**CS 291 Exam One Terms and Concepts**

**Hein Section 6.2 Propositional Calculus**

* Be familiar with *truth tables* and know how to use them to show the truth value of statements.
* Know what makes a statement a well-formed formula (wff).
* Understand the hierarchy of evaluation for the logical connectives and be able to unambiguously interpret wffs.
* Know how to show that two wffs are *logically equivalent* by doing a step-by-step proof from one form to the other.
* You should be familiar with the basic equivalences from Figure 6.2.6 on page 420.
* Understand what it means for a wff to be a *tautology*, a *contradiction* or a *contingency* and be able to determine which of these any wff is using Quine's method.
* Be familiar with Conjunctive Normal Form (CNF) and Disjunctive Normal Form (DNF). Be able to turn a wff into either form using equivalences and using truth tables.

**Hein Section 6.3 Formal Reasoning**

* Know how to do proofs using natural deduction.
* For the open book exam you will have access to the Proof Rules on page 439 of your book. Know how to use them to do step-by-step proofs where each step is justified by previous steps and proof rules.
* This includes being able to do nested *Conditional Proofs* (CP) and *Indirect Proofs* (IP).
* You will also have access to the Derived Rules on page 450 of your book, but I will also not expect you to use them.

**Hein Section 6.4 Formal Axiom Systems**

* Know the definitions of *soundness* and *completeness* and how they differ.
* **Soundness:**All proofs yield theorems that are tautologies. This means that everything we can prove is in fact true.
* **Completeness:**All tautologies are provable as theorems. This means that everything that is true can be proven.