

Department of Communication Disorders  
ComD 421 Speech Science – Winter 2009

**Instructor**

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Office hours: Tuesday 1:00-3:00 or by appointment

**Blackboard**

Blackboard will be an essential component of the course. It will allow you to review lecture materials, take quizzes, post information about yourself, learn about other students in the class, and more.

**Prerequisites**

A good understanding of the material from ComD 320 (speech anatomy and physiology) and Physics 167 (acoustics of music and speech) is absolutely necessary to your success in this course. If you did not take these prerequisites, please drop this class and take them before registering for this course next year. This semester's work will build on the foundation provided by the prerequisite courses and will not involve re-teaching of what you should already know. A working knowledge of phonetics (taught in ComD 331) is also strongly recommended.

**Course Objectives**

What am I hoping you will learn this semester? The goal is that you will come to understand more about how speech works. You have already learned about the characteristics of sound, and also about anatomy and basic physiology. In this class we will bring these themes together by applying acoustic analysis techniques to normal and disordered speech. You will gain experience with recording speech into a computer and extracting meaningful measures of production from those recordings. As a communication disorders professional, you will need to know how to use technology in your clinical work. The profession's recently increased emphasis on evidence-based practice underlines the need for you to know how to gather your own treatment outcome evidence and evaluate that of others. By the end of this semester you should feel confident in using readily available software tools to document speech performance. You will also learn about the tools used by speech researchers so that you can get more out of the journal articles you read in our professional literature.

**Specific Objectives**

By the end of the course, you will be expected to demonstrate knowledge and competence in areas corresponding to ASHA's CAA standards in the Knowledge and Skills Acquisition (KASA) guidelines:

- Basic principles of speech production, including acoustic and physiological aspects and their measurement (standard III-B)
- Principles and methods of quantifying a variety of speech disorders, based on a sound grasp of the physiologic basis of normal function, with a goal of documenting treatment outcomes (standard III-D)

- The application of principles from the current research literature in measuring speech performance in preparation for participating in evidence-based practice (standard III-F)

### **Required Reading**

Ray Kent and Charles Read: *Acoustic analysis of speech* (2<sup>nd</sup> edition). Singular Publishing, 2002. ISBN 0-7693-0112-6. Five chapters from other books will be posted on the Lee Library's Electronic Reserve system, which you will need to read in preparation for class.

You will be required to buy a CD called "A Look at Speech Science," available at the bookstore. This disc contains 20 illustrations/animations of speech science concepts that we will be covering this semester. Read carefully the text that shows up in the "Description" panel at the left when you single click on an icon. Then double click to play the animation.

An optional CD is also available at the bookstore called "ComD 421 Speech Science Lectures." On this CD are the PowerPoint slides that will be shown in class this semester, along with audio commentary that I have recorded to explain each slide. This is intended as a resource if you should have to miss class and need to catch up on the material. It may also help you in preparing for the exams.

### **Reading and CD Quizzes (on Blackboard)**

Fourteen open-book quizzes on the readings will be given throughout the semester. They will cover material from the text and other materials on electronic reserve that will prepare you for our classroom discussion. They will be open for 45 minutes, so please ensure that you have read the material carefully in advance, rather than trying to skim the readings once you see the questions. You will not be able to preview these quizzes; once you open a quiz, you must finish it within 45 minutes. In addition, 18 simple questions in one quiz relating to some of the CD illustrations will be posted; this quiz is different in that you can take it a few questions at a time, with no time limit. All quizzes will be available until class begins on the date indicated in the syllabus. If you fail to take one by the due date, it will no longer be available, and you will have missed the credit for that quiz.

### **Software Projects**

Freeware programs will be provided for you to use on your own or another computer. There will be nine separate projects. Detailed instructions for each will be posted on Blackboard. These are not group projects. Please submit your own work. I encourage you to work with others if you would like to so that you can learn together, but the data you submit must be your own, and each submission must be unique. These are due in class on the date indicated in the syllabus. Scores for late work will be reduced 10% for each day beyond the deadline.

## Examinations

The two mid-term exams will cover material presented in the first and second parts of the semester respectively. Exam 1 is available starting on February 9<sup>th</sup> (ending at noon on the 11<sup>th</sup>). Exam 2 will start March 16<sup>th</sup> (ending at noon on the 18<sup>th</sup>). The final will be cumulative, and will be available throughout finals week. All examinations will be taken in the Testing Center.

## Extra Credit: Instructional DVDs in the LRC

For two extra percentage points on the course grade, you may watch 2 DVDs in the Lee Library's Learning Resource Center (LRC). There will be an on-line quiz for each DVD. I will provide the questions on Blackboard ahead of time so that you will know what to watch for in the DVDs. Please take the on-line quiz for each DVD by the due date in parentheses if you would like this extra credit. Feel free to do this early in the semester.

34R Human Speech Acoustics (April 1<sup>st</sup>)

35R Human Speech Source-Filter (April 13<sup>th</sup>)

## Extra Credit: Learning your Names

I am going to try to learn all of your names, although with a big class, this may take a while. 1% extra credit for the course will be awarded if you do the following three things. 1) either I or my assistant will video record you saying your name, where you are from, and one interesting thing about you. 2) you will need to post some information about yourself on Blackboard. Be creative here, but consider such things as where you come from, what motivated you to get into this field, what your career ambitions are, your family, your hobbies and interests, a favorite joke or story, etc. 3) you will need to look at the information posted by the 5 students who follow you alphabetically and send me an email describing something you learned about them. If the person who follows you on the list has not posted anything, just go on until you find the next 5 after you who have information available. The deadline for completing this assignment is the end of January, and the extra credit point will not be given after this time.

