Date prepared: 1/30/13

Syllabus
The University of New Orleans
Dept. of Philosophy

PHIL 3101: Advanced Logic (3 credits)

SECTION 001: LA 370, Tue/Thur, 9:30 - 10:45 p.m.

<table>
<tr><td rowspan="6">**Contact Information**</td><td>**Instructor:**</td><td>Dr. Robert Stufflebeam</td></tr>
<tr><td>**Office:**</td><td>UNO: LA 385</td></tr>
<tr><td>**Office Hours:**</td><td>M-T-W-Th, 12:30 – 2:00 (and by appointment)</td></tr>
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<tr><td>**Email:**</td><td>rstuffle@uno.edu (add '**PHIL 3101**' to subject line)</td></tr>
<tr><td>**Course Webpages:**</td><td>Moodle login page</td></tr>
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Course Description

CATALOG DESCRIPTION: A study of the semantics of formal languages, including proofs of the consistency and completeness of the propositional and first-order predicate logics. The course may also include discussion of such non-standard logics as multi-valued, modal, and deontic.

COURSE OVERVIEW: Logic is the study of the principles and methods used to distinguish "good" reasoning from "bad" reasoning. Arguments are the main medium through which we reason. When English is the language used to study arguments and such expressed in English, the logic is *informal*. When a symbolic or "formal" language is used to study arguments expressed in English (or the forms of such arguments), the logic is *formal*. Through the study of **sentential logic** (**S-logic**) and then **predicate logic** (**P-logic**), the main aim of this course is to explore the nature and limits of formal systems. Toward this end, we shall also explore certain metalogical concepts dealing with the foundations of mathematics and formal computation, including: proofs, consistency, completeness, Gödel's proof, functions, and computation.

Student Learning Outcomes

Upon successfully completing this course, students will be able to do the following:

- to understand the nature of logic and formal systems
- to understand and to apply the principles of "good" deductive reasoning (both in English and symbolically)
- to understand the following distinctions:

    o object language vs. metalanguage
    o informal logic vs. formal logic
    o deductive logic vs. inductive logic
    o sentences vs. statements
    o statements vs. statement forms
    o arguments vs. argument forms
    o cogency vs. validity
    o assumptions vs. presumptions

- to know the different types of statements (atomic and compound), their anatomy, and the conditions according to which any given statement is true or false
- to recognize arguments expressed in prose and to reconstruct them in standard form
- to understand the RIFUT Rule and all of the fallacies associated with violating it
- to evaluate the cogency of an argument fully
- to determine whether a claim follows from its evidence (i.e., whether an argument is valid) using truth-tables and proofs
- to translate statements from English into the formal languages of **S-logic** and **P-logic** (and vice versa)
- to demonstrate whether a statement is logically true, logically false, or contingent
- to know the logical relations among statements (e.g., validity, invalidity, consistency, etc.)
- to know the rules of natural deduction and to be able to use them both symbolically and in English
- to read, to understand, and to construct formal proofs, hybrid proofs, and informal proofs
- to prove that a statement (or statement form) is a theorem
- to construct cogent arguments and proofs in English
- to understand Godel's Proofs regarding completeness and consistency
- to understand the nature of functions
- to understand the relation between formal logic and symbolic (digital) computation

Requirement			Final grade	
Quizzes	(15%)	15 points	**A**	100 – 89.5 points
Exam 1	(20%)	20 points	**B**	89.4 – 79.5 points
Exam 2	(20%)	20 points	**C**	79.4 – 69.5 points
Exam 3	(20%)	20 points	**D**	69.4 – 59.5 points
Portfolio	(25%)	25 points	**F**	59.4 — 0 points

Course Requirements

QUIZZES: There will be a series of quizzes given over the semester. Most quizzes will be at the beginning of class. There will be no make up quizzes. The quizzes are worth 15% of your final grade.

EXAMS: There will be **3** in class exams. Each exam is composed of conceptual questions as well as skills questions corresponding to the exercises for that portion of the course. The exams are worth 60% of your final grade.

