Course Specifications
Valid as from the academic year 2018-2019

Due to Covid 19, the education and evaluation methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

Course
Information Theory (E003600)

Valid as from the academic year 2018-2019

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

Credits 6.0
Study time 180 h
Contact hrs 60.0 h

Course offerings and teaching methods in academic year 2019-2020

A (semester 2)

Dutch

UGent

guided self-study 30.0 h
on campus project 2.5 h
on campus seminar: coached exercises 27.5 h

B (semester 2)

English

on campus seminar: coached exercises 27.5 h
on campus project 2.5 h
on campus lecture 30.0 h

Lecturers in academic year 2019-2020

Steendam, Heidi

TW07 lecturer-in-charge

Offered in the following programmes in 2019-2020

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<tr>
<th>Programme</th>
<th>crds</th>
<th>offering</th>
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<tr>
<td>Bridging Programme Master of Science in Electrical Engineering</td>
<td>6</td>
<td>B</td>
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<tr>
<td>(main subject Communication and Information Technology)</td>
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<td>(main subject Electronic Circuits and Systems)</td>
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<td>Brugprogramma Master of Science in Bioinformatics (main subject Engineering)</td>
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<td>Bridging Programme Master of Science in Computer Science Engineering</td>
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<tr>
<td>Master of Science in Electromechanical Engineering (main subject Control Engineering and Automation)</td>
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<tr>
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<td>Master of Science in Electromechanical Engineering (main subject Maritime Engineering)</td>
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<tr>
<td>Master of Science in Electromechanical Engineering (main subject Mechanical Energy Engineering)</td>
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<tr>
<td>Master of Science in Computer Science</td>
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<td>Master of Science in Computer Science Engineering</td>
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<tr>
<td>European Master of Science in Photonics</td>
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<tr>
<td>Exchange Programme in Bioinformatics (master's level)</td>
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<tr>
<td>Exchange Programme in Computer Science (master's level)</td>
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Teaching languages
Dutch, English

(Approved)
Keywords
source coding, channel coding

Position of the course
This course provides an in-depth treatment of the concepts and principles of source coding (compression and quantization) and channel coding (protection against transmission errors). Derivation of the theoretical bounds and study a number of important classes of practical codes.

Contents
• Introduction
• Information measure
• Source coding: Source models, Coding of discrete sources, Coding of analog sources, Source coding theorem, rate distortion theory
• Channel coding: Channel models, Channel capacity, channel coding theorem
• Error detecting and error correcting codes: Linear block codes, Cyclic codes, Convolutional codes

Initial competences
Communication theory: partim data communication

Final competences
1 Compute theoretical bounds for source and channel coding.
2 Use lossless and lossy source coding.
3 Compute the optimal quantizer.
4 Analyse hard and soft decoding.
5 Recognize the graphical representation of codes.
6 Apply Viterbi decoding.
7 Apply error detection and error correction for soft and hard decoding.
8 Compute performance.

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
Guided self-study, on campus lecture, on campus project, on campus seminar: coached exercises

Learning materials and price
English course notes

References

Course content-related study coaching

Evaluation methods
end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period
Written examination, open book examination

Examination methods in case of periodic evaluation during the second examination period
Written examination, open book examination

Examination methods in case of permanent evaluation
Report
Possibilities of retake in case of permanent evaluation
examination during the second examination period is possible in modified form

Extra information on the examination methods

(Approved)
During examination period: written open book exam
During semester: graded project reports. Second chance: if score less than 8/20: oral examination

Calculation of the examination mark
Evaluation throughout semester as well as during examination period. Special conditions: evaluation throughout semester: 20% examination: 80% The score of the evaluation throughout the semester obtained in the first examination period counts in the second examination period for 20% of the total. If the score of the evaluation throughout the semester is less than 8/20, the student cannot pass for the course. The end score is then the lowest of the two scores.