

# INTRODUCTION TO LOGIC

Gregory Johnson, Ph.D.

[gregory.johnson@msstate.edu](mailto:gregory.johnson@msstate.edu)

## 1 Preliminaries

Email is the best way to reach me, and I will usually respond within 24 hours. If you would like a more immediate response, you can try calling or sending a text message to 267-416-0292. But don't leave a voicemail. I won't get it.

Meetings by appointment. (Webex or George Hall)

## 2 Textbook & Software

We will begin with the chapter "An Introduction to Arguments," which is posted on Canvas. Then, for the rest of the term, we will use the textbook *forall x: the Mississippi State edition*. The information for ordering this book is on Canvas. Starting in week 2, we will use the free online logic software Carnap (<http://carnap.io/>). A link that you will use to set up an account in Carnap will be provided.

## 3 Course Description

This course is an introduction to formal logic. The primary focus of the course is learning a formal language, which is then used for representing, explaining, and evaluating certain kinds of reasoning. There are several purposes for such a course. One is that it is an important sub-field of philosophy that is worth studying in its own right. It also overlaps with mathematics and computer science, and it is an important part of those disciplines. (In fact, it is fundamental to computer science.) It is also applicable to any field where arguments and reasoning processes are analyzed and evaluated. But, beyond its direct applications, learning logic is an important part of a complete education. Amanda Ripley makes the point plainly in *The Smartest Kids in the World, And How They Got That Way*. Explaining the value of mastering "the language of logic," she writes,

It is a disciplined, organized way of thinking. There is a right answer; there are rules that must be followed. More than any other subject, [it] is rigor distilled. Mastering the language of logic helps to embed higher-order habits in

[our] minds: the ability to reason, for example, to detect patterns and to make informed guesses. Those kinds of skills have rising value in a world in which information is cheap and messy. (p.70)

While formal logic is a part of philosophy, you will also find that it looks somewhat like math (and, as mentioned above, in some respects, it overlaps with math). As with mathematics, in formal logic, we apply formal techniques and use symbolic expression – for example,  $P \vee Q \vdash \neg P \rightarrow Q$ . Don't be intimidated by the symbols. The use of symbols makes the relevant characteristics of the sentences more obvious and manageable, and once you have a grasp of them, they present no difficulty.

If you are having trouble with any part of this course, please contact me right away. The course is designed to make working through the material and learning it a straightforward process. Since this is an online course, however, you are responsible for

1. making time each week to do the work for the course,
2. using the textbook and videos to complete the assignments, and
3. determining if and when you need to contact me with questions.

Again, don't hesitate to contact me. It's what I'm here for, and I don't mind answering questions.

#### 4 Learning Objectives

After the successful completion of this course, students will be able to identify arguments, distinguish valid and invalid arguments, translate English sentences into sentences in a formal language (TFL), construct truth tables, evaluate arguments using truth tables, and construct proofs in a formal language (TFL).

#### 5 Student Honor Code & Academic Misconduct

Mississippi State has an approved Honor Code that applies to all students. The code is as follows:

As a Mississippi State University student, I will conduct myself with honor and integrity at all times. I will not lie, cheat, or steal, nor will I accept the actions of those who do.

Upon accepting admission to Mississippi State University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor Code. Student will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the MSU community from the requirements or the

processes of the Honor Code. For additional information, please visit: <http://honorcode.msstate.edu/policy> and <http://students.msstate.edu/studentconduct/>.

**To be clear, students who cheat in any way will be penalized. Cheating includes giving as well as receiving help when such help is not explicitly allowed.** Plagiarism is also a form of cheating. The best way to avoid anything that might be academic misconduct is to put yourself in a position where you don't need to cheat or plagiarize. Don't get behind, and if there are things that you don't understand, give yourself time to figure them out or ask me about them.

If you have any further questions about what constitutes cheating, either ask me or see the University's policy on academic dishonesty. (I am happy to answer to any questions about what is and is not allowed. But ask me before you do something questionable.)

