GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2024-2025

Speech Processing (E010220)

Course size *(nominal values; actual values may depend on programme)*

Credits 4.0 **Study time 120 h**

Course offerings and teaching methods in academic year 2025-2026

A (semester 2)	English	Gent	lecture
			independent work

Lecturers in academic year 2025-2026

Demuynck, Kris	TW06	lecturer-in-charge

Offered in the following programmes in 2025-2026	crdts	offering
Master of Science in Electrical Engineering (main subject Communication and Information Technology)	4	A
Master of Science in Computer Science	4	A
Master of Science in Computer Science Engineering	4	A
Exchange Programme in Computer Science (master's level)	4	A

Teaching languages

English

Keywords

Speech coding, speech recognition, speech synthesis

Position of the course

In this course, the basic principles underlying modern systems for speech recognition, speech coding (e.g. GSM, MPEG), and speech synthesis are explained. Modern speech processing builds upon the principles of signal processing, machine learning (including deep learning), and artificial intelligence (search algorithms). In that aspect, this course also serves as an introduction to (or recapitulation of) these techniques as well as an illustration of the application of these techniques in a specific domain.

Contents

- Speech and hearing
- Speech recognition
- Digital speech reproduction
- Speech synthesis

Initial competences

no foreknowledge required

Final competences

1 Get to know the properties of speech as an acoustic signal or as a carrier of linguistic information.
2 Get to know the most important speech coding methods and understand the underlying basic principles.
3 Get to know the major components of a speech recognition system and the way they these components operate and interact with each other.
4 Get to know the major components of s speech synthesis system and the way these components operate and interact
5 Be able to apply knowledge of speech production and perception to understand why certain decisions were made during the design of speech processing systems.
6 Learn how to combine principles from signal processing, computational

linguistics, machine learning, and artificial intelligence in one system.

7 Learn when and how to speech processing technology can help to build new applications or to improve the human-machine interaction in existing application.

8 Learn to understand the principles beyond the theory in such a way that you can also apply them in other domains such as image processing or dynamic system modeling.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Lecture, Independent work

Study material

None

References

- Spoken Language Processing; X. Huang, A. Acero, H. Hon; 2001; Prentice Hall (ISBN 0-13-022616-5)

Course content-related study coaching

Assessment moments

end-of-term and continuous assessment

Examination methods in case of periodic assessment during the first examination period

Oral assessment open-book

Examination methods in case of periodic assessment during the second examination period

Oral assessment open-book

Examination methods in case of permanent assessment

Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible in modified form

Extra information on the examination methods

During examination period: oral open-book exam
During semester: graded project reports. Second chance: Possible in adapted form

Calculation of the examination mark

The graded project report (during semester) counts for 1/4 of the points. The written exam counts for the other 3/4 of the points.