# Hearing and Speech Sciences 600: Instrumentation

**Fall 2014**

**W 3:30 – 6:00**

**UNIVERSITY OF MARYLAND – COLLEGE PARK**


**Instructor:** Matthew Goupell
**Office:** 0119E Lefrak (LEF) Hall
**Office Hours:** Mondays 1-3 PM or by appointment
**Email:** goupell@umd.edu


**I would like to meet in person whenever possible, either during office hours or during class. You should only use email to set up one-on-one meetings or in cases of emergencies where you miss class unexpectedly. I typically have a 24+ hour turnaround time on emails.**

**My office is in a hallway which is normally locked. Please knock at the door closest to LEF0123. If you ever come to my office for office hours and I have stepped out momentarily, ask people in the locked hallway as to my whereabouts.**

# COURSE DESCRIPTION AND OBJECTIVES

Students will acquire knowledge in foundations of audiology practice, fundamentals of acoustic signals and calibration, and evaluation of hearing.

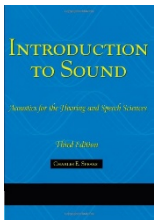
As a result of knowledge obtained in this course, students will be able to:

1. Apply principles and methods of psychoacoustics to hearing evaluations.
2. Understand the physical characteristics and measurement of acoustic stimuli.
3. Apply knowledge of calibration procedures for acoustic stimuli.
4. Analyze the electric properties of stimuli and utilize electric calibration devices.
5. Utilize the principles of research design and laboratory methods in clinical evaluation and research.
6. Conduct an electroacoustics calibration of standard audiometric equipment according to accepted standards.
7. Identify normal and abnormal results of routine audiometric evaluations.
8. Troubleshoot sources of malfunction in audiometric equipment.

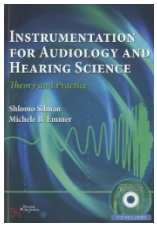
# COURSE REQUIREMENTS AND POLICIES

## Materials Needed:

*Texts:*




Introduction To Sound: Acoustics for the Hearing and Speech Sciences
Speaks
ISBN-13: 978-1565939790




Instrumentation in Audiology and Hearing Science: Theory and Practice
Silman and Emmer
ISBN-13: 978-1597563819

*Calculator:* A scientific calculator (one that calculates logarithms, sines, cosines, powers, etc.) will be necessary for this course and should be brought to every class.

## Attendance:

- Attendance to class is not required in this class; however, it is highly encouraged.
- Midterm and final exams will not be provided to students who are more than fifteen minutes late for the start of the exam.
- Please inform me ahead of time about excused absences for missing class/quizzes/exams due to illness, family emergencies, religious observances, inclement weather, etc. so that I can try to accommodate your situation.
- In the extreme circumstance that you cannot inform me that you will miss an exam before it occurs, contact me as soon as you can so that **I can try** to accommodate your situation.

## University Emergency Closing:

In the event that the University is closed for an emergency or extended period of time, I will communicate to you via email to indicate schedule adjustments, including rescheduling of examinations and assignments due to inclement weather and campus emergencies. Official closures and delays are announced on the campus website http://www.umd.edu. The snow phone line is 301-405-SNOW, as well as local radio and TV stations.

## Class Participation:

Class participation is highly encouraged. Students are expected in class to perform ungraded writing, interact with other students and discuss ideas, speak to the entire class, etc. I will not waste your time regurgitating the textbook for you as a "sage on the stage." The discussions are intended to find areas that the class do not understand and collectively address that deficiency. I will often wander about the room during our discussions to ask individuals questions. Thus, the course is not designed well for people who only like copying notes and not interacting.

Students are expected to treat each other with respect. Disruptive behavior of any kind will not be tolerated. Students who are unable to demonstrate civility with one another, the teaching assistants, or me will be subject to referral to the Office of Student Conduct or to the University Campus Police. You are expected to adhere to the Code of Student Conduct.

## Other Electronic Devices:

- Cell phones and similar communication devices should be silenced before class time. If a cell phone or similar device audibly disrupts class, I will subtract five points from that person's final grade. If no one admits to forgetting to turn off their cell phone, I will subtract five points from the grade of everyone in the class. Alternatively, if I forget to turn off my cell phone, I will add ten points to everyone's grade.
- Laptop computers and smartphones are allowed. However, they cannot be used as your calculator during quizzes and exams.
- No pictures or videos during lectures please – I'm famous enough already.

## Quizzes and Exams:

- Exercises (20-25 pts each): Four-five exercises will be provided each week, typically on Friday, and due the following Friday.
- Exams (300 pts each): A midterm and a final will be given. The final is cumulative.

Weekly quizzes and exams will be returned after I grade them.

## Grading:

Your course grade will depend upon homework, quizzes, a midterm exam, and final exam. Students will be able to drop their <u>lowest three</u> weekly quiz scores. Grades will be on an absolute scale for the follow percentages:

| | | |
|---|---|---|
| A+: ≥100 | A: 93-99 | A-: 90-92 |
| B+: 90-87 | B: 83-86 | B-: 80-82 |
| C+: 80-77 | C: 73-76 | C-: 70-72 |
| D+: 70-67 | D: 63-66 | D-: 60-62 |

F: 59 or less

## Copywrite:

Class lectures and other materials are copywrited and may not be reproduced for anything other than personal use without written permission from me. Lectures, materials, quizzes, and tests may not be sold to other parties.

