

Introduction to Logic

PHIL 10

I. Course Content

Some forms of reasoning are defensible and desirable; some others are indefensible and to be avoided like the plague. Logic, the science of validity, helps us determine which is which: studying logic allows us to hone our reasoning ability and thus to discriminate the defensible from the indefensible. It enables to do what we all desire: to reason well whenever we reason. Since we reason in just about every human endeavor—in the natural sciences, in mathematics, in computer science, in artificial intelligence, in the social sciences, across a range of humanistic fields, and in all manner of practical deliberation—logic is key to our well-being.

Logic is thus a tool we should all wish to have at our disposal. Our entry into the subject will comprise two complementary activities, the first informal and the second formal:

- (i) In the informal part of the class, we will begin to develop skills for:
 - identifying arguments; understanding how logic relates to natural language;
 - establishing how and why some arguments are fallacious; and, briefly,
 - appreciating how cognitive biases can distort our ability to reason logically.
- (ii) The second, formal part moves us into artificial language—ours will be a truth-functional language—affording us greater precision in our discussions of proof; consistency and inconsistency; validity and entailment. We will also develop a powerful system of inference rules, allowing us to develop our powers of logical acumen in two directions, namely identifying valid and invalid arguments, and, more importantly, constructing logical arguments of our own.

II. A Warning, a Recommendation, and an Invitation

Experience teaches that student performance in this Introduction to Logic tends to be bimodal: there are lots of A-level marks and lots of D- or F-level marks. I would be only too pleased if that were false, if all of my students performed at an A-level in this course, which is to say if all of my students mastered elementary logic. I hope, then, that this will be the semester where that bi-modality recedes.

How to make that happen? The course is not easy; on the contrary, for many students it will prove very difficult—especially if they do not follow our recommendations: read the material before lecture and then read it again afterwards; note things that you do not understand and bring your questions to your section meetings; work all of the exercises and check your answers; bring problems that you cannot work out to section so that your TA can guide you; understand that learning logic, especially the formal part, is more like learning to play the piano or mastering a new language than it is like memorizing (even impressively) the periodic table or all of the Kings and Queens of England and all of their respective dates. Logic is incremental, each skill building on the one before it.

We invite you to avail yourselves of the services we offer, in lectures, in sections, in our office hours. We enjoy teaching logic, and enjoy it even more when we are successful.

To repeat and redirect the encouragement: you may find the early material easy going, only to stumble badly in the formal part. The formal material is not, all things considered, too terribly difficult; but it is demanding, in the sense that you will need to practice, practice, practice. The upside, if you do: you will be on the right side of the bi-modal division. I hope you are.

II. Office Hours and Contact Information:

Prof. Shields

Office: Arts & Humanities Building 447

Office hours: W 4.00-5.00 and by appt.

e-mail: CJShields@ucsd.edu

website: cjshields.com

N.b. I prefer e-mail to telephone as a manner of student contact. I make an effort to answer student e-mails promptly, but please be aware that I measure promptness in this domain in days rather than hours or minutes.

Teaching Assistants:

Patricio Avila Cardenas: pavilacardenas@ucsd.edu

Arts & Humanities 438

Sections:

W: 2.00; W: 3.00

Office hour: M: 2.00-3.00 and by appt.

Louis Santoro: lsantoro@ucsd.edu

Arts & Humanities 435

Sections:

W: 12.00; W: 1.00

Office hour: W: 10.00-11.00 and by appt.

Andy Sin: osin@ucsd.edu

Arts & Humanities 439

Sections:

W: 11.00; F: 9.00

Office hour: W: 10.00-11.00 and by appt.

Noam Tiran: ntiran@ucsd.edu

Arts & Humanities 439

Sections:

M: 8.00; M: 10.00

Office hour: Th. 9.00-10.00 and by appt.

III. Required Text

Kelley, David and Hutchins, Debby, *The Art of Reasoning* 5th. edition (Norton: 2024) [abbreviated *AR* below]

This edition is available in our campus bookstore and also as an e-book

You may use any format you wish.

