



SPH 399

The Acoustics of Speech

S2 Day 2015

Dept of Linguistics

Contents

<u>General Information</u>	2
<u>Learning Outcomes</u>	3
<u>General Assessment Information</u>	3
<u>Assessment Tasks</u>	6
<u>Delivery and Resources</u>	7
<u>Unit Schedule</u>	8
<u>Policies and Procedures</u>	9
<u>Graduate Capabilities</u>	11

Disclaimer

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

General Information

Unit convenor and teaching staff

Felicity Cox

felicity.cox@mq.edu.au

AHH 3.519

Margaret Wood

margaret.wood@mq.edu.au

Lecturer

Titia Benders

titia.benders@mq.edu.au

AHH 3.435

Lecturer

Anita Szakay

anita.szakay@mq.edu.au

AHH 3.434

Demonstrator

Chi Lo

chi.lo@mq.edu.au

Demonstrator

Linda Buckley

linda.buckley@mq.edu.au

Credit points

3

Prerequisites

6cp in LING units at 200 level including (LING210(P) or LING217(P))

Corequisites

6cp in SPH units at 300 level

Co-badged status

Unit description

This unit is based around lecture and practical laboratory workshops. Essential topics in speech acoustics are addressed commencing with general acoustic theory, focusing particularly on the phenomenon of resonance. This is followed by an examination of the acoustic theory of speech production, which describes the interaction between vocal sound sources and the resonant or filtering effects of different vocal articulations. The unit examines in detail the acoustics of vowels and consonants, voice quality, prosody (intonation and stress) and coarticulation.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

Learning Outcomes

On successful completion of this unit, you will be able to:

- Demonstrate an understanding of acoustic analysis of sound
- Be able to explain how speech can be represented acoustically
- Demonstrate understanding of the acoustic theory of speech production
- Use standard computer software to analyse the acoustic features of consonants and vowels
- Examine the acoustic characteristics of speech
- Examine the acoustics of coarticulated speech and demonstrate the ability to deconstruct coarticulated acoustic representations
- Demonstrate an understanding of the acoustic correlates of prosody

General Assessment Information

Assessment

Assessment Task	Weight	Due Date
Class Test (covering weeks 1-2)	10%	21 st August 2014
Vowel Assignment	25%	7 th October 2014
Consonant Assignment	25%	31 st October 2014
Final Exam	40%	Final exam period

It is a requirement of this unit that you complete all assessment tasks. Failure to complete all assessment tasks may result in failure in the whole unit even if the marks on the completed tasks total more than 50%.

Submission

Unless you are explicitly informed otherwise for a specific assignment, all assignments must be submitted in hardcopy to the assignment box in the C3A Undergraduate office and **also** submitted via Turnitin.

For each hardcopy assignment, you **MUST** fill in and include the Linguistics Department cover sheet. Assignments will not be accepted unless they have the cover sheet.

Extension Requests and Lateness Policy

Any request for an extension must be provided with associated documentation via ask@mq before the assignment deadline.

Unless you have negotiated an extension based on documented evidence of significant disruption to your studies, a penalty of 5% of the total marks for the assignment per day (including 2 days for weekends) will apply to late submissions.

Unless otherwise negotiated, assignments will not be accepted at all **AFTER** the date on which the marked assignments are returned to students in the unit.

Academic Honesty

As a good student, you are responsible for ensuring academic integrity practices are followed at all times. Your first step is to read the [University's Academic Honesty Policy](#), and make sure you know what constitutes good practice. Then make sure you know how to reference and cite correctly. There are other practices we need to consider, and one of these is the potential for collusion.

Informal study groups are encouraged as a good way to assist your learning, but please remember that all your independently assessed assignments must be totally independently completed. Unless you are doing a group project where each member contributes to producing one piece of work, for which you get the one mark, using part or all of another person's work constitutes collusion and breaches the [University's Academic Honesty policy](#).

What is collusion?

This is the unauthorised presentation of group work as your own. It may involve

- Working with someone to provide one piece of work
- Allowing others to share your assignment answer or copy your work
- Using the assignment answer or work of another student (past or present) with or without

their permission. It is collusion even if only small parts of the assignment are used

- Allowing others to edit and write your work
- Editing or writing the work of another student
- Offering to do work for another student or seeking payment for preparing academic work for someone else

How can you avoid collusion?

- Do not share your findings or answers to an assignment
- Do not use another student's case studies, findings or ideas about an assignment
- Do not ask another student for a copy of their assignment
- Do not share your current or past assignments with another student (whether to "look at the structure" or any other reason).

