

## Signal Processing (E010010)

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

**Credits 6.0**

**Study time 180 h**

**Course offerings and teaching methods in academic year 2024-2025**

A (semester 2)

English

Gent

lecture

seminar

practical

**Lecturers in academic year 2024-2025**

Madhu, Nilesh

TW06

lecturer-in-charge

**Offered in the following programmes in 2024-2025**

[Bachelor of Science in Engineering\(main subject Electrical Engineering\)](#)

**crdts**

6

**offering**

A

[Master of Science in Computer Science Engineering](#)

6

A

**Teaching languages**

English

**Keywords**

signal processing, digital filters, DFT, spectral analysis, non-stationary signals and systems

**Position of the course**

Learn how to apply signal models for the solution of diverse problems in signal processing.

Learn to design signal processing systems from specifications.

**Contents**

- Signal models: Signal spaces, signal transformations, applications
- Digital-filter design: IIR and FIR filters; multirate filtering
- The DFT and its applications: FFT, fast convolution, filtering in frequency domain, cepstrum
- Spectral signal analysis
- Non-stationary signals and systems

**Initial competences**

This course builds further upon the concepts introduced in the course "Systems and Signal Analysis"

**Final competences**

- 1 Understand and correctly interpret signal processing methods and models
- 2 Understand and apply digital filter design methods
- 3 Convert a realistic problem statement into signal processing system specifications
- 4 Selection of the best design method for accomplishing certain system requirements
- 5 Inventarisation and comparison of suitable methods for solving a specific problem

**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**

Seminar, Lecture, Practical

**Study material**

Type: Syllabus

Name: Course material - Signal processing

Indicative price: Free or paid by faculty

Optional: yes

Language : Dutch

Number of Pages : 214

Available on Ufora : Yes

Online Available : No

Available in the Library : No

Available through Student Association : No

Additional information: Older course material (in Dutch), serving as a stop-gap till my own text is completed. This complements the slides and, as such, is not compulsory for the course but can serve as additional reading.

Type: Slides

Name: Course slides - Signal processing

Indicative price: Free or paid by faculty

Optional: no

Language : English

Number of Slides : 650

Available on Ufora : Yes

Online Available : No

Available in the Library : No

Available through Student Association : No

Additional information: Slides that contain the main course material. This is the material that will be discussed in class.

## References

- Alan V. Oppenheim & Ronald W. Schaffer. Discrete-Time Signal Processing, (2nd or 3rd edition), Pearson Education Limited, 2009, ISBN-13: 9780131988422
- J. Proakis & D. Manolakis. Digital Signal Processing : Principles, algorithms & applications (2nd edition). Macmillan, 1992

## Course content-related study coaching

The instructor is available for discussion and clarifications before and after the class. He may also be contacted by email.

## Assessment moments

end-of-term and continuous assessment

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

Written assessment with open-ended questions

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

Written assessment with open-ended questions

## Examination methods in case of permanent assessment

Assignment

## Possibilities of retake in case of permanent assessment

examination during the second examination period is not possible

## Extra information on the examination methods

During examination period: Closed-book exam. However: students are allowed to bring with them four (4) A4-sheets of paper (double-sided) with **handwritten** notes. No photocopies, printouts etc. allowed.

During semester: graded project reports. Second chance: Not possible

## Calculation of the examination mark

The final score is based on a weighted average of the score obtained for the computer projects and the score obtained in the final exam. However, students must pass both parts to pass the course.

Calculation of score:

- Weight of computer projects = 1/2
- Weight of final exam = 1/2

If the score on any one component (projects or written exam) is less than 50%, then the final score will be reduced to 9/20.

If the score on the written exam is less than 40% then the final score will be reduced to the

lowest score of 7/20, such that it cannot be considered for deliberation.