## Academic Integrity:

It is the responsibility of all students to read and understand the misconduct guidelines of UM – College Park. (http://www.testudo.umd.edu/soc/dishonesty.html)
Any suspicion of academic dishonestly will result in a report filed with the Student Honor Council. Any of the following acts, when committed by a student, shall constitute academic dishonesty:

- CHEATING: intentionally using or attempting to use unauthorized materials, information, or study aids in any academic exercise.
- FABRICATION: intentional and unauthorized falsification or invention of any information or citation in an academic exercise.
- FACILITATING ACADEMIC DISHONESTY: intentionally or knowingly helping or attempting to help another to violate any provision of this Code.
- PLAGIARISM: intentionally or knowingly representing the words or ideas of another as one's own in any academic exercise.

## Special Accommodations and Religious Inclusiveness:

I will make every effort to accommodate students who are registered with the Disability Support Service (DSS) Office and who provide me with a University of Maryland DSS Accommodation form. Only written DSS documentation of the accommodation will be considered. This form must be presented to me no later than **September 16, 2014**. I am not able to accommodate students who are not registered with DSS or who provide me with documentation which has not been reviewed and approved by UM's DSS Office after **September 16, 2014**.

It is the policy of the UM – College Park to not schedule exams on religious holidays. If I have accidently scheduled an exam on a religious holiday that you observe, please let me know no later than **September 16, 2014**. I will reschedule the exam for the entire class to a more appropriate date.

## Course Outline and Daily Preparation:

The course will be broken up into two sections, separated by the midterm. We will try to keep to the course schedule, but we will stay flexible depending on whether some material takes more or less time than planned.

Daily readings shown on the schedule should be done before coming to class. I highly encourage reading the weeks material again after class (I know, I know, that is a lot of reading!). Lectures as .pdfs will be uploaded to the ELMS site before the lecture (although I suppose sometimes corrections to the lectures will be made). Supplementary material such as figures, exercises, and other things will also be uploaded to the course website from time to time.

I highly encourage you to attempt the exercises by yourself at first, but do not spend an inordinate amount of time on exercises that you cannot do. Getting together with classmates to (1) have them teach you how to do the exercises you can't do and (2) have you teach them how to do the exercises they can't do would be excellent preparation for the exams and working with colleagues in this field. During this time, you can also discuss unclear concepts from the text. Finally, I suggest attempting the exercises again at a later time to see if you can do them. Practices makes perfect you know. Solutions will be posted sometime after the material is covered for a given chapter.

# COURSE SCHEDULE

| Date | Lecture Number | | Topics Covered | Readings |
|---|---|---|---|---|
| September 3, 2014 | 1 | | Introduction, Syllabus, Signals Overview | |
| September 10, 2014 | 2 | Sound 1 | Nature of Sound Waves | Speaks 1, 2, 8 |
| September 17, 2014 | 3 | Sound 2 | Logs, Intensity, and Pressure | Speaks 3 & 4 |
| September 24, 2014 | 4 | Sound 3 | Compex Waves and Fourier Transform | Speaks 5 |
| October 1, 2014 | 5 | Sound 4 | Resonance and Filtering | Speaks 6 |
| October 8, 2014 | 6 | Sound 5 | Distortion | Speaks 7 |
| October 15, 2014 | 7 | | Catch up & Review | |
| **October 22, 2014** | **8** | | **Exam 1** | |
| October 29, 2014 | 9 | Electricity 1 | AC/DC | Silman 3 & 4 |
| November 5, 2014 | 10 | Electricity 2 | Filtering 2 | Silman 5 |
| November 12, 2014 | 11 | Electricity 3 | Comm Systems, Immittance, Reflectance | Silman 6 & 7 |
| November 19, 2014 | 12 | Electricity 4 | DSP | Silman 8 |
| November 26, 2014 | | | | |
| December 3, 2014 | 13 | Electricity 5 | Test & Calibration Equipment | Silman 9 & 10 |
| December 10, 2014 | 14 | Electricity 6 | Catch up & Review | |
| **December 17, 2014** | **15** | | **Final Exam** | |

LEARNING OBJECTIVES AND OUTCOMES
HESP 600: INSTRUMENTATION

STUDENT NAME:

SEMESTER COMPLETED: Fall 2014

| Number | Title | Exam/quiz Questions | Homework Assignments |
|---|---|---|---|
| A13 | Instrumentation and bioelectrical hazards. | | |
| A14 | Physical characteristics and measurement of electric and other nonacoustic stimuli | | |
| A24 | The use of instrumentation according to manufacturer's specifications and recommendations | | |
| A25 | Determining whether instrumentation is in calibration according to accepted standards. | | |

Method of assessment denoted by (*).
Verification of assessment denoted by checkmark.

The above-named student has successfully demonstrated mastery of these learning outcomes, through class lectures and discussion, in-class examinations, and homework assignments.

_____ Date:
Matthew Goupell, Ph.D.
Faculty instructor