COURSE INFORMATION
Formal Foundations of Linguistics
(Linguistics 680)
Autumn 2011
5 credits

Lecture: TR 11:30-1:18, Biological Sciences 676

Recitation: F 11:30-12:18, Biological Sciences 676

Course Web Site: `http://www.ling.ohio-state.edu/~scott/680/`

Instructor:

Carl Pollard
Office: Oxley Hall 18
Office hours by appointment
E-mail: pollard@ling.ohio-state.edu
Office phone: (614) 292-7590
Cell: (614) 975-9789

Teaching Assistant:

Scott Martin
Office: Oxley Hall 24b
Office hours by appointment
Web: `http://www.ling.ohio-state.edu/~scott/`
Office phone: (614) 292-8878

Prerequisite: satisfaction of the GEC Requirement in Mathematical and Logical Analysis (or the equivalent). It is not required to have taken a linguistics course, but if you have, the motivation for learning this kind of math might seem less mysterious!

Please note: Linguistics 680 or its equivalent is a prerequisite for Linguistics 683.01 (Semantics 1), Linguistics 684.02 (Computational Linguistics 2), Linguistics 602.02 (Syntax 2), and Linguistics 780 (Pragmatics).

Content: Linguistics 680 introduces fundamental mathematical concepts and techniques used in precise formulation of linguistic theories. Many of these concepts and techniques are also applicable in areas such as logic, artificial intelligence, computer science, philosophy (of language, science, or mathematics), etc. The chief goal is to acquire technical facility through practice in solving problems, primarily in the form of informal (but rigorous) proofs. There are no exams or term papers. (But we will use the exam time slot for the last recitation session.) The course covers selected topics in set theory, abstract algebra, logic, and formal language theory. A tentative syllabus will be provided soon.

Text: *Formal Foundations of Linguistic Theory.* Downloadable at:
`http://www.ling.osu.edu/~scott/teaching/2011/autumn/680/fflt.pdf`

Format: Tuesdays and Thursdays: lecture, preferably interrupted as often as possible by questions and constructive comments! Fridays: Recitation. Practice in problem solving, clarification of material in lectures and text, discussion of returned problem sets, or whatever else you and Scott want to use the time for.

Grading: Based on percentage of total points on weekly problem sets:

A:	90-100	A-:	87-89	B+:	84-86	B:	81-83
B-:	78-80	C+:	75-77	C:	72-74	C-:	69-71
D+:	66-68	D:	63-65	E:	60-61		

There is also a fudge factor of a few points, so it is possible to raise your grade through regular attendance and constructive participation.

Written work: Preferably double-spaced computer formatted, but *extremely* neat hand printing in black ball-point pen is also acceptable. Written work can be turned in to Scott in person or by e-mail.

It is *very* important to leave ample margins (at least one inch all around) for written comments. And because – as with all math classes – the material builds cumulatively on what came before, it is *very* important to stay on track, including turning problem sets in when they are due.

Problem solutions and proofs must be written in easy-to-follow English prose, so that the structure of your reasoning is clear. Of course there will be equations and other formulas consisting of math symbols, but there must be enough prose to make clear what role the formulas are playing in your argumentation. Don't be alarmed if you are uncertain at the outset what counts as acceptable mathematical argumentation: this is one of the skills you will learn.

Study groups: Encouraged. But you must work alone when you write up your problem sets, using your own words.

Attendance: Very strongly recommended. Much material covered will be in the text, but not necessarily all. If you miss a class, you are responsible for reconstructing what you missed from classmates' notes. **We do not have time to reteach missed material during office hours!** Readings and problem sets will be posted on the course website, but there is always the possibility of material being introduced in class that is not covered in the readings.

Academic Misconduct: Academic misconduct, such as cheating or plagiarism, will not be tolerated. If you are unclear what constitutes academic misconduct, see pages 2-3 of the Code of Student Conduct:

`http://studentaffairs.osu.edu/pdfs/csc_12-31-07.pdf`

University policy requires faculty to report any case of academic misconduct to the appropriate university committee.

Disability services: Students who feel they may need an accomodation for a disability should contact me privately at the beginning of the course to discuss their specific needs. Faculty rely on the Office of Disability Services for assistance in assessing needs and developing accomodations for disabilities. Students with such needs are encouraged to contact that Office (614-292-3307, VRS (614-429-1334), web site:

`http://ods.ohio-state.edu`, e-mail:ods@studentlife.ohio-state.edu

(Very) Tentative Syllabus

Lecture 1 (9/22): Sets 1

Lecture 2 (9/27): Sets (continued)

Lecture 3 (9/29): Mathese

Lecture 4 (10/4): Relations and functions

Lecture 5 (10/6): Orders and equivalences

Lecture 6 (10/11): Inductive proof and recursive definition

Lecture 7 (10/13): Infinity

Lecture 8 (10/18): Regular languages and context-free languages

Lecture 9 (10/20): Syntax of first-order logic; first-order models

Lecture 10 (10/25): Introducing algebras: monoids and (semi-)lattices

Lecture 11 (10/27): Preordered Algebras

Lecture 12 (11/1): Trees

Lecture 13 (11/3): Natural Deduction: linear logic

Lecture 14 (11/8): Natural Deduction: positive intuitionistic logic

Lecture 15 (11/10): Disjunction and negation; quantification

Lecture 16 (11/15): heyting algebras and boolean algebras; (ultra-)filters

Lecture 17 (11/17): Typed lambda calculus: syntax and semantics

Lecture 18 (11/22): Typed lambda calculus: Curry-Howard correspondence

Lecture 19 (11/29): Higher order logic: defining the connectives, Henkin models, possible-worlds semantics with worlds as basic

Lecture 20 (12/1): Possible-worlds semantics with propositions as basic