IV. Requirements:

Students will sit four examinations, three preliminary and one final.

Dates for the examinations:

Preliminary Examinations:

First: 23 October

Second: 13 November

Third: 4 December

Final Examination: Wednesday, 11 December, 8.00-11.00

V. Grading and Protocol:

Each of the preliminary examinations is worth 100 points. The comprehensive final examination is worth 200 points. Your mark for this course will be determined exclusively by your performance on these examinations. There are, then, a total of 500 available points.

The marking scale will adhere to standard breaking down:

450-500: A-range

500 points: A+

466-499: A

450-465: A-

400-449: B-range

435-449: B+

414-434: B

400-413: B-

350-399: C-range

385-399: C+

366-384: C

350-365: C-

300-349: D-Range

335-349: D+

314-334: D

300-313: D-

299 and below: F

Please note:

- There will be no opportunity for making up missed preliminary examinations. Please note, however, that all students will be given the option of designating one section of the final for double counting, such that your mark on the designated preliminary examination will be expunged. More specifically, the final examination will comprise three parts, each corresponding to one of the preliminary examinations. If you elect this option, you must notify your TA in writing, by e-mail, at least three days in advance of the final, naming the section of the final you intend to double count. That is to say, your written decision must be submitted to your TA by 11.59 p.m. on 8 December. Once you commit yourself to this course, you may not back out, even if it means that your final mark will be worse than it would have been had you not so elected. (We will explain this policy in greater detail in lecture and in section.) This is a course of action which we permit rather than encourage; but it is intended to allow you to improve your final mark in the event you stumble along the way, as we all sometimes do in life.

- Fairness demands that no consideration can be given to external factors in assigning grades. If, for instance, your receiving a D for this course will result in your losing your eligibility for financial aid or for your continued education at UCSD or for your participation in sports or for anything of the sort, we will not be in a position to assist you. If you approach us with such a request, we will say, simply, 'Please see the second bullet point under §V of the syllabus.' Then our conversation will be over.
- This means that there is no opportunity for 'extra credit'.
- This does not mean, however, that if you have a legitimate reason for needing to reschedule an examination we will be anything but accommodating. Legitimate reasons include, for instance, documented health emergencies, documented deaths in your immediate family, and the like. In all such cases, we will require appropriate documentation.

VI. Academic Integrity

You are responsible for knowing and understanding all university policies on cheating, plagiarism, and academic integrity. Cheating of any kind is disrespectful to your fellow students, to your instructors, and to your university: it will be reported and the harshest penalties possible will be sought. Penalties extend to suspension and expulsion from the university.

VII. Accommodations

Students requesting accommodations for this course due to a disability must provide a current Authorization for Accommodation letter issued by the Office for Students with Disabilities. Please have your AFA letter sent as soon as possible. Students are required to present their AFA letters to faculty and to the OSD liaison in the department at least one week in advance of affected assignments so that accommodations may be arranged.

We will gladly work with you to meet your requested and documented accommodations.

VIII. Topics and Reading Schedule

Part One: Language and Reasoning

Week One:

Reading: *AR* Chapter One: Language: Concepts and Propositions

Week Two:

Reading: *AR* Chapter Two: Argument Analysis

Week Three:

Reading: *AR* Chapter Three: Fallacies

Week Four:

Reading: *AR* Chapter Four: Cognitive Biases

First Preliminary Examination

Part Two: Deductive Logic

Week Five:

Reading: *AR* Chapter Eight §§ 1-2: Propositional Logic I

Week Six:

Reading: *AR* Chapter Eight §§ 3-4: Propositional Logic II

Week Seven:

Reading: *AR* Chapter Eight §§ 5-6: Propositional Logic III

Second Preliminary Examination

Week Eight:

Reading: *AR* Chapter Nine § 1: Natural Deduction I

Week Nine:

Reading: *AR* Chapter Nine § 2: Natural Deduction II

Week Ten:

Reading: *AR* Chapter Nine § 3: Natural Deduction III

Third Preliminary Examination