

The Hong Kong University of Science and Technology
UG Course Syllabus

Phonetics and Speech Technology

LANG2091

3 credits

Pre-requisites: N/A

Co-requisites: N/A

Name of Course Coordinator: Dr. Christie Law

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Office Hours of Course Coordinator: Available by appointment only.

Course Description

Speech technology such as voice assistants on smart speakers and smartphones has become an integral part of everyday life. Development of speech technology requires a systematic understanding of human speech sounds. LANG 2091 introduces students to Phonetics, the scientific study of the physical properties of human speech sounds. Students will learn the physical (acoustic) properties of different components of human speech, how speech sounds are produced and how the knowledge of Phonetics can be useful to speech technology and its development. Students will be actively engaged throughout the course through lectures, interactive tasks, and hands-on practice and learning activities. They will also conduct computerized acoustic analyses of speech sounds using freely available software and explore topics in Phonetics (e.g. foreign accent) or speech technology (e.g. synthesized speech) which are of interest or relevance to students.

Key topics:

- Integration of phonetic knowledge in speech technology
- The International Phonetic Alphabet (IPA) and phonetic transcriptions
- Anatomy of Speech Production
- Basic acoustics for studying speech
- Vowels
- Consonants
- Suprasegmentals

Intended Learning Outcomes (ILOs)

By the end of this course, students should be able to:

1. Identify English speech sounds and describe them phonetically
2. Recognize and transcribe English speech sounds in terms of their distinctive features
3. Explain the articulatory descriptions and acoustic properties of English speech sounds
4. Conduct acoustic analyses of English speech sounds using appropriate tools or software
5. Communicate research findings on a topic related to Phonetics and speech technology to a specific audience

Assessment and Grading

This course will be assessed using criterion-referencing and grades will not be assigned using a curve.

Assessments

Assessment Task	Contribution to Overall Course grade (%)	Due date
A1: Two in-class tests <i>Assess students' understanding of concepts (such as phonemes, place and manner of articulation)</i>	35%	Approx. weeks 7 & 13*
A2: Tutorial practice <i>Group-based tutorial practice on computerized acoustic analysis necessary to successfully complete the final project</i>	15%	Approx. weeks 8, 11 & 12*
A3: Final project <i>A short paper (about 1,000 – 1,200 words) to report on a mini-research they conducted individually</i>	45%	Approx. finals week*
A4: Peer evaluation <i>Evaluation of peer contribution to the group discussion and if applicable, data collection for the final project</i>	5%	Approx. finals week*

* Specific due dates are posted on Canvas.

Mapping of Course ILOs to Assessment Tasks

Assessed Task	Mapped ILOs	Explanation
A1: Two in-class tests	ILOs 1 – 4	Two in-class tests (15% and 20% respectively) will be administered in Weeks 7 & 13 during the regular lecture period. These tests assess students' understanding of concepts (such as phonemes, place and manner of articulation) and mastery of skills to do phonetic transcriptions.
A2: Tutorial practice	ILO1, ILOs 3 – 5	Group-based (4 – 5 students in a group) tutorial practice on computerized acoustic analysis necessary to successfully complete the final project.
A3: Final project	ILOs 1 – 5	Students will write a short paper (about 1,000 – 1,200 words) individually to report on a mini-research they conducted. In this paper, students will:

		a) report on the choice of a “nonstandard” speech for acoustic analysis; “non-standard” speech refers to speech that diverges from the “standard” speech in some identifiable acoustic manner. Examples of “non-standard” speech may include (but not limited to) synthesized speech, dialects, codeswitched speech. Reasons for the choice should be explained b) compare and contrast a real “standard” speech with the chosen “non-standard” speech, utilizing the acoustic analysis skills they have practiced in the tutorials. Students can choose what “non-standard” speech to use based on interest or relevance c) relate the findings of this mini-research to a special topic regarding the current or future developments of speech technology
A4: Peer evaluation	ILOs 4 – 5	Evaluation of peer contribution to the group discussion and if applicable, data collection

Grading Rubrics

Detailed rubrics for each assignment are provided on Canvas. These rubrics clearly outline the criteria used for evaluation. Students can refer to these rubrics to understand how their work will be assessed.

Final Grade Descriptors

Grades	Short Description	Elaboration on subject grading description
A	Excellent Performance	Outstanding performance on all intended learning outcomes. Demonstrates the ability to sophisticatedly synthesize and apply the concepts or skills learned in the course. Demonstrates the ability to skilfully communicate research findings in phonetics or speech technology with sustained awareness of audience, context and purpose.
B	Good Performance	Substantial performance on all intended learning outcomes or substantial performance on most intended learning outcomes which compensates for slightly less satisfactory performance on some other learning outcomes.

