### PHIL 2311: LOGIC Syllabus

**Course Description:** This is a course in formal (or symbolic) logic. Logic is one of the foundations of mathematics (as well as being foundational for other disciplines—e.g., philosophy, linguistics, computer science). In the course we will cover the following topics:

(1) Translating sentences and arguments stated in ordinary language into logical symbolism

(2) Propositional Logic (statements and arguments involving the Boolean connectives, *and*, *or*, *not*, *if-then*, *if and only if* )—natural deduction and axiomatic systems, truth-tables, tautologies,

contradictions, logical independence, logical equivalence, inconsistency and consistency (3) Predicate and Categorical Logic (statements and arguments involving universal and existential quantification)—natural deduction and axiomatic systems, truth-functional expansions for finite domains

(4) Proof techniques (indirect proof, conditional proof)

(5) Common formal fallacies (e.g., denying the antecedent, affirming the consequent)

(6) The logic of relations (identity and equivalence relations, transitivity, symmetry, reflexivity, orderings)

(7) The history of logic and its important place in the development of philosophy, mathematics, science, and computer science

# This course satisfies the UT Arlington core curriculum requirement in mathematics.

*Learning outcomes*. Successful students will demonstrably increase their ability to understand the logical forms of sentences and arguments and sharpen their analytical and argumentative skills. The course is essentially a course in deductive formal reasoning methods. Successful students will be able to formalize statements and argument and test arguments for deductive validity using the formal techniques learned in class. They will be able to test sets of statements for consistency, equivalence, and independence. They will be able to determine if individual statements are tautologies, contradictions, or contingent. They will be able to derive the logical consequences of sets of statements using a variety of formal deductive systems. These skills will be tested via a combination of exams, quizzes, homework assignments, and in-class activities.

## Core curriculum objectives.

- Critical Thinking Skills: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information;
- Communication Skills: to include effective development, interpretation and expression of ideas through written, oral and visual communication;
- Empirical and Quantitative Skills: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.

*Signature assignments*. The following assignments (among others) will be used to assess the student's level of achievement of the Core Curriculum Objectives:

- 1. Each student will translate statements in ordinary language into the language of propositional logic. The student also also assess the deductive validity of arguments using the assessment methods appropriate to propositional logic. (Critical Thinking Skills, Communication Skills, Empirical and Quantitative Skills)
- 2. Each student will translate statements in ordinary language into the language of predicate logic. The student will also assess the deductive validity of arguments using the assessment methods appropriate to predicate logic. (Critical Thinking Skills, Communication Skills, Empirical and Quantitative Skills)

**Textbook:** Stan Baronett, *Logic*, 3rd Edition (Oxford: Oxford University Press). In addition, students will need to register with Dashboard (<u>dashboard.oup.com</u>) to gain access to online exercises and additional instructional resources.

**Grading:** Your grade in this course will be based on your performance on the graded exercises in Dashboard, your participation in the discussion boards for each lesson, and your scores on the exams. I use a weighted average system, not a total points system. Your current grade is available through the Grades link at the left. In addition, practice exercises are provided in Dashboard. These do not count towards your grade, but Dashboard will show your score in its grade book, since this can be useful information.

Consult the calendar for a list of all the assignments for the course along with their due dates. Assignments must be completed by the end of the day on the due date provided. If you fail to complete an assignment, you will receive a 0 on that assignment. In general, there are no make-ups. In addition, it is important to note that exams are not group projects. Any students working with others to complete an exam will be given a 0 for that exam and will be reported for academic dishonesty. This policy is strictly enforced.

### **Percentage Allocations**

- Graded Dashboard Exercises: 30% Total
- Discussion Board Assignments: 10% Total
- o 4 Exams: 15% each / 60% Total

### **Grade Distribution**

- o A 89.5% 100%
- o B 79.5% 89.49%
- C 69.5% 79.49%
- D 59.5% 69.49%
- o F 0% 59.49%

**Communication Plan:** The primary method of communication for this course will be through UTA email. Please make sure to check your UTA email regularly, as not to miss any important communication about the course. I will check email regularly as well, and I will try to respond to any email

communication within one business day. In addition, I am available for virtual office hours Monday through Thursday from 1:00 to 3:00. You can reach me during those hours by email (jeremy.byrd@uta.edu) or phone (817-515-4605). In person meetings may be available by appointment.

**Method of Instruction:** This course will be conducted entirely online. Students are expected to maintain contact with me as needed. Individual assistance is available in person or electronically, as noted in the Communication Plan.

**Attendance Policy:** Attendance in this course will be based on participation in the weekly assignments. Any student who does not complete any of the weekly assignments by the due date will be marked absent for that week.