PHI 201 – Introductory Logic **Final Exam Review Sheet**

Practical information

- We reserve the right to examine you on anything covered in the course, whether it is explicitly stated on this review sheet or not.
- The exam is cumulative, but emphasis will be placed on material from the second half of the semester.
- The exam is designed to require approximately 1.5 hours. You will be permitted to use up to 2.5 hours to complete the exam.

Basic Concepts (See Lecture 1, and the downloadable chapter from Tomassi's book *Logic*)

- Know the definitions of central logical concepts (e.g. what is an **argument**, **inductive** vs. **deductive** arguments, **valid** and **sound** arguments, etc. . .).

Section I (Lectures 2–9; LPL, Chapters 1–8)

- Know the definitions of elementary grammatical concepts of FOL — e.g., **term**, **name**, **predicate symbol**, **function symbol**, **literal**, etc. . . .
- Semantics
  - Know the truth-tables for the five Boolean sentence connectives ($\neg, \wedge, \vee, \rightarrow, \leftrightarrow$).
  - Be able to give precise definitions for semantic concepts. e.g., what does it mean to say that a FOL sentence is a tautology, a TT-possibility, etc . . . ? What does it mean to say that two FOL sentences are tautologically equivalent, that one is a tautological consequence of the other, etc . . . ? (Note: "TT-possibility" is only defined and used in the exercises on p. 105 of LPL. But the idea is simple: A sentence P is TT-possible when $\neg\mathsf{P}$ is *not* a tautology.)
  - Be able to apply semantic concepts. e.g., show that a FOL sentence is a tautology, a TT-possibility, etc. . .
  - Know what it means to say that a sentence connective (operator) is "truth-functional." Be able to distinguish between English connectives (operators) that are and are not truth-functional.
- Proofs
  - Be able to do proofs involving = Intro and = Elim. Also be able to state these rules explicitly.
  - Be able to do proofs involving the rules for the Boolean connectives. Also be able to state these rules explicitly.

- Be able to identify the Boolean structure of English sentences. Pay special attention to tricky constructions such as "P only if Q", "P is a sufficient condition for Q", and "P unless Q".
- Be able to explain what it means to say that $\mathcal{F}_T$ is "sound" and "complete," and why this is significant. (Section 8.3)

Section II (Lectures 10–20; LPL, Chapters 9–14)

- Grammar: Be able to define **well-formed formula**, **free** and **bound** variables, etc....
- Proofs: Be able to do proofs involving the four quantifier rules. Also be able to state the rules along with their restrictions.
- Semantics
  - Be able to give the precise definition for when a quantifier statement is true in a given situation. Be able to define the relation "a satisfies P" where a is an object and P is a WFF.
  - Be able to give precise definitions of semantic concepts. e.g., what does is mean to say that a sentence is a FO-validity? What does it mean to say that one sentence is a FO-consequence of another sentence?
  - Be able to apply semantic concepts. e.g., show that a sentence is not a FO-validity; show that one sentence is not a FO-consequence of another sentence; etc...
  - Know the relations between the semantic concepts from Section I and those from Section II. e.g., if Q is a FO-consequence of P, then is it also a TT-consequence?
  - Know the relations between the precise semantic concepts defined for FOL and the "murky" semantic concepts we use on a daily basis. e.g., if Q is a FO-consequence of P, then is it also a logical consequence?
- Be able to translate between English and FOL (including definite descriptions, numerical quantification, etc...).
- **Note:** You do **not** need to know the material from sections 14.4–14.6 in LPL.