

# Syllabus: Linguistic Phonetics

Linguistics 520, UNC-Chapel Hill  
Elliott Moreton

2017 August 23 (W)

<i>Time:</i>	MWF 11:15–12:10	<i>Instructor:</i>	Elliott Moreton
<i>Place:</i>	Dey 304	<i>Office:</i>	Smith 101
<i>Textbooks:</i>	Johnson, <i>Acoustic and Auditory Phonetics</i> ; Ladefoged & Disner, <i>Vowels and Consonants</i> (both required)	<i>Office hours:</i>	M 1:15–2:15?, W 3:30–4:30?
<i>Sakai:</i>	<a href="https://sakai.unc.edu">https://sakai.unc.edu</a>	<i>Email:</i>	<a href="mailto:moreton@unc.edu">moreton@unc.edu</a>
<i>Website:</i>	<a href="http://www.unc.edu/~moreton/Ling520/520main.html">http://www.unc.edu/~moreton/Ling520/520main.html</a>		

## 1 Course aims

Linguistics 520 is intended to introduce phonetics to an audience of linguists, or others interested in the linguistic way of looking at spoken language. We will therefore be asking what physics, biology, and psychology can tell us about why spoken languages are the way they are.

Doing this will require certain technical skills. It is a principal goal of this course to impart them. By the end of it, you will have learned (by doing)

- How to collect acoustic speech data
- How to manipulate it with the Praat speech-analysis software
- How to interpret waveforms and spectrograms
- How to make accurate measurements of acoustic variables
- How to design, manufacture, run, and analyze a speech-production experiment
- How to use the International Phonetic Alphabet
- How to use simple acoustical theory to predict the acoustics of speech sounds from their articulations, and vice versa.

By December you will have all of the basic skills needed to do your own experiments, and to understand (and critically evaluate) the published results of other peoples' experiments.

The course is organized as a nature tour of the vocal tract. We will systematically examine each of the major speech-sound classes to see

- What the speech organs do to produce them
- What is happening acoustically when they are produced, and why
- Which of the acoustic cues listeners actually used to figure out what they heard.

We will listen to examples of these sounds in a wide variety of languages, and examine their acoustical properties using analysis software. We will pay special attention to phonetic explanations of phonological facts, such as:

- Articulatory and acoustic correlates of the distinctive features (why do languages use those particular features?)

- Markedness and inventory theory (why are certain sounds or contrasts common all over the world, while others are rare?)
- Phonological alternations (why are these two sounds in complementary distribution more often than those two?)
- Historical change (why is this sound change more common than that one?)

The only prerequisite for this course is Linguistics 101, Introduction to Language, or the equivalent. A knowledge of high-school algebra is assumed.

## 2 Requirements

Final grades for this course will be calculated as follows:

Attendance and participation	10%
Homework (problem sets and labs)	25%
Exams (two)	20%
Article report	15%
Final project	30%

**Attendance and participation** You are expected to come to class having done the reading and thought about it until either (a) it makes sense, or (b) you can express precisely what about it doesn't make sense; either way, you'll have something to talk about in class.

In the case of the Ladefoged book, doing the reading includes listening to the sound files for that chapter. In the case of the Johnson book, it includes the stuff in the gray boxes.

If I start getting the impression that people aren't doing the readings, I'm going to institute pop quizzes. These are annoying because they waste class time, but coming to class without having done the reading wastes even more class time.

Missing classes will make it hard to keep up. It will also lower your participation grade. If you miss a class, it is your responsibility to get missed materials from me or other students. Always check the website if you have been absent.

**Homework** Homework includes problem sets and labs, of which there will be about 7. You'll get detailed information about each one when it's assigned, but there are some general points that apply to all of them.

When you hand in homework, it can be handwritten, word-processed, or even typed, but it has to be (1) neat, (2) legible, (3) on paper, and (4) well-organized. Homeworks will be graded on a 3-point scale, in a way that will be explained along with each assignment. Homeworks that are not handed in will receive a zero.