## 6 Schedule

See the Google calendar in Canvas for the exact schedule. The calendar is also available [HERE](#).

Week 1	"An introduction to arguments" for all $x$ , chapters 3 - 6: introduction to truth functional logic Test 1 is due by <b>July 12</b> .
Week 2	for all $x$ , chapters 8 - 11: truth tables Test 2 is due by <b>July 19</b> .
Weeks 3 & 4	for all $x$ , chapters 13 - 16: proofs for all $x$ , chapter 17: theorems Test 3 is due by <b>August 4</b> .

## 7 Coursework & Grading

Letter grades will be assigned using the standard Mississippi State scale (an A is 90 – 100 percent, a B is 80 – 89 percent, a C is 70 – 79 percent, etc.). The grades will be set based on this coursework and these percentages:

quizzes and homework assignments: 65 percent  
three tests: 35 percent

All of the work for this course is open book and notes (your own notes, not other people's notes). **Other than consulting with the instructor, you are required to do all quizzes, homework assignments, and tests alone and without help.** You can work on the practice quizzes and practice problems with other students.

Because everything in this course builds what you have done previously, you have to do every assignment. (That is, you have to do every quiz, practice quiz, homework assignment, and test; you don't, however, have to do all of the practice problems in Carnap). Assignments can be completed after their due dates, but there are penalties for completing them late.

1. For quizzes and tests in Canvas, 3 percent will be deducted from an assignment's grade for each day that it is late.
2. For homework assignments in Carnap, late work will receive a 20 percent penalty (that is just a penalty for being late, not a per day penalty).

Generally, there will be three or four assignments due per week. Each student's two lowest quiz or homework grades will be dropped. There will not be any extra credit at the end of the course, and so you should do as well as you can throughout the semester.

**Honorlock** You will use the proctoring software Honorlock for some of the tests. There is information about using it on Canvas, but right now, you should make sure that you have a working webcam—either the webcam built into your laptop or an external one (which doesn't have to be HD or otherwise fancy).

## 8 Disability Resource Center

Mississippi State University is committed to providing equitable access to learning opportunities for all students.

**Starkville** The Disability Resource Center (01 Montgomery Hall) collaborates with students who have disabilities to arrange reasonable accommodations. If you have, or think you may have, a disability, please contact [drc@saffairs.msstate.edu](mailto:drc@saffairs.msstate.edu) or 662-325-3335 to arrange a confidential discussion regarding equitable access and reasonable accommodations.

Disabilities may include, but are not limited to, conditions related to mental health, chronic health, attention, learning, autism, brain injury, vision, hearing, mobility, speech, or intellectual disabilities. In the case of short-term disabilities (e.g., broken arm), students and instructors can often work to minimize barriers. If additional assistance is needed, please contact the Disability Resource Center.

## 9 Title IX

MSU is committed to complying with Title IX, a federal law that prohibits discrimination, including violence and harassment, based on sex. This means that MSU's educational pro-

grams and activities must be free from sex discrimination, sexual harassment, and other forms of sexual misconduct. If you or someone you know has experienced sex discrimination, sexual violence, or harassment by any member of the University community, you are encouraged to report the conduct to MSU's Director of Title IX/EEO Programs at 662-325-8124 or by e-mail to [titleix@msstate.edu](mailto:titleix@msstate.edu). Additional resources are available here:

<http://students.msstate.edu/sexualmisconduct/>

<http://www.msstate.edu/web/security>

## **10 University Safety Statement**

Mississippi State University values the safety of all campus community members. Students are encouraged to register for Maroon Alert texts and to download the Everbridge App. Visit the Personal Information section in Banner on your MyState portal to register.

To report suspicious activity or to request a courtesy escort via Safe Walk, call University Police at 601-934-0863, or in case of emergency, call 911. For more information regarding safety and to view available training resources, including helpful videos, visit: <http://ready.msstate.edu>.