Linguistics 285: Human Language and Technology
Spring 2015, 38838R
USC General Education: Category IV

Professor: Louis Goldstein
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Office Hours: W 12:00-1:00, Th 2:30-3:30 and by appointment. TA Office Hours to be announced by TAs.

Course Description: The everyday task of conversing, which usually seems close to effortless, requires us to carry out some very complex mental computations. Linguists, psychologists, and engineers have been trying to model this complexity in order to understand how speech and language work, leading to many innovations in technology. Speech recognition, dictation systems, grammar checkers, online searching, and dialog systems are becoming fundamental technologies. We will investigate significant aspects of human speech, and learn how scientific knowledge of this system is modeled computationally. This course will allow the student to learn about one of our species' greatest achievements, human language, and to appreciate how that knowledge, combined with a great deal of computational creativity propels human technology. In gaining this knowledge, students will learn about how scientific innovation gives rise to a complex technological system.

Labs: Students will use PRAAT software to record their voice, and investigate speech acoustics and variability. You will also learn how to write simple programs that will help you understand the basic principles underlying speech science and technology. No programming knowledge is assumed for the course. Students will be gently introduced to the programming language *MATLAB*, which will allow us to implement many of the ideas discussed in the lectures. **Attendance in lab sections is mandatory and is calculated into the grade course**.

Readings: There are assigned readings for every week of the class. Readings will be provided to the students through Blackboard.

Homework: Besides readings for every class, there will be 5 HW assignments during the semester (due dates in schedule on p.3). The one with the lowest grade will be dropped. **All assignments are to be done independently by each student,** unless TA's explicitly coordinate collaborative work. HW assignments will be electronically posted a week before they're due. HW is to be submitted electronically the day it's due, and *10% of the grade for the HW will be deducted for each day it's late*.

Course Requirement and grades: Students will be evaluated in the course through 3 tests, HW, and lab and lecture attendance and participation. Attendance will not be taken, but this class involves audio and video material that is only available in lecture, therefore class attendance is crucial to success in this class. In addition 12

in-class activities, graded pass/fail, will be given at random throughout the semester only in class (cannot be made up), and ten of them constitute the 5 points for class attendance and participation.

Test 1:	25%
Test 2:	25 %
Test 3 (Final Exam):	25%
Homework:	15%
Lab Attendance/Participation:	5%
Class Attendance/Participation:	5%

There will be no extra-credit in this course.

Tests: The dates of the tests are in the schedule. Students are asked to check to make sure that they have no conflicts on these dates. Please advise the instructor as soon as possible, but not later than a week before the exam, if there are any test conflicts. Exceptions are only accommodated in situations of emergency, or if the students have to be away from campus on official university matters (as documented by the governing office).

Academic Integrity: For all of your written work, quotations or other forms of reference to other work are of course acceptable with the appropriate citations. USC takes academic integrity very seriously and enforces it strictly. To find out more, students should consult the guide to academic integrity:
http://dornsife.usc.edu/usc-policies/#plagiarism

Class Protocol: Cell phones and pager use is not allowed in class, unless as part of an in-class demonstration led by the instructor or TA's. Computers can only be used for taking notes or for class work led by the instructor or TA's.

Students with Disabilities: Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP when adequate documentation is filed. Please be sure the letter is delivered to the instructor as early in the semester as possible. DSP is open Monday-Friday, 8:30 a.m.-5:00 p.m. The office is in Student Union 301 and their phone number is (213) 740-0776. Their website is
http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html

Schedule	Topic	Readings
8/25	Introduction and Phonetics 1	
8/27	Phonetics 2	*Discovering speech*, 23-34
9/1	Acoustics 1	*Discovering speech*, 51-54
9/3	Acoustics 2	*Discovering speech*, 51-54
9/8	Vowel Acoustics	*Discovering speech*, 54-62
9/9		**HW1 Due**
9/10	Vowel Production	*Discovering speech*, 62-65
9/15	Dynamical Systems	
9/17	Dynamical Systems	Thinking in Systems, Ch.1
9/22	Dynamical Systems	Thinking in Systems, Ch.1
9/23		**HW2 Due**
9/24	Dynamical Systems	Lecture Notes
9/29	**Test 1**	
10/1	Speech Synthesis 1	Lecture Notes
10/6	Speech Synthesis 2	Lecture Notes
10/8	Speech Synthesis 3	Lecture Notes
10/13	Speech Synthesis 4	Lecture Notes
10/14		**HW3 Due**
10/15	Speech Synthesis 5	*Discovering speech,* 89-94
10/20	Speech Recognition 1	Lecture Notes
10/22	Speech Recognition 2	Lecture Notes
10/27	Speech Recognition 3	Lecture Notes
10/29	Speech Recognition 4	Lecture Notes
11/3	**Test 2**	Lecture Notes
11/5	Speech Recognition 5	Lecture Notes
11/10	Speech Recognition 6	Lecture Notes
11/12	Speech Recognition 7	Lecture Notes
11/17	Speech Recognition 8	Lecture Notes
11/18		**HW 4 Due**
11/19	Speech Recognition 9	Lecture Notes
11/24	Speech Recognition 10	Lecture Notes
12/1	Speech Recognition 11	Lecture Notes
12/2		**HW 5 Due**
12/3	Speech Recognition 12	Lecture Notes
12/15 11am-1pm	**Exam**	