Florida Atlantic University Department of Philosophy

PHI 2102

Logic

GS 208
Tuesday & Thursday 1-15 pm to 2-50 pm

professor andrew m. dobson
Office/Hours. AL 183 - TWR 11 to 1
Phone. 297-3816
E-mail. adobson1@fau.edu

Course Description & Objectives

Logic is a general introduction to the theory of good argument covering categorical, propositional, and predicate logic. Students may expect to learn the basic concepts of *form* and *validity*, as well as the basics of evaluating arguments.

Our aim is to learn how to use the apparatus of logic to analyze and evaluate the formal strength of arguments. Because this is not an applied logic or critical thinking course, the subject matter of the arguments we discuss is not strictly relevant—for all we care, we could be evaluating arguments about marsupials or men from Mars. Our job is to understand the formal properties of arguments, and hence we will very often be translating arguments given in English prose into symbolic form. Aside from learning various skills of argument analysis, students are expected to master the process of natural deduction, where complex arguments are provided with a valid justification.

□

A passing grade in Logic is necessary for all philosophy majors.

Students wishing to discharge a Gordon Rule math requirement may do so by passing this class.

□

We will cover in detail three ways of analyzing and evaluating the logic of arguments. The first way is the theory of the syllogism, roughly as it was taught by Aristotle. (We will add a visual method of evaluating arguments, Venn diagrams, developed by the 19th century logician John Venn.) The second way is the logical system built around whole propositions. The third, predicate logic, builds on ideas found in both syllogistic and propositional logic.

***

Aristotle's main concern was formulating a logic of class membership in order to deal with statements such as *all wombats are marsupials* and *some marsupials are Australian*. Ultimately, we are concerned to know what these two statements imply. Do they imply, for instance, that all wombats are Australian? Aristotelian logic lays out the rules for what can and cannot be deduced from such statements.

But very often we think in terms, not of classes, but whole propositions. (Roughly, a proposition is a declarative sentence that is either true or false.) Consider the following two propositions.

- This rose is red
- If this rose is red then either it is not blue or else I'm color blind

Neither of these are (principally) statements about class membership. Rather, we are concerned with the logic of a conditional statement, an "if...then..." statement. And notice how by taking both of them together we can deduce

- This rose is either not blue or else I'm color blind

By studying propositional logic, you will see that complex strings of propositions can be joined to form long arguments, and also that one can use a set of rules to prove that such arguments are valid.

Predicate logic takes propositional logic and adds some devices for representing the logic of quantified statements. As with Aristotelian logic, though with a different symbolic language, we are then able to mark the difference between saying, for example, that *some* roses are red versus saying *all* roses are red—propositional logic allows no such distinction.

Textbook & Materials

There is one textbook, Patrick Hurley's (2008), *A Concise Introduction to Logic* (**10th edition only**). As necessary, additional material will be posted to Blackboard in pdf format. Students are expected to print their own copy of this material.

Exams will require scan forms. Buy several of the large blue variety at the bookstore.

Assessment & Policies

Your course grade is composed of grades from exams, quizzes, and homework. The grade you see on Blackboard will, without exception, be your course grade—no extra credit is ever offered.

Grade Equivalences

The following equivalences will be adhered to strictly.

- A (94 to 100), A- (90 to 93)
- B+ (87 to 89), B (84 to 86), B- (80 to 83)
- C+ (77 to 79), C (74 to 76), C- (70 to 73)
- D+ (67 to 69), D (64 to 66), D- (60 to 63)
- F (59% and lower)

Grade Composition

- Exam 1: 15%
- Exam 2: 15%
- Exam 3: 15%
- Exam 4: 15%
- Exam 5: 15%
- Homework: 15%
- Quizzes: 10%

Exams are closed book, and they are not cumulative. Your lowest exam grade is dropped.

Homework is due at the beginning of class and is graded for adequate completion, meaning that a full faith effort must be made to complete the homework. Complete homework is given full credit. Incomplete homework and *all* late homework is given 50%, regardless why it is incomplete or late. Your two lowest homework grades are dropped.

Quizzes are graded for accuracy and may not be made up because of absence or sickness. Your lowest quiz grade is dropped.