**Article report** As mentioned above, one of the goals of this course is to get students to read and understand phonetics articles. One assignment, therefore, is to pick an interesting-looking article from an actual journal or conference, read it, and summarize and discuss it in a short paper. This will also give you an idea of how phonetics is written up, which will be useful for your. . .

**Final project** Students choose a research question, then design, execute, and analyze an experiment to answer it, and finally present the question and the results to the class. This will take place in several steps, and I'll be giving details as each one comes up.

**Human-subjects certification** Students are required to complete the Collaborative Institutional Training Initiative's on-line training course in research ethics and the pro-

tection of human research subjects.<sup>1</sup> This will get you a certificate that will allow you to do human-subjects research at UNC. (If you've already done this for another class or project, you don't need to repeat it.) There is no grade for this, but you have to do it to get a grade for the class at all.

Numeric grades will be converted to UNC's letter-grade system by mapping the numeric range from 60 to 100 onto the 10 passing letter grades from D to A, with four numeric points per step (except that A has 5 points, 96 to 100).

### 3 Partnerships

Except when otherwise specified, the assigned work in this class will be done with a partner, for a shared grade. There are several reasons for this.

One is purely practical. The final project is going to take more work than one person can reasonably be asked to do, so you will have to work with someone in order to finish the project on time and do a good job. But, the final project shouldn't be the first time you and your partner work together. Collaboration on homeworks during the first part of the semester gives you the opportunity to get the bugs out of the partnership.

Another reason is pedagogical. If you want to understand something yourself, it is very helpful to try explaining it to someone else. Again and again throughout the semester, each of you is going to find yourself having to explain something to your partner. Both of you will understand it better as a result.

Finally, this is how real research is done! You work with other people, share the ideas, share the labor, spot opportunities or mistakes that the other person overlooked, present the results together, and share the credit (or ignominy). This is an upper-division course, and it's none too early to start getting used to this aspect of research culture.

I will be assigning partners, on the basis of the questionnaires, to insure that there is a fair distribution of skills and backgrounds among the partnerships. It is your job to insure that there is a fair distribution of work within each partnership. For the final project, this is mandatory: your project proposal must include an account of how you have agreed to divide up the work. Explicit agreements are not required for the homework, but informal ones are a very good idea.

Partners will work together on the homeworks and the final project, but not on the two in-class exams. You may work with your partner on the article report, but you can choose to work alone if you want.

Partners are jointly responsible for handing in the assignment; that is, if it doesn't show up on time, it counts against both people.

### 4 Policies

*Attendance.* If you must miss class because of a medical or family emergency, you should let me know *beforehand* by emailing, phoning, slipping a note under my door, or buttonholing me in person. If you miss a class, it is your responsibility to get missed materials from me or other students. Always check the website if you have been absent.

*Homework.* You'll get detailed information about each one when it's assigned, but there are some general points that apply to all of them. When you hand in homework, it can be handwritten, word-processed, or even typewritten, but it will not be accepted unless it is

---

<sup>1</sup><http://research.unc.edu/offices/human-research-ethics/researchers/training/index.htm>

- on time
- on paper
- honor-pledged.

Homework meeting these criteria will be graded on a scale from 1 to 3 in a way that will be explained along with each assignment using a device called a *grading rubric*. The 1–3 scale will map approximately onto a 60–100 scale in computation of the final grade. Hence, a 0 is *much* worse than a 1! Homework that does not meet the criteria, or is not handed in, will receive a 0.

*Late assignments.* Homework solutions will normally be discussed in class the day the assignment is due. Therefore, as a general rule, NO LATE ASSIGNMENTS WILL BE ACCEPTED FOR CREDIT. Exceptions *may* be made if

- You got *advance* permission (by asking me *before* the due date) to hand in an assignment late, or
- You couldn't come to campus on the day the assignment is due because of a serious illness or other unexpected emergency. You need to get the assignment in at the earliest possible opportunity with a *written explanation* of the situation. Email is best.

