Phi 251 Logic

Spring 2021

Time:	MonWed 3:45–5:05pm	**Lectures on:**	Zoom (find link on Blackboard)
Instructor:	Thiago Xavier de Melo	**Office hours:**	Tuesdays, 3:45pm and by app.; via Zoom
Email:	txdemelo@syr.edu		

Course Description

Arguments are used to justify all sorts of beliefs—scientific, mathematical, political, moral, religious, etc. But what constitutes a good argument? The main goal of this course is to introduce students to concepts and methods of formal logic that help evaluating arguments. More specifically, our object of study will be arguments whose conclusions are said to *follow from* their premises in virtue of their *logical structure*. We will study two standard formal systems and learn how to use them i) to analyze the 'logical structure' of the English sentences that compose those arguments and ii) to check whether the conclusions semantically and syntactically 'follow from' the premises. By the end of this course, students will be familiar with Truth-Functional Logic and First-Order Logic and with model- and proof-theoretical concepts, such as validity, interpretation, tautology, semantic consequence, natural deduction and syntactic consequence.

Regular Activities

There are five regular activities you will be required to do in this course:

- Attend and participate in **lectures online via Zoom**, link on Blackboard.
- **Read your textbook** and do practice exercises. (More on it below.)
- Complete (almost) weekly **problem sets via Carnap.io**. (More on PS's and Carnap below.)
- Take **exams via Carnap.io**. (More below.)
- Access **Blackboard** to read announcements, access lecture slides, textbook, discussion board etc.

Bonus: logic is pretty fun; I will be always glad to meet you during **office hours** to talk about it.

Course Materials

- Most of our course will follow chapters and exercises of the book:
  - "`forall` x: `Cambridge`" by P.D. Magnus and T. Button.

  This is an *open and free* book. It is available for download on `Blackboard`.
- Slides and supplementary material will be made available on `Blackboard` too.

Digital Platforms

- We will use three technologies: **Blackboard**, **Zoom**, and **Carnap**.
- Blackboard is our main platform. There, you will find everything else: course materials, discussion boards, and links to our Zoom class and to Carnap.io.
- As you know, your Syracuse NetID gives you access to Blackboard and Zoom, but not to Carnap.
- **Carnap** will be our platform to study and complete problem sets and exams. You will have to sign up on the first day of class.
  - *Sign up*: Go to `https://carnap.io` and click on "login" (right, top corner) to sign up. Or go here: `https://carnap.io/auth/login`.
  - *Join our course*: Once you are in, click on (or copy) this to join our course: `https://carnap.io/enroll/Syracuse%20-%20Logic%20PHI%20251%20-%20de%20Melo`
  - Please when doing so, add your SUID as 'University ID'.

Grade Distribution, Problem Sets, and Exams

You will have something—either a problem set, or an exam—due *every Monday* by 3:30pm (with one exception: April 25.) Your final grade is a function of these assignments, as showed below.

45% – Problem Sets (nine of them; 5% each)

- These are **due** on Mondays (see schedule).
- Three **redo**'s per student are available conditional on meeting me in office hours. (You meet me; we talk about how you can improve; and you get a redo. Better than free lunch!)
- Limited **collaboration** via Blackboard is allowed and encouraged. (But see "RULES for collaboration on Problem Sets" below.)

20% – Two symbolization exams (10% each) (See below for tentative schedule.)

- These are timed exams. And different students get different versions of the exam.
- ***No*** collaboration whatsoever. Any evidence of it will be reported as possible plagiarism.

15% – Midterm exam (See below for tentative schedule.)

- Timed. Multiple versions. ***No*** collaboration whatsoever is allowed. Any evidence of it will be reported as a possible violation of academic integrity.

20% – Final exam (See below for tentative schedule.)

- Timed. Multiple versions. ***No*** collaboration whatsoever allowed. Any evidence of it will be reported as a possible violation of academic integrity.

- There is partial credit for late problem sets (2% instead of 5%), but *not* for late exams.

Rules for collaboration on Problem Sets

Knowledge is built on collaboration, but never on plagiarism.

Since problem sets are meant to help you learn, collaboration when solving problem sets is *allowed*! Since science benefits from collaboration, and since this is also something we must learn how to do, you are *encouraged* to collaborate! But **importantly**:

- First, the same is **not** true of Exams. There is **no collaboration** on exams. **Exams** are to *test* your *individual* proficiency of the material. I will have to report any evidence of plagiarism as a possible violation of academic integrity.

