

# Signal processing and computational methods for speech

 Niveau d'étude  
Master 2

 ECTS  
3 crédits

 Volume horaire  
30h

 Période de  
l'année  
Semestre 3

## Présentation

### DESCRIPTION

This course aims to equip student with the basics of signal processing leading to Automatic Speech Recognition approaches and computational methods used in phonetics and phonology. We follow a laboratory-phonology approach looking at the role of fine-phonetic-detail in defining various types of contrasts (phonological, sociophonological, speaker-specific detail, etc.). We look at how to deal with data recording, automated transcriptions, semi-manual and automatic time-alignment and segmentation, exploring pre-processing and signal processing techniques for the various segmental and suprasegmental parts of the speech signal, before moving into how Automatic Speech Recognition approaches work. We then explore advanced computational techniques as implemented in state-of-the-art tools borrowed from classical signal processing tools as implemented in Praat going through to more advanced tools such as OpenSMILE for obtaining various feature sets, including ComParE16, eGeMAPS, emobase (both low-level descriptors and functionals). We end with a few sessions using the R programming language to run various signal processing techniques in addition to applying statistical analyses adapted to speech data

### OBJECTIFS

On successful completion of this course, students should be able to:

- Gain insights into the role of fine-phonetic-detail and advanced signal processing tools in identifying various types of contrasts
- Gain essential technical skills from signal processing that form the basis of Automatic Speech Recognition
- Gain competency level in manipulating and analysing the speech signal and apply computational methods in phonetics and phonology
- Identify the various measures that can be applied to identify various categories following the relational invariance approach
- Use computational approaches borrowed from classical phonetic/phonology studies and from Automatic Speech Recognition as implemented in, e.g., Praat, OpenSMILE and R for signal processing and statistical analyses
- Being able to statistically analyse the outputs

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## HEURES D'ENSEIGNEMENT

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Signal processing and computational methods for speech	Cours Magistral	18h
Signal processing and computational methods for speech	Travaux Dirigés	12h

## PRÉ-REQUIS OBLIGATOIRES

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There are no specific prerequisites for this course, but students will ideally need basic knowledge of Phonetics, a basic introduction to Phonology and to Experimental Phonology

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