PORTFOLIO: Through several argument construction, argument evaluation, and other reasoning portfolio assignments, you are required to apply the deductive reasoning skills you have learned by completing the exercises. Generally, there is one assignment per chapter. It will be due a week after it is assigned. You must turn in your assignments on time (since some assignments require applying "new" skills to your "old" assignments). I'll supply some templates (Word **.docx** files) to make things easier. Portfolio assignments are worth 25% of your final grade.

EXTRA CREDIT: **10** points extra credit is available by completing a fallacy recognition / evaluation assignment. Each submission is worth **1** percentage point. Extra credit must be completed and submitted in accordance with the guidelines that are on Moodle.

NOTE: It is university policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities that may affect their ability to participate in course activities or to meet course requirements. Students with disabilities are encouraged to contact their instructors to discuss their individual needs for accommodations. If you have any questions, contact the Office of Disability Services at UC 260, 280-6222 (voice).

What follows are my class policies. If for any reason you are unable to abide by these policies, you should withdraw from my course.

Course Policies

ACADEMIC DISHONESTY:	Academic honesty is fundamental to the process of learning and to evaluating academic performance. **Academic dishonesty** includes the following: cheating (e.g., collaborating while taking an exam), plagiarizing, tampering with academic records or exams, falsifying identity, and being an accessory to acts of academic dishonesty. I HAVE **ZERO** TOLERANCE FOR ACADEMIC DISHONESTY! If I find you guilty of cheating on an exam or plagiarizing your essay, not only will you receive a '0' on the assignment, I shall aggressively pursue both your receiving an overall 'F' AND a permanent blemish on your record. Refer to the UNO Judicial Code for further.
ATTENDANCE:	Your attendance is required. Classes begin on time. Do NOT stroll in late. And if you know that you must leave class early, let me know.
AUDITS:	Whether an audit is successful will depend only on your class participation performance.
COMPUTERS/PADS:	If you use a computer or pad with which to take notes, that's fine. But you may NOT check email, Facebook, etc. during class.
INCOMPLETES:	Incompletes are STRONGLY discouraged. Should you need to take an incomplete, arrangements must be made with me well before the last class meeting.
CLASSROOM CONDUCT/ SEXUAL HARASSMENT:	Feel free to say anything to me or to your peers, but tailor your remarks so as not to be uncivil, abusive, or inappropriate. I will not tolerate ANY abusive behavior in the one minute argument discussions, so do not engage in any personal attacks or name calling. (See my 'warning' below.)
LATE-STARTS:	There are no special dispensations for late-start students.
LATE WORK:	*Portfolio assignments*: The portfolio assignment guidelines identify the dates on which your assignments are due. Assignments are always due at the beginning of class. Generally, if turned in during or after class but no more than one week late, the assignment will be penalized one letter grade. If turned in after that class but no more that two weeks late, it will be penalized two letter grades. And so on. Failing to complete assignments by the time I turn in grades will result in your receiving a '0' for those assignments, not an incomplete.
MAKE-UPS:	There will be no make-up quizzes. If you miss an exam, it is YOUR responsibility to tell me promptly (via phone, email, or in person) what *extreme* circumstances prevented your presence in class. Failing to do so will result in your receiving a '0' on the exam. Regardless of the reason for the make-up, if I give one, it will be harder than the original. Make-up exams are bad, bad things. Don't be tempted by them.
PHONES:	Distracting interruptions are inconsiderate, disrespectful, and time-wasting. Phones should be turned off before class begins. Do NOT text during class.
WITHDRAWALS:	You may withdraw from this course for any reason. Withdrawal is strictly up to you and none of my business. Look in the course listings for the last day to withdraw without a penalty — a 'W' appearing on your transcript.

