

*Agnes Scott College*

# Why Take Logic?

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In general, logic is the study of correct reasoning. It attempts to answer questions like: What does it mean to say that one claim follows (logically) from another? What makes an argument good or valid? What makes an argument invalid or bad? Logicians use mathematical techniques to answer these questions.

Studying basic symbolic logic is a lot like learning a new language, but one with a small vocabulary and just a few rules of grammar. Actually, here's a better analogy: suppose you went your whole life up to now without learning basic arithmetic or any formal mathematics. Of course, to get by in life, you must have picked up most of the mathematical reasoning skills that you would have learned in early math classes, but without the fancy symbols. Now suppose you go to college and finally take a course in basic arithmetic. At some point you figured out that if you have two bags with two apples per bag, you have four apples. But now you know something much more general and much more useful:  $2 \times 2 = 4$ . That's what a logic course is like. You already know, if only intuitively, what makes one argument better than another, since making and assessing arguments is part of getting by in life. What logic gives you is a language, much like the language of arithmetic, that finally lets you say whether and why an argument, *any argument*, is good or bad.

Hopefully, we've piqued your interest. But you might still be wondering, "Why should I take a logic course?" Below is a list of some reasons to do so.

1. **Logic Makes You Smarter:** When you know what makes an argument good, you can make your own arguments better. This lets you discover new things, make illuminating insights, and persuade others of your point of view. Conversely, knowing what makes an argument bad helps you to avoid bad reasoning, to spot the problems in others' arguments, and to offer insightful criticism. Whether you're an astrophysicist, a web designer, a baseball pitcher, a social worker, a parent, or a panhandler, you make or make use of arguments all the time. Logic helps to render these arguments transparent; it uncovers their strengths and flaws. In short, logic makes you smarter, and isn't that why you're going college? (BTW: all philosophy courses give you these skills, so take others!)
2. **Logic is a Gateway:** The mathematical tools that you learn in a symbolic logic course are the foundation for a number of areas of study. For instance, every computer programming language is based on the language of first-order logic that you'll learn in an introductory class. Modern linguistics uses this same language to understand the structure of natural languages. Finally, first-order logic was devised in an explicit attempt to formalize the practice of mathematical proofs. Familiarizing yourself with

this language and how it works will make any study of these fields much easier. So if you are interested in *Math*, *Computer Science*, *Linguistics*, or any field where you work with formal languages (which includes most scientific disciplines), you'll definitely want to take a logic course.

3. **Logic Delivers the Goods:** Whether its the GRE, LSAT, GMAT, or MCAT, standardized tests for post-undergraduate programs all require demonstration of analytic reasoning skills. Testing for analytic reasoning involves either a reading or a writing exercise, and often both. Reading exercises ask the test-taker to examine a passage of text, analyze its argumentative structure, and evaluate its cogency. Writing exercises require test-takers to construct a cogent argument that responds to a prompt. Since logic teaches you how to identify, analyze, evaluate, and construct arguments, these tests are literally testing you on the skills you acquire in logic (and in philosophy courses more generally). If you want to perform well on these tests, better take a logic course! (And if you want to get really good at these kinds of exercises, better take some other philosophy courses too!)
4. **Logic is Fun:** You get to do all sort of things with the new symbols you learn in logic: you use them to analyze the structure of ordinary sentences, to test arguments for validity, and to construct proofs for complex arguments whose validity isn't obvious. The exercises that help you become adept at these things are like puzzles, so if you like brain teasers, crosswords, or sudoku you'll love logic. Did you ever get that 'rush' that comes from getting a math problem right or finishing a puzzle? You'll get lots of that in logic!

**Logic at Agnes Scott:** Introduction to Logic (PHI103) provides students with the foundations of symbolic logic. In this course, we study two powerful artificial languages called *Truth-Functional Logic* (TFL) and *First-Order Logic* (FOL) that will allow us to precisely formulate the concepts of *proof*, *truth* and *valid argument*. Our study of TFL and FOL will focus on using them to represent and evaluate the inferences we normally express in ordinary English. This will also force you to examine those inferences in detail and improve your understanding of how they do and don't work. **Bonus:** the textbook for this course is written by the professor and is provided free to students!

In Spring 2020, an Intermediate Logic course will be offered that builds upon this foundation and introduces students to logical meta-theory, computation theory, and non-standard logics that are widely used in applications of artificial intelligence and computer simulation.