LING 180/208 (Mathematical Structures in Language I)
Fall 2016

Instructor

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Office hours: Wednesdays 10am – 12 noon, or by appointment
                         Rolfe Hall 3312

Course website: CCLE (ccle.ucla.edu)
                         Check the website regularly for updates and announcements.

Course content

The course has two main goals:
        1. teaching basic methods and concepts from mathematics and logic (set theory, functions, ordering, relations, logic, writing proofs, …)
        2. using these tools to develop some well-known formal syntactic and semantic theories (categorial grammar, CFGs, compositional semantics, Boolean semantics, generalized quantifiers, …)

Textbook

Keenan and Moss, *Mathematical Structures in Language.* CSLI, 2016.
(available at UCLA Bookstore)

Lectures

Tuesday/Thursday 2:00 – 4:00, Haines A44
for 208 students only: alternative session Thursday 12:00 – 2:00, Campbell 3103D

Sections

TA: Deborah Wong   deborah.jm.wong@ucla.edu
Section 1A, Friday 9:00, Humanities A46
Section 1B, Friday 10:00, Humanities A26
Office hours: Monday 9-10am & 12-1pm, Campbell 2209 (TA office)

Homework

Homework exercises are an important part of your grade.
- Homework exercises from the textbook will be posted on the course website.
- Homeworks are to be submitted on **Tuesday**, at the **beginning of class**.
- Late homeworks are accepted for full credit **only** in case of documented medical emergency. Otherwise, late homeworks are accepted with a penalty, as follows: homework submitted on Wednesday is 10% off, homework submitted on Thursday is 20% off. Homework is not accepted for credit after Thursday, because the homework will be discussed in section on Friday.
- If you can't make it to class, leave your homework in Deborah's mailbox (Campbell 3125), and have it timestamped.

- You are encouraged to work together on homework problems, but you **have to** write up your own version. Homeworks that are suspiciously similar will be brought to the Dean of Students. There are different kinds of academic misconduct; it's not just copying. See here: http://www.studentgroups.ucla.edu/dos/assets/documents/StudentGuide.pdf

How to do well in the course

Some hints:
- Learning to do mathematics requires a lot of practice and trial and error, even more so than in other linguistics classes.
- Reading the textbook may seem daunting at first, especially if you are not familiar with formal notation. However, it is a very good idea to keep up with the reading. This will help you get familiar with the notation, and the writing style of formal work.
- The mathematical notation we use in this class is standard, and you cannot deviate from it: {1,2,3} means something very different from <1,2,3> or (1,2,3). When we take off points for these sorts of mistakes, we are sometimes perceived as being unreasonably strict. However, this is inherent to the subject matter, which requires very precise notation and formulation.
- Some of you may already be familiar with the mathematical background taught in the first two weeks. This does not mean you should stop paying attention, because the later material is most likely new, and builds on what we do in the first few weeks.

Scoring

- There are 8 homeworks, which make up 50% of your grade.
- There is a short in-class quiz in week 2. This is the only closed-book part of your grade, and will test your knowledge of the Greek alphabet and mathematical notation.
- The rest of your grade will be made up of the midterm and final exams. These are both take-home exams.

Homeworks	50%
Quiz (closed-book)	5%
Midterm (take home)	20%
Final (take home)	25%

Extra credit (for 180 students): in every set of homework exercises, some exercises are marked as 'extra credit'. These are required for 208 students, but count as extra credit for 180 students.

Schedule

	Week	Date	Chapters covered	Topics covered	Extra topics for graduate students	Homework	Reading
I. BACKGROUND	wk 0	Thu Sep 22	intro & Ch. 1	set theory, recursion in language			Ch 1
	wk 1	Tue Sep 27	Ch. 1 / Ch. 2	functions, sequences, infinity		HW 1 due	Ch 2
		Thu Sep 29	Ch. 2	definition by recursion; proofs			
II. SYNTAX	wk 2	Tue Oct 04	Ch. 4.1 – 4.3	orderings, relations, trees		HW 2 due	Ch 4
		Thu Oct 06	Ch. 4.4 – 4.6	constituency; categorial grammar (intro)	boolean phonology	**Quiz** (in-class)	
	wk 3	Tue Oct 11	Ch. 5	categorial grammar; relative clauses		HW 3 due	Ch 5
		Thu Oct 13	Ch. 6	context-free grammars			
	wk 4	Tue Oct 18	Ch. 6.3	CFGs and natural language		HW 4 due; Give out midterm	Ch 6; 7.1-7.2
		Thu Oct 20	Ch. 7.1 – 7.2	automata; regular expressions	Chomsky hierarchy; mildly context-sensitive languages		
III. SEMANTICS	wk 5	Tue Oct 25	Ch. 8.1 – 8.2;	sentential logic			Ch 8.1 – 8.2
		Thu Oct 27	Ch. 8.3	compositional semantics for English	quantifier raising	**Midterm due**	
	wk 6	Tue Nov 01	Ch. 8.3	compositional semantics for English		HW 5 due	Ch 8.3
		Thu Nov 03	Ch. 9	lattice theory	mathematical properties of propositional logic		
	wk 7	Tue Nov 08	Ch. 9	lattice theory		HW 6 due	Ch 9
		~~Thu Nov 10~~	*class cancelled*				
	wk 8	Tue Nov 15	Ch. 10.1 – 10.2	first order logic			Ch 10
		Thu Nov 17	Ch. 10.3	scope relations; lambda operator			
	wk 9	Tue Nov 22	Ch. 11	NPIs and monotonicity		HW 7 due	Ch 11
		~~Thu Nov 24~~	*Thanksgiving*				
	wk 10	Tue Nov 29	Ch. 12	generalized quantifier theory		Give out Final exam	Ch 12
		Thu Dec 01	Ch. 12	adverbial quantification + other applications of GQT	Bare Grammar (Keenan & Stabler)	HW 8 due	
		Wed Dec 07				**Final exam due**	