It is recommended that you complete this [Academic Integrity Module](#):

Academic honesty is considered to be extremely important by the Department of Linguistics and the University. All assignments are submitted to Turnitin and compared with other assignments (past and present) and with content on the internet. Serious breaches of academic honesty may result in failure of the unit or in extreme cases suspension or expulsion from the university.

Grading

Academic Senate has a set of guidelines on the distribution of grades across the range from fail to high distinction. Your final result will include one of these grades plus a standardised numerical grade (SNG).

The following descriptions apply to assessment grades:

HD (85-100) High Distinction: denotes performance which meets all unit objectives in such an exceptional way and with such marked excellence that it deserves the highest level of recognition.

D (75-84) Distinction: denotes performance which clearly deserves a very high level of recognition as an excellent achievement in the unit.

Cr (65-74) Credit: denotes performance which is substantially better than would normally be expected of competent students in the unit.

P (50-64) Pass: denotes performance which satisfies unit objectives.

F (0-49) Fail: denotes that a candidate has failed to complete a unit satisfactorily.

Please note that

1. The above grades and descriptions apply to undergraduate degrees, postgraduate coursework degrees, diploma and graduate certificate programs
2. Marks assigned in assignments are *raw marks*. These are subsequently converted into Standard Numerical Grades (SNG) in order to determine letter grades for the unit.

The SNG which you receive as the final result for the unit may not be the same as the total of your marks for each assessment item. Under the Senate guidelines, results may be scaled to ensure that there is a degree of comparability across the university, so that units with the same past performances of their students should achieve similar results.

The process of scaling does not change the order of marks among students.

Assessment Tasks

Name	Weighting	Due
<u>Consonant Assignment</u>	25%	Week 10
<u>Vowel Assignment</u>	25%	Week 8
<u>Exam</u>	40%	Exam Period
<u>Class Test</u>	10%	Week 3

Consonant Assignment

Due: **Week 10**

Weighting: **25%**

The Consonant assignment is based on the spectrogram reading skills acquired in the workshops and requires analysis and interpretation of acoustic data.

On successful completion you will be able to:

- Demonstrate an understanding of acoustic analysis of sound
- Be able to explain how speech can be represented acoustically
- Use standard computer software to analyse the acoustic features of consonants and vowels
- Examine the acoustic characteristics of speech
- Examine the acoustics of coarticulated speech and demonstrate the ability to deconstruct coarticulated acoustic representations

Vowel Assignment

Due: **Week 8**

Weighting: **25%**

The Vowel assignment is based on the spectrogram reading skills acquired in the workshops. It requires students to acoustically analyse their own vowels and present a report comparing their vowel spaces to others from the literature.

On successful completion you will be able to:

- Demonstrate an understanding of acoustic analysis of sound
- Be able to explain how speech can be represented acoustically
- Demonstrate understanding of the acoustic theory of speech production
- Use standard computer software to analyse the acoustic features of consonants and vowels
- Examine the acoustic characteristics of speech

Exam

Due: **Exam Period**

Weighting: **40%**

The final exam requires 4 short essays from a pool of 6 questions to be completed in 90 minutes.

On successful completion you will be able to:

- Demonstrate an understanding of acoustic analysis of sound
- Demonstrate understanding of the acoustic theory of speech production
- Examine the acoustics of coarticulated speech and demonstrate the ability to deconstruct coarticulated acoustic representations
- Demonstrate an understanding of the acoustic correlates of prosody

Class Test

Due: **Week 3**

Weighting: **10%**

In class test on material presented in weeks 1 and 2.

On successful completion you will be able to:

- Demonstrate an understanding of acoustic analysis of sound

Delivery and Resources

The learning and teaching strategies used in this Unit are structured around an extensive set of interactive text, image and audio based online materials as well as lecture presentations (recorded lectures and associated resources), readings and workshop participation. The unit iLearn site contains details of the timetable of topics with links to the relevant materials. Interaction with ilearn discussion facility is expected. Students **MUST** use ilearn to access important messages.

Attendance at workshops is compulsory. **Failure to attend 80% of workshops without sufficient documentation will result in failure of the unit.**

Text:

- Ladefoged, P. & Johnson, K. (2015) *A Course in Phonetics*, 7th Edition, Cengage Learning, Stamford.

