

**University of London M.A. 2001-2**  
**Logic**  
**(BBK and KCL M.A. Conversion students)**

**Lecture Schedule**

**Lecturer:** Guy Longworth  
g.longworth@bbk.ac.uk

**Place:** T1: 2.04, Clore Management Centre  
T2: 201 Gresse Street  
**Time:** Mondays, 7.45-8.45

**Aims of course**

- to acquaint students with the methods of formal logic
- to acquaint students with some of the philosophical questions raised by formal logic

**Objectives of course**

Students who successfully complete the course will:

- have an understanding of the key concepts and terminology of formal logic
- have a basic understanding of problems raised in attempts to formalise natural language reasoning
- be able to perform elementary proofs in propositional and predicate calculi
- be able to represent simple claims and arguments from natural language in propositional and predicate calculi
- have some understanding of some of the philosophical issues raised by formal logic

**The text book for these lectures is:**

Guttenplan, Samuel (1997) *The Languages of Logic*, 2<sup>nd</sup> Edition, Oxford: Blackwell (henceforth, LL). It is essential that you acquire a copy of this book immediately and work through the readings specified each week.

**Optional readings:**

Forbes, Graeme (1994) *Modern Logic*, Oxford: OUP. A careful treatment of formal methods. Not easy, but a good place to look ahead to more advanced topics.

Hodges, Wilfred (1977) *Logic*, Penguin. A classic text. Deals at length with the business

of representing natural language claims in the formal systems we'll be looking at.

Lemmon, E. J. (1965) *Beginning Logic*, London: Nelson. Another classic. A good basic introduction, especially strong on natural deduction.

Lepore, Ernest (2000) *Meaning and Argument*, Oxford: Blackwell. Quite detailed treatment of a variety of types of natural language expressions, but big and easy to get lost in.

Sainsbury, Mark (1991) *Logical Forms*, Oxford: Blackwell. An excellent, but fairly advanced, introduction to logic. Especially good on philosophical issues surrounding logic.

## **The Lectures**

There are fifteen lectures in total; the topics addressed follow. Although many of the topics will be covered in the Lectures, Lectures will also involve discussion and exercises. In order to ensure coverage of the topics it is therefore insufficient to attend the Lectures. Students must also work through the (non-optional) readings given below, completing all exercises.

### **Part I: The Nature of Deductive Logic**

#### **Lecture 1: What is Logic?**

What is logic? Arguments and validity: *arguments (chains of reasoning); premises and conclusions; truth, falsity, and truth-values; definition of deductive validity*. Why study logic?

**Reading:** LL, chs 1, 2.

(Optional reading: Sainsbury, ch.1; Hodges, chs. 1-3.

#### **Lecture 2: Validity**

What is validity? Validity and possible situations. Intuitive tests for validity and their limitations. A strategy for providing more effective tests.

**Reading:** LL, chs. 2, 3.

(Optional: Sainsbury, ch. 1)

#### **Lecture 3: Primitive**

More on the proposed test for validity. Primitive, a first language of logic. Truth-tables for primitive.

**Reading:** LL ch. 3, 4.

**Part II:**                    *Sentential or the Propositional Calculus*

**Lecture 4:**        **Sentential: Syntax, Schemata, and Scope**

Moving from Primitive to Sentential. The need for rules of syntax.  
Schemata                    and truth-tables for schemata. Scope and schemata.

**Reading:** LL ch. 5.

(Optional: Sainsbury, ch. 1, §10-12)

**Lecture 5:**        **A Decision procedure for Sentential**

Constructing truth-tables for sentences of Sentential. Using truth-tables to determine the validity of arguments in Sentential.

**Reading:** LL, ch.6.

**Lecture 6:**        **Consistency and Validity**

Some new concepts: *Tautologies, Contradictions, Contingent claims.*  
Consistency                    and Validity.

**Lecture 7:**        **Translating Natural Language Arguments into Sentential**

**Reading:** LL, chs. 7, 8.

(Optional: Sainsbury, ch. 2.)

**Lecture 8:**        **Deduction in Sentential**

Deduction: systems of rules that enable us to construct valid arguments.

**Reading:** LL, ch. 9.

(Optional: Lemmon, ch.1; Forbes ch. 4.)

**Part III:**            *Predicate or the Predicate Calculus*

**Lecture 9:**        **Structure within sentences**

Does Sentential capture all natural language arguments which are valid in virtue of their form? Looking at sub-sentential structure: *Designators* and *Predicates*.

**Reading:** LL, chs. 10, 11.

**Lecture 10:**      **Predicate I: Variables and Quantifiers**

Universal and Existential quantification: 'all' and 'some'.

**Reading:** LL, ch. 11.  
(Optional: Sainsbury, ch. 4., §1-4.)

**Lecture 11: Predicate II: Multiple generality and Scope**  
Sentences involving more than one quantifier.

**Reading:** LL, ch. 12.  
(Optional: Sainsbury, ch. 4, §1-4.)

**Lecture 12: Translating Natural Language Arguments into Predicate.**  
More on Predicate. Translating into Predicate.

**Reading:** LL, ch. 13.  
(Optional: Sainsbury, ch. 4, §13-15, 21.)

**Lecture 13: Validity in Predicate.**  
Validity and testing for validity in Predicate.

**Reading:** LL, ch. 14.  
(Optional: Sainsbury, ch.4, §14-15, 22.)

**Lecture 14: Deduction in Predicate.**  
Constructing arguments in Predicate.

**Reading:** LL, ch. 14.  
(Optional: Lemmon, ch. 3; Forbes, chs. 5-8, especially chs. 6, 8.)

**Lecture 15: Identity, Problems, and Prospects.**  
Addition to Predicate of a symbol for identity.  
Looking ahead to some problems and prospects in formal logic.

**Reading:** LL, ch. 15.  
(Optional: on identity: Sainsbury, ch. 4, §8; on problems and prospects:  
Sainsbury, ch. 6. (this is very difficult.))

Guy Longworth  
g.longworth@bbk.ac.uk