Exam Policies

Students who miss exams must have a very good excuse, verified by some documentation. **I reserve the right not to allow you to make up a missed exam.** If you are granted permission to make it up, you will do it in the Testing Center and at a time I set. You will not be allowed to make it up during regularly scheduled class time.

Incompletes

If you wish to receive an incomplete grade, you must provide me with (a) a written request stating your reasons, and (b) written evidence supporting these reasons. Along with my recommendation, your request is then submitted to the Philosophy Department Chair Dr. Headley who makes the final decision. If Dr. Headley approves, you must go to the Philosophy Department in AH 110 to fill out the incomplete form wherein I specify the deadline for completing any remaining coursework. By default, if you do not complete the work in time, your incomplete becomes an F. Both Dr. Headley and I must sign this form.

In all cases, FAU policy states that if the incomplete form is not filled-out and signed by you, me, and Dr. Headley, the registrar will automatically change the incomplete to an F after six months have expired. It is also FAU policy that in the event work is not completed by the stated deadline, the registrar automatically changes the incomplete to an F.

You are reminded that once you have submitted all

necessary work, you bear full responsibility for confirming that your incomplete has been correctly changed to the new grade. *Absolutely no exceptions will be made to this policy*.

Class Attendance

Class attendance is mandatory. A pattern of unexcused absences is grounds for failing the course, regardless of your grades on tests and assignments. It is a vital part of this course that you not only submit your work but that you participate in class, and obviously this isn't possible unless you attend regularly. As a rule of thumb, if you've missed an equivalent of two weeks worth of classes, you will not be allowed to pass the class. Assume that attendance is taken every day.

Class Demeanor

Students are expected to be in class on time, and can expect to be downgraded at the end of the semester if there is a pattern of tardiness (and/or unexcused absences; see above).

The use of cell phones for any purpose is strictly forbidden. Students are required to turn off phones and place them out of sight in their bags. Penalties (such as being downgraded) will be imposed for anyone incapable of respecting the integrity of the classroom as a place of learning, where we may all expect each other's undivided attention. To be clear and fair about this, students deserve this respect not just from their peers but from their instructors too.

Honor Code

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty, including cheating and plagiarism, is considered a serious breach of these ethical standards, because it interferes with the University mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the University community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, go too: http://www.fau.edu/regulations/chapter4/4.001_Honor_Code.pdf.

Students with Disabilities

In compliance with the Americans with Disabilities Act (ADA), students who require special accommodations due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) located in SU 133 (561-297-3880), and follow all OSD procedures.

Schedule of Classes

Throughout the semester, classes are scheduled as below and will not deviate. If I happen to miss class, assume that the schedule will continue as advertised. I will of course make adjustments to the lecture so that any problems students are having are dealt with.

Always assume that there will be a quiz every class.

Week One

Class 1 5/12

- Introduction & Syllabus

Class 2 5/14

- Basic Concepts
  - 1.1 Arguments, Premises, & Conclusion
  - 1.2 Recognizing Arguments
  - Homework exercises for class 2 due:
    - 1.1 (I) 1-20
    - 1.1 (III)
    - 1.1 (IV)
    - 1.2 (I) 1-12
    - 1.2 (III) 6
    - 1.2 (VI) 1-10

Week Two

Class 3 5/19

- Basic Concepts (*continued*)
  - 1.3 Deduction & Induction
  - 1.4 Validity, Truth, Soundness
- Homework exercises for class 3 due:
  - 1.3 (I) 1-12
  - 1.3 (III) 1-15
  - 1.4 (I) 1-15
  - 1.4 (III) 1-10
  - 1.4 (V) 1-8

Class 4 5/21

- Basic Concepts (*continued*)
  - 1.5 Proving Invalidity
- Homework exercises for class 4 due:
  - 1.5 (I) 1-10

Week Three

Class 5 5/26

- **EXAM 1 (15%)**

Class 6 5/28

- Categorical Propositions
  - 4.1 The Components of Categorical Propositions
  - 4.2 Quality, Quantity, & Distribution
  - 4.3 Venn Diagrams & The Modern Square of Opposition
- Homework exercises for class 6 due:
  - 4.1
  - 4.2 (I), (II), (III), & (IV)
  - 4.3 (I), (II), & (III)