WARNING! Doing logic requires a willingness to think critically. Critical thinking does not consist in merely making claims. Rather, it requires offering reasons/evidence in support of your claims. It also requires your willingness to entertain criticism from others who do not share your assumptions. You will be required to do logic in this class. Doing logic can be hazardous to your cherished beliefs. Consequently, if you are unwilling to participate, to subject your views to critical analysis, to explore issues that cannot be resolved empirically, or to use computers, then my course is not for you.

PHIL 3101 Game Plan
(subject to revision)

DATE	TOPIC	READ	PA
(1) T Jan. 15 (2) Th Jan. 17	**Introduction to logic** • "good" reasoning matters • the nature of logic and types of logic • the nature of arguments • deductive arguments vs. inductive arguments • the problem of induction • an object language vs. a metalanguage • the use-mention distinction	Ch. 1	PA 1
(3) T Jan. 22 (4) Th Jan. 24 (5) T Jan. 29 (6) Th Jan. 31	**INFORMAL LOGIC & SENTENTIAL LOGIC (S-logic)** **Statements and statement forms** • functions of language • sentences vs. statements • types of statements • truth, functions, and truth functions	Ch. 2	PA 2
	• **S-logic** alphabet: constants, variables, connectives, grouping indicators • statement forms and substitution instance • negations, conjunctions, disjunctions, conditionals, and biconditionals	Ch. 7	PA 7
(7) T Feb. 05	**Recognizing arguments** • premise = assumption = evidence • conclusion = inference = deduction = claim • evidence + claim = argument • indicators • useful generalizations • writing arguments in standard form	Ch. 3	
(8) Th Feb. 07 T Feb. 12 (9) Th Feb. 14	**Evaluating arguments informally** • deduction vs. induction revisited • Are all valid arguments "good" arguments? • cogency vs. validity • The RIFUT Rule (the evidence must be **R**elevant to the claim, **I**ndependent of the claim, **F**ree of dubious assumptions, **U**nambiguous, and **T**rue) • fallacies of relevance, independence, presumption, and ambiguity	Ch. 4	PA 4
(10) T Feb. 19	**Exam 1**		
(11) Th Feb. 21 (12) T Feb. 26	**Truth-table methods** • logical equivalence • logical properties of statements (tautologies, contradictions, and contingent statements) • anatomy of truth-tables • evaluating logical properties of statements (tautologies, contradictions, and contingent statements) • evaluating validity: "long" truth-table method • evaluating validity: "short" truth-table method	Ch. 8	PA 8
(13) Th Feb. 28 (14) T Mar. 05 (15) Th Mar. 07	**Proof method** • the nature of proofs • natural deduction • rules of inference • rules of replacement	Ch. 9	
(16) T Mar. 12 (17) Th Mar. 14 (18) T Mar. 19	• conditional proof rule • indirect proof rule	Ch. 10	PA 10
(19) Th Mar. 21	**Exam 2**		

	T	Mar. 15	**PREDICATE LOGIC (P-logic)**		
	Th	Mar. 17	**The alphabet and grammer of P-logic**		
(20)	T	Apr. 02	• **P-logic** alphabet	Ch. 11	PA 11
(21)	Th	Apr. 04	• singular atomic wffs		
			• simple identity wffs		
			• truth-functional compound wffs without quantifications		
(22)	T	Apr. 09	**Quantifications**	Ch. 12	PA 12
(23)	Th	Apr. 11	• general wffs		
			• truth-functional compound wffs with quantifications		
			• complex identity relations		
(24)	T	Apr. 16	**Proof method**	Ch. 13	PA 13
(25)	Th	Apr. 18	• new rules of inference		
			• new rules of replacement		
(26)	T	Apr. 23	• hybrid proofs	Ch. 14	PA 14
(27)	Th	Apr. 25	• informal proofs		
			• proving your claims		
(28)	T	Apr. 30	**METALOGIC**	*Godel's Proof*	PA Final
(29)	Th	May 02	• consistency		
			• completeness		
			• Godel		
			• functions		
	W	May 08	**10:00-12:00 - Exam 3**; **PA Final & EC due**		