*Collaboration and citation.* It is a really good idea to discuss assignments with others in the class and solve the problems together. However, each person should write up their solution alone. If you work with others, or look up information in sources that aren't officially part of this course, you are required to acknowledge them in the writeup. (There is no shame in collaborating, or in digging out information independently, but you need to give credit where it is due.)

*Recording.* Permission to make audio or video recordings of class will be given only in special circumstances (e.g., to students with hearing impairments).

*Dates* are still tentative at this point (except for the final exam). I'll give at least two weeks' notice of the midterm, and will hand out a midterm syllabus (a study guide) one week before the midterm.

**The Carolina Honor Code is in effect in this class, and I will treat violations seriously.** You should review it at <http://instrument.unc.edu>. If you have questions about interpretation, you should bring them to me. **Every assignment you hand in must be accompanied by a signed statement that you have complied with the Code requirements in everything related to that work**, e.g., “I completed this assignment in full compliance with the Honor Code.”.

## 5 Equipment and software

You will need

**Headphones** Most assignments (including the “reading” assignments) will involve listening to audio files. You'll hear better if you have a pair of headphones or earphones. The kind used with portable tape/CD/MP3 players are fine. The headphones will plug into the headphone or speaker jack on your laptop or desktop computer.

**Microphone** To record, you'll need a microphone. Most laptops come with a little microphone embedded in them somewhere, but it isn't good enough for serious phonetic work. Better ones will be issued to you, to use but not to keep.

**Speech-analysis software** Thanks to the generosity of the Government of the Netherlands, a very nice speech-analysis package is available free for download from the

Institute of Phonetic Sciences in Amsterdam. There are versions for PC, Mac, and Linux. I'll be providing or linking to details on how to download and install it.

**A mirror** Some days, I'll ask you to bring a small mirror to class, for observing your articulators. The best kind is the folding pocket mirror, the kind which has a regular mirror and a magnifying mirror hinged together (so you can see around corners). However, a plain old hand mirror is perfectly serviceable.

## 6 Approximate schedule

Week	Date	Topics	Events
1	8/23 8/25	W Organization. Overview. Sound. Praat F	Setting up your computer.
2	8/28 8/30 9/1	M <b>Vowels.</b> Source/filter theory. Larynx W and the glottal wave. Resonances of F schwa.	
3	9/6 9/8	W Theory of resonance. Harmonics vs. for- F mants. Recording with Praat.	
4	9/11 9/13 9/15	M Perturbation theory. Supralaryngeal W anatomy. Height, backness, and round- F ing. English vowels. IPA.	
5	9/18 9/20 9/22	M Non-English vowels. Vowel space. Pro- W tection of research subjects. Two-tube F vowel models. Vowel typology.	On-line human- subjects training due.
6	9/25 9/27 9/29	M Adaptive dispersion. Laryngeal and nasal W vowel features. F	MIDTERM.
7	10/2 10/4 10/6	M <b>Consonants.</b> Fricatives. Acoustics of W fricative noise. Voicing contrasts in frica- F tives.	
8	10/9 10/11 10/13	M Stops. Production, acoustics. Acous- W tic theory of formant transitions before F schwa.	Article selections due. Trip to Odum Insti- tute.
9	10/16 10/18	M Filter functions for stops before non- W schwa vowels. Spectrogram reading.	
10	10/23 10/25 10/27	M Phonation types. Places of articulation. W Experimental design. F	Article reports due.
11	10/30 11/1 11/3	M Nasals, laterals, and semivowels. Clicks, W trills, taps, and flaps. F	Final-project propos- als due.
12	11/6 11/8 11/10	M <b>Perception.</b> Hearing. Ears. Physical vs. W psychological units. Perceptual maps. F	
13	11/13 11/15 11/17	M McGurk effect. Native-language effects W on perception. F	
14	11/20	M Weber–Fechner law and categorical per- ception.	
15	11/27 11/29 12/1	M Acquisition of phonetics by infants and W children. F	
16	12/4 12/6	M Project presentations. W	
17	12/12	T	Final exam, noon