

Design of Multimedia Applications (E017920)

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

Credits 6.0 **Study time 180 h** **Contact hrs** 60.0h

Course offerings and teaching methods in academic year 2022-2023

A (semester 2)	English	Gent	practicum	30.0h
			lecture	30.0h
B (semester 2)	Dutch	Gent	guided self-study	30.0h
			practicum	30.0h

Lecturers in academic year 2022-2023

Van Wallendael, Glenn	TW06	lecturer-in-charge
Lambert, Peter	TW06	co-lecturer

Offered in the following programmes in 2022-2023

	crdts	offering
Bridging Programme Master of Science in Computer Science Engineering	6	B
Bridging Programme Master of Science in Computer Science Engineering	6	A
Master of Science in Electrical Engineering (main subject Communication and Information Technology)	6	A
Master of Science in Electromechanical Engineering(main subject Control Engineering and Automation)	6	A
Master of Science in Electromechanical Engineering(main subject Electrical Power Engineering)	6	A
Master of Science in Electromechanical Engineering(main subject Maritime Engineering)	6	A
Master of Science in Electromechanical Engineering(main subject Mechanical Construction)	6	A
Master of Science in Electromechanical Engineering(main subject Mechanical Energy Engineering)	6	A
Master of Science in Computer Science	6	A
Master of Science in Computer Science Engineering	6	B
Master of Science in Computer Science Engineering	6	A
Exchange Programme in Computer Science (master's level)	6	A

Teaching languages

English, Dutch

Keywords

Multimedia, design, coding, interactivity, adaptivity, standards, implementation aspects, applications

Position of the course

The main purpose of this course is to let the students familiarize with the most important concepts behind the design of multimedia applications. Moreover, the students will gain some experience with setting up multimedia applications, including integration of different subsystems.

Contents

- block-based hybrid coding for digital video
- measuring image and video quality: objective vs. subjective distortion metrics / quality metrics
- standards for compression of multimedia data (e.g., H.264/AVC, HEVC, AV1)
- transmission aspects: error resilience and concealment
- coding and compression of 3D meshes

- audio compression (e.g., MP3)
- capita selecta: recent advances in multimedia technology
- design decisions & implementation aspects of complex & integrated multimedia applications
- design of concrete components of multimedia applications: computer exercises (specifically tailored to actual state-of-the-art technologies)

Initial competences

Programming in a high level programming language; basic knowledge communication networks; basic knowledge of multimedia coding (DCT and Fourier Transforms, quantization, entropy coding, JPEG compression)

Final competences

- 1 to understand, know, and be able to apply mathematical transformations that form the basis for the encoding and compression of multimedia data
- 2 to understand and know current techniques for encoding multimedia data, and be able to implement (parts of) them
- 3 to understand and know the structure and functionality of standards for coding of multimedia data
- 4 to understand and know current techniques for error detection, resilience, and concealment, and be able to implement (parts of) them
- 5 to be able to analyze specific functional multimedia applications and to identify the associated technology requirements, and to be able to design and deploy an integrated multimedia application

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

Practicum, Guided self-study, Lecture

Extra information on the teaching methods

The use of an own laptop is highly recommended for the lab exercises.

Learning materials and price

PowerPoint presentations

Book [optional]: David R. Bull and Fan Zhang, "Intelligent Image and Video

Compression - Communicating Pictures", 2nd Edition, Elsevier Academic Press

Price: 123 EUR

References

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

Skills test, Report

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 closed-book exam
- During semester: graded lab sessions; graded project reports. Second chance: Possible in adapted form

Calculation of the examination mark

General: students who eschew one or more parts of the evaluation can no longer

pass the course as a whole. Total scores will be reduced to the highest non-deliberative quotation (7/20) in case the total score is higher.

First examination period: total score = 50% non-periodical evaluation + 50% periodical evaluation (exam). When students obtains less than 8/20 for at least one of the components, they can no longer pass the course as a whole. If the total score does turn out to be a mark of ten or more out of twenty, this is reduced to the highest fail mark (9/20).

Second examination period: total score = 50% exam + 50% non-periodical evaluation (as obtained during the first examination period). If the score of the non-periodical evaluation during the first examination period is less than 8/20, an additional (individual) task will be defined in the second examination period. In this case, the total score = 50% exam + 50% additional task. When students obtains less than 8/20 for at least one of the components, they can no longer pass the course as a whole; if the total score does turn out to be a mark of ten or more out of twenty, this is reduced to the highest fail mark (9/20).