Week Four

Class 7 6/2

- Categorical Propositions (*continued*)
  - 4.4 Conversion, Obversion, & Contraposition
  - 4.5 The Traditional Square of Opposition
- Homework exercises for class 7 due:

- 4.4 (I), (II), & (III)
- 4.5 (I) 1-5
- 4.5 (II) 1-5
- 4.5 (III)
- 4.5 (IV) 1-10

Class 8 6/4

- Categorical Propositions (*continued*)
  - 4.6 Venn Diagrams & The Traditional Standpoint
- Homework exercises for class 8 due:
  - 4.6 (I) 1-6
  - 4.6 (II) 1-5

Week Five

Class 9 6/9

- Categorical Syllogisms
  - 5.1 Standard Form, Mood, & Figure
  - 5.2 Venn Diagrams
- Homework exercises for class 9 due:
  - 5.1 (I), (II), (III), & (IV)
  - 5.2 (I) 1-10
  - **5.2 (II)**

Class 10 6/11

- **EXAM 2 (15%)**

Week Six

Class 11 6/16

- Propositional Logic
  - 6.1 Symbols & Translation
  - 6.2 Truth Functions
- Homework exercises for class 11 due:
  - 6.1 (I), (II), & (III)
  - 6.2 (I)
  - 6.2 (II)
  - 6.2 (III) 1-15
  - 6.2 (IV) 1-10

Class 12 6/18

- Propositional Logic (*continued*)
  - 6.3 Truth Tables for Propositions
- Homework exercises for class 12 due:
  - 6.3 (I) 1-10
  - 6.3 (II) 1-8
  - 6.3 (III) 1-5

Week Seven

Class 13 6/23

- Propositional Logic (*continued*)
  - 6.4 Truth Tables for Arguments
- Homework exercises for class 13 due:
  - 6.4 (I) & (II)

Class 14 6/25

- Propositional Logic (*continued*)
  - 6.6 Argument Forms & Fallacies
- Homework exercises for class 14 due:
  - 6.6 (I) 1-6
  - 6.6 (II) 1-6

Week Eight

Class 15 6/30

- **EXAM 3 (15%)**

Class 16 7/2

- Natural Deduction in Propositional Logic
  - 7.1 Rules of Implication I

- 7.2 Rules of Implication II
- Homework exercises for class 16 due:
  - 7.1 (I) 1-10
  - 7.1 (II) 1-10
  - 7.1 (III) 1-10
  - 7.2 (I) 1-10
  - 7.2 (II) 1-6
  - 7.2 (III) 1-10

Week Nine

Class 17 7/7

- Natural Deduction in PL (*continued*)
  - 7.3 Rules of Replacement I
- Homework exercises for class 17 due:
  - 7.3 (I) 1-10
  - 7.3 (II) 1-10
  - 7.3 (III) 1-10

Class 18 7/9

- Natural Deduction in PL (*continued*)
  - 7.4 Rules of Replacement II
- Homework exercises for class 18 due:
  - 7.4 (I) 1-10
  - 7.4 (II) 1-10
  - 7.4 (III) 1-10

Week Ten

Class 19 7/14

- Natural Deduction in PL (*continued*)
  - 7.5 Conditional Proof
  - Homework exercises for class 19 due:
    - 7.5 (I) 1-10
    - 7.5 (II) 2, 3

Class 20 7/16

- Natural Deduction in PL (*continued*)
  - 7.6 Indirect Proof
- Homework exercises for class 20 due:
  - 7.6 (I) 1-10
  - 7.6 (II) 2, 3

Week Eleven

Class 21 7/21

- **EXAM 4 (15%)**

Class 22 7/23

- Predicate Logic
  - 8.1 Symbols and Translation
- Homework exercises for class 22 due:
  - **8.1 1-30**

Week Twelve

Class 23 7/28

- Predicate Logic (*continued*)
  - 8.2 Using the Rules of Inference
- Homework exercises for class 23 due:
  - 8.2 (I) 1-9

Class 24 7/30

- **EXAM 5 (15%)**