PHIL 134 – Introductory Formal Logic

Summer Semester, 2007

Unit Outline

Last modified 8/1/07
UNIT OUTLINE: Phil 134, Introductory Formal Logic

Students in this unit should read this unit outline carefully at the start of course. It contains important information about the unit. If anything in it is unclear, please consult one of the teaching staff.

ABOUT THIS UNIT

Logic is the study of good reasoning. Formal logic applies the tools of the formal sciences to the study of reasoning.

In this unit we introduce the basic concepts of formal logic: both propositional logic and predicate logic. Students will learn how to represent arguments symbolically and to use formal techniques to analyse these representations. We will also critically examine some of the assumptions underlying formal approaches to logic.

Phil 134 will be of interest both to those who want to study logic for its own sake, and those who need to understand the techniques of formal logic in Computing, Mathematics, Linguistics and Philosophy.

Phil 134 is worth 3 credit points.

TEACHING STAFF

The lecturer and convenor is Mr Greg O’Keefe:
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Web: http://rsise.anu.edu.au/~okeefe
Consultation times: Wednesday 3-5

CLASSES

The course meetings are on Tuesdays and Thursdays at 4-7pm. All meetings are held in E6A room 131. There are no separate lectures and tutorials, all the teaching will be in these meetings.
(Absence of) Unit Web Page

The unit does not have a website. Some electronic materials may be made available by email or on the lecturers website.

Textbook

The course text is Logic (Routledge: 1999), by Paul Tomassi. It contains all of the required reading for the course, and the exercises for you to work on throughout the unit. You will need to purchase this book, which is available in the Co-op bookshop.

In any study, it is always good to read widely in that subject, but in logic, you must take care! Different books often use different notation and terminology, and present different formal systems. This can be confusing for beginners.

Assessment

The assessment for internal students will consist of five components:

• A homework assignment will be handed out at each meeting, except for the last, to be handed in at the beginning of the following meeting. These assignments together are worth 10%.
• An in-class test in the meeting of Thursday January 25, worth 30%, covering material from meetings 1-5
• Final exam, on 15 February, worth 50%, covering the entire unit, with the main focus on meetings 6-10
• Tutorial participation (throughout semester), worth 10%

If you miss the in-class test, contact Greg O’Keefe as soon as possible. You will require a medical certificate or other appropriate documentation explaining your absence, to be granted a supplementary test.


**TEACHING AND LEARNING STRATEGY**

There are 10 meetings of 3 hours each. At the beginning of each meeting, we will mark and address difficulties with the homework assignment from the previous meeting. This will be followed by a 50 minute lecture on some theoretical, historical or philosophical material. The second half of the meeting will be dedicated to practical skill building work. Greg will demonstrate some technique, then set exercises for students to work on in class, helping students individually as difficulties are encountered. At the conclusion of each meeting (except for the last) a homework assignment and readings from Tomassi will be set, for completion before the next meeting.

**LEARNING OUTCOMES**

In this unit, students will develop a good understanding of the fundamentals of formal logic. You will learn to translate between English and the languages of propositional and quantificational logic, and to use formal techniques for evaluating the validity of arguments in those systems, using syntactic and semantic methods.

You will also be introduced to some of the philosophical assumptions underlying formal logic, and to some of the extensions of formal logic into philosophy and other areas.

University study does not only aim to provide you with knowledge and skills in a particular academic discipline, but also in research, work and expression skills that will help you in later employment. These are known as generic skills. The main generic skills you will be learning in this unit are problem solving skills and critical analysis skills.
RELATIONSHIP BETWEEN ASSESSMENT AND LEARNING OUTCOMES

The assessment activities for Phil 134 are designed to assess the skills and understanding developed throughout the course.

The homework assignments are designed to test students’ understanding of the fundamental concepts that have been introduced, and provide early feedback.

The in-class test and the final exam will test students’ ability to apply what they have learnt, in a series of problems similar those that will have been set each week from the textbook. These tests and exam will be relatively straightforward for anyone who has kept up with the exercises.

