

## Advanced Modulation and Coding (E012210)

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

<b>Course size</b>	<i>(nominal values; actual values may depend on programme)</i>			
<b>Credits 4.0</b>	<b>Study time 120 h</b>	<b>Contact hrs</b>	30.0h	
<b>Course offerings and teaching methods in academic year 2021-2022</b>				
A (semester 2)	English	Gent	lecture	15.0h
			seminar: coached exercises	15.0h
<b>Lecturers in academic year 2021-2022</b>				
Steendam, Heidi		TW07	lecturer-in-charge	
Noels, Nele		TW07	co-lecturer	
<b>Offered in the following programmes in 2021-2022</b>			<b>crdts</b>	<b>offering</b>
<a href="#">Master of Science in Electrical Engineering (main subject Communication and Information Technology )</a>			4	A
<a href="#">Master of Science in Electrical Engineering (main subject Electronic Circuits and Systems)</a>			4	A
<a href="#">Master of Science in Computer Science Engineering</a>			4	A
<a href="#">Master of Science in Computer Science Engineering</a>			4	A

### Teaching languages

English

### Keywords

modulation, coding, detection, estimation

### Position of the course

This course deals with communication systems that make use of advanced modulation, coding, detection and estimation. A selection of the topics mentioned below will be covered

### Contents

- Advanced coding: turbo codes; LDPC codes
- Advanced modulation and detection: Modulation and detection for systems with multiple antennas (MIMO)
- Iterative ("turbo") estimation and detection: decoding; equalization; synchronization

### Initial competences

Communication Theory

### Final competences

- 1 Recognize and use factor graphs.
- 2 Analyse and apply turbo codes, LDPC codes.
- 3 Evaluate systems with multiple antennas.
- 4 Apply turbo estimation.
- 5 Understand and use techniques to reduce the effect of interference.
- 6 Understand and use iterative techniques to reach theoretical performance bounds.

### 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, Seminar: coached exercises

### Learning materials and price

available on the electronic learning platform

### **References**

H. Wymeersch, Iterative Receiver Design, Cambridge University Press, ISBN: 978-0521873154

### **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 examination

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

Oral examination

#### **Examination methods in case of permanent assessment**

Report, Oral examination

#### **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: oral closed-book exam

During semester: graded project reports; graded oral presentation. Second chance: Not possible

#### **Calculation of the examination mark**

Evaluation throughout semester as well as during examination period. Special conditions:

Evaluation throughout semester : 75% Examination : 25%