		Demonstrates the ability to sufficiently synthesize and apply the concepts or skills learned in the course. Demonstrates the ability to effectively communicate research findings in phonetics or speech technology with high awareness of audience, context and purpose.
C	Satisfactory Performance	Satisfactory performance on the majority of intended learning outcomes. Demonstrates the ability to partially synthesize and apply the concepts or skills learned in the course. Demonstrates the ability to appropriately communicate research findings in phonetics or speech technology with some awareness of audience, context and purpose.
D	Marginal Pass	Barely satisfactory performance on very few intended learning outcomes. Demonstrates limited ability to synthesize and apply the concepts or skills learned in the course. Inadequately or awkwardly communicates research findings in phonetics or speech technology with little awareness of audience, context and purpose.
F	Fail	Unsatisfactory performance on a number of intended learning outcomes. Fails to synthesize and apply the concepts or skills learned in the course. Fails to communicate research findings in phonetics or speech technology with awareness of audience, context and purpose.

Course AI Policy

We encourage students to make use of all the tools available that can help them to communicate more effectively in English. We also expect students to uphold the highest standards of academic integrity. There is no penalty for using or not using GenAI. However, GenAI and other tools cannot be used as a substitute for a student's own work. Students are expected to complete and write their own assessed assignments themselves.

GenAI tools can be very useful for:

- Brainstorming ideas and suggesting sources BUT the information provided may not be accurate or relevant to your assignment.
- Giving suggestions about improving the organization of your writing BUT GenAI tends to suggest very formulaic patterns of writing which may not fit your requirements.
- Giving suggestions about improving your language BUT GenAI may make suggestions for language changes which are not appropriate for the intended context and audience.
- Suggesting simple ways of expressing complex discipline-specific concepts BUT these explanations may be unfamiliar to your audience.

- Providing summaries of long texts BUT important information may be omitted, particularly if the original text is not well-written.

In short, GenAI provides opportunities to enhance your writing and use of English and contains pitfalls which you need to be aware of.

If students use AI tools in the course assessments, they must adhere to the principles of academic integrity and make a declaration at the end of each oral or written assessment. The declaration should include: 1) Was any AI tool used in this assessment? 2) What tool was used and how was it used?

Any misdeclaration will be regarded as a violation of academic integrity and result in serious consequences. See the section Academic Integrity below for details.

Communication and Feedback

Assessment marks for individual assessed tasks will be communicated via Canvas within ten working days of submission. Feedback on assignments will include strengths and areas for improvement where relevant. Students who have further questions about the feedback including marks should consult the instructor within five working days after the feedback is received.

Resubmission Policy

Resubmissions are not accepted, except in exceptional circumstances.

Required Texts and Materials

Course materials and additional resources are provided via Canvas.

Required textbooks:

Ladefoged, P. & Disner, S. F. (2012). *Vowels and consonants*, 3rd Ed. Wiley Blackwell.

Ladefoged, P. & Johnson, K. (2015). *A course in phonetics*, 7th Ed. Cengage.

Supplementary readings:

Clark, J., Yallop, C. & Fletcher, J. (2007). *An introduction to phonetics and phonology*, 3rd Ed. Wiley-Blackwell.

Johnson, K. (2011). *Acoustic and auditory phonetics*, 3rd Ed. Wiley-Blackwell.

Ladefoged, P. (1996). *Elements of acoustic phonetics*, 2nd Ed. The University of Chicago Press.

Roach, P. (2010). *English phonetics and phonology*, 4th Ed. Cambridge University Press.

Small, L. H. (2020). *Fundamentals of Phonetics: A practical guide for students*, 5th Ed. Pearson.

Academic Integrity

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST's Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to [Academic Integrity | HKUST – Academic Registry](#) for the University's definition of plagiarism and ways to avoid cheating and plagiarism.

Plagiarism

In CLE assignments, students should not copy from others nor submit the same work for multiple courses. Source materials must be explicitly acknowledged.

Assignments with evidence of plagiarism may score a zero and be followed up with your department's Dean. To demonstrate academic integrity and avoid plagiarism, you are expected to:

- paraphrase, summarize, reference and synthesize ideas from sources
- refrain from copying expressions and ideas directly from any source (e.g. from another student, or from a video, or from an article, etc.) without proper acknowledgement