PHI 340: Midterm Exam Study Guide

(Version 0.1, Revised 1:56pm, November 1, 2005.)

You ought to know at least these things:

- Basics of set theory. Definitions, axioms, how to prove things.
  - Cartesian products; relations
  - Functions
  - Inductively defined sets
- Basics of languages and logics.
  - What are the components of a *language*?
  - What are the valuations of classical propositional logic (CPL)?
  - What is the definition of "$\mathcal{X} \models A$"?
  - What is a *tautology*?
  - What is a *base* for a valuation? Do all valuations have bases?
  - When is one language an *extension* of another?
  - What is a *logic*?
  - Define: *soundness, completeness, argument completeness, strong completeness, compactness*.
  - What is the difference between $\models$ and $\vdash$?
  - Calculus of deductive systems. e.g. be able to show that: $Cn(Cn(\mathcal{X})) = Cn(\mathcal{X})$; if $\mathcal{X} \subseteq \mathcal{Y}$ then $Cn(\mathcal{X}) \subseteq Cn(\mathcal{Y})$.
- Modal logics: K, D, T, S4, B, S5, NN, NN^r.
  - Models and restrictions on the accessibility relation $\mathcal{R}$.
  - What is the relationship between "models" and "valuations"?
  - Tableau methods for the normal modal logics (K, D, T, S4, B, S5).
  - Characteristic sentences for the normal modal logics.
  - Paradoxes of material implication.
  - What are the valuations of NN?

– The rule of necessitation:

  If $A_1, \ldots, A_n \models B$ then $\Box A_1, \ldots, \Box A_n \models \Box B$.

  For which modal logics is this true?

– Natural deduction for S5. (Optional: You will have a choice between natural deduction problems and problems that don't use a system of natural deduction.)