Contemporary logic

Contemporary formal logic (symbolic logic) began as an attempt to establish the foundations of arithmetic. But it has implications beyond this, and its systematic nature makes it possible to extend it in various directions. It has been used by recent philosophers as the most suitable tool for philosophical development. Students require some knowledge of it if they are to use and evaluate many recent contributions to philosophy. This course is aimed at giving our students sufficient knowledge of formal logic to enable them to benefit from authors who themselves use it, and to apply their logical knowledge, when appropriate, to older and more traditional authors.

Book:
Paul Tomassi, Logic, Routledge 1999

The course will be tested and graded principally on a mid-semester and a final test, but also by exercises worked through in class or as homework. The date of the final test has not yet been announced by the Registry.

My office hours:
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Course content
Mon Jan 22 Philosophy in the curriculum at this university. Logic, faith and reason
Wed Jan 24 Using truth-tables to explain truth-functional connectives equivalent to “not”, “and” “or”, “if”, “if and only if” ( ‘¬’, ‘&’, ‘∨’, ‘→’, ‘↔’)
Mon Jan 29 The use of truth-tables to show validity
Wed Jan 31 Scope. Direct and indirect truth-tables
Mon Feb 5 Introducing and eliminating conjunction
Wed Feb 7 Modus ponens
Mon Feb 12 Conditional proof
Wed Feb 14 Negation, double negation
Mon Feb 19 Modus tollens
Wed Feb 21 Introducing disjunction
Mon Feb 26 Eliminating disjunction
Wed Feb 28 Reductio ad absurdum
Mon Mar 5 Proof-strategies and review
Wed Mar 7 Mid-term test
Mon Mar 12 Spring Break: no classes
Wed Mar 14 Spring Break: no classes
Mon Mar 19 Universal quantification
Wed Mar 21 Existential quantification
Mon Mar 26 Relational expressions and quantification
Wed Mar 28 Relational expressions and multiple quantification
Mon Apr 2 Formal properties of relationships
Wed Apr 4 Universal elimination
Mon Apr 9 Universal introduction
Wed Apr 11 Existential introduction
Mon Apr 16 Existential elimination
Wed Apr 18 Quantification and relations
Aims and Objectives

We are, or perhaps were – it is impossible to keep track of all the useless demands our administrators make of us from time to time – required to state aims and objectives for our classes. The notion of a list of “objectives” for a series of classes presumably means more than a list of their contents (see above). In its origin the notion of the “objectives” of a class was linked to a behaviorist account of the mind: an “objective” of that class would be some definite way in which the behavior of “subjects” would be altered by undergoing the process. As far as I’m concerned, people who use the notion of “objectives” without protest have either been deceived themselves or themselves hold this inhuman and objectionable theory of the mind. Let this count as my protest against the notion, then.

Here is a fuller account of the content of these classes in the style approved by authorities on the question. This account may scare off some people who could have completed the course perfectly competently. This is not my fault.

Aims
To introduce the basic ways of symbolizing simple arguments, the methods of proving them according to the rules of natural deduction.

Objectives
When you have finished the course you should be able to do the following (at this point it is sufficient that you should not panic on reading them):
1. Distinguish arguments from statements, and from proofs;
2. Understand the requirements for truth, falsity, and validity;
3. Construct formal statements using variables and constants;
4. Identify the truth-functional connectives broadly equivalent to “not”, “and” “or”, “if”, “if and only if” (‘¬’, ‘&’, ‘∨’, ‘→’, ‘↔’);
5. Distinguish a well-formed formula (wff) from a jumble of symbols, and distinguish sequents from formulae;
6. Understand what is indicated by the use of brackets in formal contexts, and explain the notion of scope;
7. Identify the operator of major scope in a sequence
8. Use truth tables to test truth-functional arguments for validity;
9. Recognise and explain contingency, tautology, and inconsistency in truth-tables;
10. Apply the following rules of natural deduction: assumption, double negation, modus ponens, modus tollens, v-introduction, v-elimination, &-introduction, &-elimination, conditional proof and reductio ad absurdum.
11. Recognise quantifiers and quantifier notation;
12. Carry out basic quantifier translations and proofs
13. Perform simple translations of identity statements into and out of the quantifier notation, and carry out simple proofs involving identity
14. Recognise the extensional nature of the propositional and the predicate calculus, and show why this property is absent from other fields of discourse.
15. Recognise the use of tense notation and modal formulas, translating them into ordinary language.