The course meetings will provide students with an opportunity to discuss the course material, and apply the skills developed throughout the course.

HOW TO DO WELL IN THIS UNIT

Firstly, Do not Panic! There are symbols in this course, and people are often frightened by symbols. The symbolic expressions are not so complicated as they look, just relax and begin with the parts you do understand. You will soon master it.

The way to maximise your chance of doing well in this unit is to make sure you keep up. Everything you do in this course builds on what you have done in previous weeks, so if you keep up with the lectures, readings and exercises then you will gradually build up an understanding of everything you need to be able to do. If you do miss a few lectures, though, or a few weeks’ exercises, catching up can be difficult. (And last-minute cramming really won’t work!)

You learn logic by doing logic, not just by listening to someone talk about it, or reading about it. Most of the assessment is on specific techniques, and you must practice them to learn to do them. Always do the exercises.

So make sure you come along to the lectures, do the suggested readings and exercises, and if you do get stuck on something, ask for help. The staff are here to assist you, so don’t hesitate to ask for help if you need it.
PLAGIARISM

The University defines plagiarism in its rules: "Plagiarism involves using the work of another person and presenting it as one's own." Plagiarism is a serious breach of the University's rules and carries significant penalties. You must read the University's practices and procedures on plagiarism. These can be found in the *Handbook of Undergraduate Studies* or on the web at: http://www.student.mq.edu.au/plagiarism/

The policies and procedures explain what plagiarism is, how to avoid it, the procedures that will be taken in cases of suspected plagiarism, and the penalties if you are found guilty. Penalties may include a deduction of marks, failure in the unit, and/or referral to the University Discipline Committee.

All assessments in this course are individual assessments, and are not to be worked on with others.

UNIVERSITY POLICY ON GRADING

Academic Senate has a set of guidelines on the distribution of grades across the range from fail to high distinction. Your final result will include one of these grades plus a standardised numerical grade (SNG).

On occasion your raw mark for a unit (i.e., the total of your marks for each assessment item) may not be the same as the SNG which you receive. Under the Senate guidelines, results may be scaled to ensure that there is a degree of comparability across the university, so that units with the same past performances of their students should achieve similar results.

It is important that you realise that the policy does not require that a minimum number of students are to be failed in any unit. In fact it does something like the opposite, in requiring examiners to explain their actions if more than 20% of students fail in a unit.

The process of scaling does not change the order of marks among students. A student who receives a higher raw mark than another will also receive a higher final scaled mark.

**STUDENT SUPPORT SERVICES**

Macquarie University provides a range of Academic Student Support Services. Details of these services can be accessed at [http://www.student.mq.edu.au](http://www.student.mq.edu.au).

**UNIT SCHEDULE**

<table>
<thead>
<tr>
<th>Meeting</th>
<th>Main focus</th>
<th>Reading (from Tomassi)</th>
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| 1       | Introduction  
The language of propositional logic (PL)  
PL translation | Chapter 1,  
Chapter 2.1-III, X-XI |
| 2       | History of Logic  
The language of quantified logic (QL)  
QL Translation | Chapter 5.I-V |
| 3       | Applications of Logic  
Advanced QL Translation | Chapter 5.VI-XII |
| 4       | Formal Semantics of PL and QL languages  
Sets, pairs, products, relations, functions  
Truth tables, “shortcut” method | Chapter 4.I-IX, XII  
Chapter 5.IV (again!) |
| 5       | Semantic Techniques  
Truth trees for PL | Chapter 4.X-XI |
| 6       | **in-class test**  
Truth trees for QL | Chapter 7 |
| 7       | Deduction  
PL deduction | Chapter 2.III-IX  
Chapter 3 |
| 8       | PL, QL deduction | Chapter 6.I-VII |
| 9       | Metatheory and Automated Reasoning  
QL deduction, proof strategy | Chapter 6.VIII-IX |
| 10      | Revision | |