Reading List:

- Clark, J., Yallop, C. & Fletcher, J. (2007) *An introduction to phonetics and phonology*, (3rd Edition), Oxford:Blackwell (especially Chapter 7, "The Acoustics of Speech Production")
- Cox, F. (2012) *Australian English: Pronunciation and Transcription*, Cambridge UP: Melbourne.
- Fant, G. (1960) *Acoustic Theory of Speech Production*, Mouton, s'Gravenhage.
- Fant, G. (1973) *Speech Sounds and Features*, MIT Press, Cambridge.
- Fant, G. (2004) *Speech Acoustics and Phonetics: Selected Writings*, Kluwer Academic, Boston, Mass.
- Fry, D.B. (1979) *The Physics of Speech*, Cambridge UP: Cambridge, (QP306.F8/1979)
- Harrington J. & Cassidy S. (1999) *Techniques in Speech Acoustics*, Kluwer: Dordrecht, especially chapters 1-4. (P221.5.H37/1999)
- Gick, B., Wilson, I. & Derrick, D. (2013) *Articulatory Phonetics*, Wiley-Blackwell, Chichester.
- Hardcastle, W., Laver, J. & Gibbon, F. (2010) (Eds.) *The Handbook of Phonetic Sciences*, John Wiley, Chichester.
- Harrington, J. (2010) *Phonetic Analysis of Speech Corpora*, Wiley-Blackwell, Chichester.
- Johnson, K. (1997) *Acoustic and Auditory Phonetics*, Blackwell: Cambridge (P221.5 .J64/1997)
- Kent R. D. & Read, C. (2002) *Acoustic Analysis of Speech*. Singular: Albany
- Ladefoged, P. (1962) *Elements of Acoustic Phonetics*, U. Chicago Press: Chicago (QP306.L33)
- Stevens, K. N. (1998) *Acoustic Phonetics*, MIT Press: Cambridge (P221.5 .S74)

Unit Schedule

Lecture Timetable: (FC = Felicity Cox, TB = Titia Benders, AS = Anita Szakay)

Week	Date	Lecture	Lecturer	Prac
1	27 July	Basic Acoustics and Speech Waveforms	TB	Recording
2	3 August	Spectral Analysis of Sound	TB	Recording

3	10 August	Acoustic Theory of Speech Production	TB	Recording
4	17 August	Acoustic Theory of Speech Production	TB	Recording
5	24 August	Vowels	FC	Praat
6	31 August	Vowels	FC	Vowels
7	7 September	Consonants	FC	Vowels
Mid Semester Break				
8	28 September	Consonants	FC	Consonants
9	5 October	No Lecture	FC	Consonants
10	12 October	Consonants	FC	Consonants
11	19 October	Acoustics of Coarticulation	AS	Coarticulation
12	26 October	Acoustics of Prosody	AS	Prosody
13	2 November	Acoustics of Prosody	AS	

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](#). Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy <http://mq.edu.au/policy/docs/assessment/policy.html>

Grading Policy <http://mq.edu.au/policy/docs/grading/policy.html>

Grade Appeal Policy <http://mq.edu.au/policy/docs/gradeappeal/policy.html>

Grievance Management Policy http://mq.edu.au/policy/docs/grievance_management/policy.html

Disruption to Studies Policy http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The*

Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.

In addition, a number of other policies can be found in the [Learning and Teaching Category](#) of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/student_conduct/

Results

Results shown in *iLearn*, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit ask.mq.edu.au.

Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

IT Help

For help with University computer systems and technology, visit <http://informatics.mq.edu.au/help/>.

When using the University's IT, you must adhere to the [Acceptable Use Policy](#). The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- Demonstrate an understanding of acoustic analysis of sound
- Be able to explain how speech can be represented acoustically
- Demonstrate understanding of the acoustic theory of speech production
- Use standard computer software to analyse the acoustic features of consonants and vowels
- Examine the acoustic characteristics of speech
- Examine the acoustics of coarticulated speech and demonstrate the ability to deconstruct coarticulated acoustic representations
- Demonstrate an understanding of the acoustic correlates of prosody

Assessment tasks

- Consonant Assignment
- Vowel Assignment
- Exam
- Class Test

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

- Be able to explain how speech can be represented acoustically

- Examine the acoustic characteristics of speech

Assessment tasks

- Consonant Assignment
- Vowel Assignment

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcomes

- Be able to explain how speech can be represented acoustically
- Use standard computer software to analyse the acoustic features of consonants and vowels
- Examine the acoustics of coarticulated speech and demonstrate the ability to deconstruct coarticulated acoustic representations

Assessment tasks

- Vowel Assignment
- Class Test

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcomes

- Use standard computer software to analyse the acoustic features of consonants and vowels
- Examine the acoustic characteristics of speech

Assessment task

- Vowel Assignment