

Syllabus – Ling 667 – Mathematical Structures in Linguistics – Fall 2008

Course information

Instructor: Jeff Heinz heinz@udel.edu 310-831-2924 42 E. Delaware, room 102 Office Hours: F 9-10am and by appointment	Course: Linguistics 4/667 Math Ling Monday, Wednesday 10:10 - 11:25am 316 Gore Hall
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There is a class website with material posted to it. This site is

<http://www.ling.udel.edu/~heinz/classes/667-F08/>

Course description

This course introduces students to approaching linguistics with mathematical thinking. We cover basic mathematical concepts like sets, relations, and functions. We cover linguistic topics in syntax, semantics, and phonology using categorical grammar, boolean algebra and lattices, among other concepts. We also look at learning theory in the context of equivalence relations to see how natural language grammars could be learned.

Text

Required

- Mathematical Structures in Linguistics. Edward Keenan and Larry Moss.

Requirements

participation in the class	10%
paper review	10%
approximately 10 assignments	40%
take-home midterm	20%
take-home final	20%

participation You are expected to ask questions to initiate discussion and to contribute to class discussions.

paper review You will select an appropriate article (I will give you a list of possibilities as examples) and write a critical review of it.

assignments These are weekly homework assignments on topics covered in class. Collaboration with classmates is permitted, but students must write-up assignments individually.

midterm and final These are cumulative, take-home exams. Collaboration with others is not permitted.

Policies

- Assignments are assigned on Wednesday and due on Wednesday.
- **NO LATE WORK ACCEPTED.** The highest grade for an assignment turned in late is 0%. If you notify me in advance with very good reasons, it is possible I may relax this on a case by case basis.
- Please submit work as hard copies though work submitted by email is accepted in certain cases (i.e. to avoid late penalties). In such a case, submit the file as a **pdf** please, and embed all fonts.
- No cell phones in class (set to vibrate or turn off).
- You may collaborate on assignments, but write them up separately. The midterm and final must be worked on individually.

Course Outline

(subject to change)

Week	Date	Topic	Assignment DUE
0	Sep 3	Intro: Sets	
1	Sep 8 Sep 10	Roots of Infinity	Read Chapter 1 Chapter 1 Exercises
2	Sep 15 Sep 17	Some Mathematical Background	Read Chapter 2 Chapter 2 Exercises
4	Sep 22 Sep 24	NO CLASS – I AM AWAY	
5	Sep 29 Oct 1	Syntax 1: Trees and Treelike Graphs	Read Chapter 3 Chapter 3 Exercises
6	Oct 6 Oct 8	Syntax 2: Design for a Language	Read Chapter 5 Chapter 5 Exercises
	Oct 10	Semantics 1: Compositionality	Read Chapter 6
7	Oct 13 Oct 15	Semantics 2: Coordination, Negation and Lattices	Read Chapter 7 Chapter 6-7 exercises
8	Oct 20 Oct 22	Semantics 2: Determiners and Generalized Quantifiers	Read Chapter 9 Chapter 9 exercises
9	Oct 27 Oct 29	Chapter 4: Naive Segmental Phonology	Read Chapter 4 Midterm Exam
10	Nov 3 Nov 5	Chomsky Hierarchy Finite State Machines and Phonology	Read Partee, Harrison 1978 Chapter 4 exercises
11	Nov 10 Nov 12	Learning Theory String Extension Learning	Read Stabler FSM exercises
12	Nov 17 Nov 19	State-merging Learning Cross-situational learning Morphology	Heinz 2008 Pertsova 2008, string extension exercises
13	Nov 24 Nov 26	Basic Probability	Read Keenan 2005 state-merging exercises
14	Dec 1 Dec 3	Probability for Linguists	Read Goldsmith probability exercises
16	Dec 8 Dec 12	Course Summary	Review Due Final Exam