- Second, there are **rules** for collaboration in this course. These rules will make sure that only proper collaboration (no plagiarism) happens on problem sets. To make sure you do only what is allowed and beneficial, please follow these rules:

  - *All sources and collaboration must be* ***credited***: You are required to report on every Problem Set any material you studied (text, site, video etc), and any collaboration, that is, any person you studied the problem set with, and the nature of the collaboration. There will be a **sources and collaboration box** at the end of every problem set where you can write things like "So and So gave me a tip for solving question X, and the tip was that ... Moreover, I read ... and I read the textbook, p. ..." Evidence of collaboration without credit will be reported and investigated.
  - You are encouraged to discuss PS's with colleagues *via Blackboard*. On the **Discussion Board** I will create one Forum per problem set. There you can create threads for questions you have. You are encouraged to ask the questions you have, and to answer your colleagues' questions.
  - You **cannot ask for or share** answers to questions, and you **cannot copy and paste** your or someone else's answer. (Think of it this way: you should always be able to *explain* what *you* did in a question if you are asked. Sometimes you'll be asked to explain it on problem set itself.)
  - **Examples**: Here are some examples of acceptable questions to ask and tips to give: you can ask for, and recommend, pages of the book or lecture slides that will help you or your colleague on a question; you can also ask for, and recommend, techniques of proof to solve a problem; you can ask for/give explanations, of concepts in a way that you think will help yourself/a colleague, solving a problem; you can report on a technique to solve a problem and tell others that it is not working for you.

- If you are unsure whether the way you want to collaborate is ok, please ask me. Also, don't be scared; if you honestly think a question/comment is sensible and counts as collaboration proper, then do post it on the Discussion Board. *If* I see something that I think shouldn't be posted, I will give you a headsup and everything will be fine. We are learning about how to collaborate too!
- Collaborating is cool. Have fun!

Policies

Academic Integrity: Syracuse University's Academic Integrity Policy holds students accountable for the integrity of the work they submit. Students should be familiar with the policy and know that it is their responsibility to learn about course specific expectations, as well as about university policy. For details visit:
http://academicintegrity.syr.edu/full-statement-of-sus-ai-expectations/

Accommodations: If you believe that you need accommodations for a disability, please contact the Office of Disability Services (ODS), disabilityservices.syr.edu, located at 804 University Avenue, room 309, or call 315.443.4498 for an appointment to discuss your needs and the process for requesting accommodations.

Schedule

This is a tentative schedule. Changes will be announced in lectures and updated to the Syllabus on Blackboard.

Day 1: **Feb 08**

Introduction to this course: Syllabus and Key Notions [Read: this syllabus]

Day 2: **Feb 10**

Key Notions (cont.) [Read: Part 1 of the Textbook, §§1-3 (pp. 1-9)]

PS DUE Problem Set 1 due on Feb 15.

Day 3: **Feb 15**

Truth-Functional Logic: First steps to symbolization [Part 2: §4]

Day 4: **Feb 17**

TFL: Connectives [Part 2: §5]

PS DUE Problem Set 2 due on Feb 22.

Day 5: **Feb 22**

TFL: Connectives (cont.) [Part 2: §5]

Day 6: **Feb 24**

TFL: Sentences of TFL [Part 2: §6]

EXAM Problem Set 3 due on Mar 01

Day 7: **Mar 01**

TFL: Review, and Use and Mention [Part 2: §7]

Day 8: **Mar 03**

TFL: Truth tables: Characteristic truth tables [Part 3: §8]

PS DUE 1st symbolization exam due on Mar 08.

Day 9: **Mar 08**

TFL: Truth tables: Complete truth tables [Part 3: §10]

Day 10: **Mar 10**

TFL: Semantic Concepts [Part 3: §11]

PS DUE Problem Set 4 due on Mar 15.

Day 11: **Mar 15**

TFL: Natural Deduction for TFL [Part 6: §§25,26]

Day 12: **Mar 17**

TFL: Natural Deduction for TFL [Part 6: §§27,28]

PS DUE Problem Set 5 due on Mar 22.

Day 13: **Mar 22**

Review: Semantics

Day 14: **Mar 24**

Review: Natural Deductions

PS DUE Problem Set 6 due on March 29.

Day 15: **Mar 29**

First-Order Logic: Building blocks and Sentences with one quantifier [Part 4: §§14-15]

Day 16: **Mar 31**

FOL: Multiple generality and Identity [Part 4: §16-17]

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EXAM **Midterm exam due on Apr 05**

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Day 17: **Apr 05**

FOL: Sentences of FOL [Part 4: §19]

Recorded class **Apr 07**:

(I will be at a conference. The recorded class will be available to watch on BB.)

PS DUE Problem Set 7 due on Apr 12.

Day 18: **Apr 12**

More symbolization

Day 19: **Apr 14**

FOL: Formal interpretation: Extensionality §20

Exam 2nd symbolization exam on Apr 19.

Day 20: **Apr 19**

FOL: Truth in FOL §21

No Class: **Apr 21**: Wellness Day

No problem set either. Yay!

Day 21: **Apr 26**

FOL: Semantic Concepts and using interpretations [§§22-24]

Day 22: **Apr 28**

FOL: Natural Deductions: basic rules [Part 7 §31]

PS DUE Problem Set 8 due on May 03.

Day 23: **May 03**

FOL: Natural Deductions: rules for identity and derived rules [Part 7 §32-4]

Day 24: **May 05**

FOL: Proof-theoretic concepts [Part 7 §35]

PS DUE Problem Set 9 due on May 10.

Day 25: **May 10**

More deductions

Day 26: **May 12**

FOL: Review

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EXAM **Final Exam**

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