructor: Dr. Audrey Yap (ayap@uvic.ca)

Office: CLE B307. Phone: 721-7510

Office Hours: TWF 11:30-12:20 and by appointment

Class Information: TWF 10:30-11:20 in ELL 162.

Drop-in Hours: TBA

Course Website: Through CourseSpaces <http://coursespaces.uvic.ca>

Textbook: Open Logic Textbook, downloadable from the course website. For more information on this textbook, see <http://openlogicproject.org>

Prerequisites: Phil 203, Math 122, or permission of the instructor.

**Course Objectives:** Techniques of formal symbolic logic are used in modeling deductive arguments. We use them most often to model the validity of arguments, and to prove that a conclusion follows from the premises. We have criteria for determining when one sentence is a logical consequence of others, and when one sentence is deducible from others. The *metatheory* of formal logic is the study of these rules and criteria. For instance, we want to make sure that our rules for deduction will always lead us to correct conclusions, and that we have enough rules to ensure that everything that logically follows can also be deduced. The goal of this course is to introduce you to the main ideas and metatheorems of formal symbolic logic, as well as teach you how to write mathematically rigorous proofs. It is important to know how to prove theorems, but such proofs also need to be clear and readable. Proof-writing skills will also be emphasised in this course.

**Communication:** Office hours are held on a drop-in basis. You do not need to make an appointment to see me during those times, although the amount of time I can spend talking to any one person during office hours can depend on how many people are waiting. If you do want to schedule an appointment outside my office hours, try emailing me with a few suggestions for times that would work for you. I'm also happy to try and answer short questions either before or after class, time permitting. In general, email is my preferred method of communication, especially for any official requests. If you ask me a question over email, you can expect a reply within about 1 working day. If you don't hear back from me after that time frame, feel free to try again in case your message went astray. When you do address me (over email or otherwise), please do so as either Professor (Prof.) Yap, Dr. Yap, or Audrey. Please don't use any of Mrs/Miss/Ms/Mr, for a variety of reasons. If you are ever nervous about sending me an email, or asking a question, feel free to include a picture of a puppy with your request. This will not affect whether or not I will be able to help you with your request, but will give you an excuse to look for pictures of puppies.

**Course Logistics:** This course typically requires regular attendance, and almost all students find it useful to attend at least one of the designated drop-in sessions. These are held every week in which an assignment is due and will give you the chance to work on the assignments in groups with instructor feedback. There will be 9 homework assignments which must be turned in by class time on the due date unless otherwise specified. Assignments will generally be due on Fridays, but any one assignment can be turned in late (the following Monday) without penalty, so long as you email me and ask for an extension before the class when it is due. Documentation is only required if you need an extension on more than one assignment without penalty. Otherwise, a second late assignment will lose 2 points per day and will not be accepted more than 5 days after the due date. Note that while I encourage you to work on your assignments in groups, you must write up your answers independently. Plagiarised work will not receive credit. For more information on plagiarism, see the University Calendar.

Homework is worth 25% of the final grade. There will also be two non-cumulative tests (20% each) and a cumulative final to be held during the final examination period to be scheduled by the Registrar (35%). Exam rewrites will only be scheduled in cases of documented illness or other extenuating circumstances. Documentation must be received within a week of the exam date.

**Numerical and Letter Grades:** Grades will be given as percentile marks. The percentile mark for the course will be converted to a letter grade in the following manner: A+ = 90 - 100, A = 85 - 89, A- = 80 - 84, B+ = 77 - 79, B = 73 - 76, B- = 70 - 72, C+ = 65 - 69, C = 60 - 64, D = 50 - 59, F = 0 - 49. The A range means exceptional, outstanding and excellent performance. A grade in the B range means a very good, good and solid performance. A grade in the C+ or C range means satisfactory, or minimally satisfactory, performance. A grade of D or D- indicates merely passable or marginal performance. An F indicates unsatisfactory performance.

### **Schedule:**

- Week One: Jan 3, 5  
Topic: Sets and Relations.
- Week Two: Jan 9, 10, 12  
Topic: Sets and Relations, continued. Functions.
- Week Three: Jan 16, 17, 19  
Topic: Propositional Logic. Induction  
HW1 due Jan 19

- Week Four: Jan 23, 24, 26  
Topic: Semantics. Sentential Connectives.  
Reading: Chap 5  
HW2 due Jan 26
- Week Five: Jan 30, 31, Feb 2  
Topic: First-Order Languages.  
HW3 due Feb 2
- Week Six: Feb 6, 7, 9  
Topic: Structures.  
Test One: Feb 7
- Week Seven: Feb 20, 21, 23  
Topic: Structures.  
HW4 due Feb 23
- Week Eight: Feb 27, 28, Mar 2  
Topic: Natural Deduction.  
HW5 due Mar 2
- Week Nine: Mar 6, 7, 9  
Topic: Soundness and Completeness.  
HW6 due Mar 9
- Week Ten: Mar 13, 14, 16  
Topic: Completeness.  
HW7 due Mar 16
- Week Eleven: Mar 20, 21, 23  
Topic: Model Theory.  
Test Two: Mar 23
- Week Twelve: Mar 27, 28, 30  
Topic: Model Theory.  
HW8 due Mar 30
- Week Thirteen: Apr 2, 4, 6  
Topic: Review.  
HW9 due Apr 6

Note: This syllabus is provisional, and should only be used to give a rough guide to the course schedule. Dates may be changed if necessary.