## Grading

The two mid-term exams will be worth 20% each. The final will be worth 25%. The open-book quizzes (text chapters and reserve materials) and the CD quiz will contribute a total of 15%. The nine software projects will contribute 20% in total. A total of 3% of extra credit is available from the two DVD quizzes and the 'Learning your Names' activity. I do not grade on a curve. The following grid will determine your letter grade for this course.

|    |    |    |    |
|----|----|----|----|
| 95 | A  | 77 | C  |
| 92 | A- | 74 | C- |
| 89 | B+ | 70 | D+ |
| 86 | B  | 65 | D  |
| 83 | B- | 60 | D- |
| 80 | C+ |    |    |

## **The Honor Code**

As a student at Brigham Young University, you are expected to uphold the highest standards of integrity. With regard to exams and quizzes, this means that you work entirely alone, and agree not to disclose to others any information about the exam or quiz you may have already taken, which they are about to take.

## **Students With Disabilities**

Brigham Young University is committed to providing a working and learning atmosphere that reasonably accommodates qualified persons with disabilities. If you have any disability, which may impair your ability to complete this course successfully, please contact the Services for Students with Disabilities Office (422-2767). Reasonable academic accommodations are reviewed for all students who have qualified documented disabilities. Services are coordinated with the student and instructor by the SSD Office. If you need assistance or if you feel you have been unlawfully discriminated against on the basis of disability, you may seek resolution through established grievance policy and procedures. You should contact the Equal Employment Office at 422-5895. D-382 ASB.

## **Preventing Sexual Harassment**

Title IX of the Education Amendments of 1972 prohibits sex discrimination against any participant in an educational program or activity receiving federal funds. The act is intended to eliminate sex discrimination in education. Title IX covers discrimination in programs, admissions, activities, and student-to-student sexual harassment. BYU's policy against sexual harassment extends not only to employees of the university but to students as well. If you encounter unlawful sexual harassment or gender based discrimination, please talk to your professor; contact the Equal Employment Office at 422-5895 or 367-5689 (24-hours); or contact the Honor Code Office at 422-2847.

## **Course Alignment with the Aims of the College**

The Conceptual Framework Aims of the David O. McKay School of Education (MSOE) are, 1) Embrace and Apply the Moral Dimensions of Teaching, 2) Demonstrate Academic Excellence, 3) Model Collaboration, and 4) Act with Social Competence. As part of the School of Education, the Department of Communication Disorders provides coursework that is consistent with the conceptual framework of the college. This course addresses the issue of academic excellence by providing a thorough grounding in both theory and application of technology in the assessment of normal and disordered speech production. As a future professional in the field of speech-language pathology or audiology, you will need to collaborate with other professionals, often interpreting for them the data that you collect with the instrumentation discussed in this course. Such collaboration, in order to be effective, demands a high level of social competence.

## Class Schedule

(subject to change... this is just the plan ☺)

|     |    | Topic                    | Reading        | Quiz | Project              |
|-----|----|--------------------------|----------------|------|----------------------|
| Jan | 5  | intro to speech science  |                |      |                      |
|     | 7  | source filter theory     | K&R 1          | 1    |                      |
|     | 12 | source filter theory     | K&R 2          | 2    | 1 Source Spectrum    |
|     | 14 | analog electronics       | Res: Decker    | 3    |                      |
|     | 19 | holiday – no class today |                |      |                      |
|     | 21 | basic instruments        | Res: Silverman | 4    |                      |
|     | 26 | digital systems          |                |      | 2 Audacity           |
|     | 28 | digital systems          | Res: Rosen     | 5    |                      |
|     |    |                          |                |      |                      |
| Feb | 2  | acoustic analysis        | K&R 3          | 6    |                      |
|     | 4  | acoustic analysis        |                |      | 3 Transfer Function  |
|     | 9  | exam 1 today – review    |                |      |                      |
|     | 11 | vowels and diphthongs    | K&R 4          | 7    |                      |
|     | 16 | holiday – no class today |                |      |                      |
| Tue | 17 | vowels and diphthongs    |                |      | 4 Vowel Formants     |
|     | 23 | consonants               | K&R 5          | 8    |                      |
|     | 25 | consonants               |                |      | 5 Consonant Timing   |
|     |    |                          |                |      |                      |
| Mar | 2  | consonants               | K&R 6          | 9    |                      |
|     | 4  | suprasegmentals          | K&R 7          | 10   |                      |
|     | 9  | speech perception        | Res: Kent      | 11   |                      |
|     | 11 | fundamental frequency    |                |      | 6 Suprasegmentals    |
|     | 16 | exam 2 today – review    |                |      |                      |
|     | 18 | speech intensity         |                |      |                      |
|     | 23 | laryngeal function       | Res: Ferrand   | 12   |                      |
|     | 25 | laryngeal function       |                |      | 7 Fundamental Freq.  |
|     | 30 | speech aerodynamics      | Res: Hillman   | 13   |                      |
|     |    |                          |                |      |                      |
| Apr | 1  | speech aerodynamics      |                | DVD  | 8 Speech Aero        |
|     | 6  | velopharyngeal function  |                | CD   |                      |
|     | 8  | speech movements         | Res: Stone     | 14   |                      |
|     | 13 | speech movements         |                | DVD  | 9 Pre/Post Treatment |

Res: electronic reserve at the library

K&R: Kent and Read course text

DVD: extra credit DVD quizzes

CD: “A Look at Speech Science” quiz