GHENT UNIVERSITY

Course Specifications

From the academic year 2021-2022 up to and including the academic year

Image Processing (E010310)

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

Credits 6.0	**Study time 180 h**	**Contact hrs**	67.5h

Course offerings and teaching methods in academic year 2022-2023

A (semester 1)	Dutch	Gent	lecture	30.0h
			project	37.5h

Lecturers in academic year 2022-2023

Philips, Wilfried	TW07	lecturer-in-charge
Goossens, Bart	TW07	co-lecturer

Offered in the following programmes in 2022-2023	**crdts**	**offering**
Master of Science in Electrical Engineering (main subject Communication and Information Technology)	6	A
Master of Science in Electronics and ICT Engineering Technology(main subject ICT)	6	A
Master of Science in Computer Science	6	A
Master of Science in Computer Science Engineering	6	A
Master of Science in Computer Science Engineering	6	A

Teaching languages

Dutch

Keywords

color, restauration, compression, analysis

Position of the course

This course is an introductory course and presents an overview of image processing techniques and applications, rather than a detailed mathematical description and technical details of the algorithms.
To present an overview of the most important phenomena and techniques in digital image and video processing: image perception, image acquisition and display, image restoration, and primitive operations for image and video analysis. To present some examples of industrial applications of image processing and some important developments in image processing research. To allow the students to experiment with image processing algorithms.

Contents

- Overview: Overview and applications of image processing
- Image perception, representation and reproduction: Image perception by humans, cameras and display systems, Sampling and colour representation
- Image restoration techniques: grey-scale and colour modification, linear filter techniques for noise suppression and edge enhancement, non-linear filter techniques
- Image models: Stochastic image models, Linear image transforms
- Image restauration: Wiener and (pseudo-) inverse filtering, regularisation, Restauration in the wavelet domain
- Primitives for image analysis: Segmentation, Edge detection, Morphological image processing, ...
- Video processing: Video representation, Video restauration
- Applications of computer vision
- Project: Introduction project, Computer project on one or of the course topics

Initial competences

None required

Final competences

1 Having knowledge of cameras, display systems and image compression standards.
2 Having insight in techniques for image and video restauration, compression and analysis.

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, Project

Learning materials and price

Electronic multimedia presentation available on the electronic learning platform, course notes (to be ordered during the first class, price: 10 euros)

References

- W.K. Pratt. Digital Image Processing. John Wiley, 2001. ISBN 0-471-37407-5
- R. Klette and P. Zamperoni. John Wiley, 1996.
- Handbook of image processing operators. ISBN 0-471-95642-2.
- R.C. Gonzalez and R.E. Woods. Digital Image Processing. Addison-Wessley, 3 edition, 1992. ISBN 0201508036.
- C.A. Poynton. Frequently asked questions about color, 1997. http://www.inforamp.net/~poynton/Poynton-color.html.
- C.A. Poynton. Frequently asked questions about gamma, 1998. http://www.inforamp.net/~poynton/GammaFAQ.html.
- J.C. Russ. The Image processing handbook. IEEE Press, 3 edition, 1998. ISBN 0849325323.
- The color FAQ. http://www.inforamp.net/~poynton/ColorFAQ.html.
- Frequently asked questions about gamma. http://www.inforamp.net/~poynton/GammaFAQ.html

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

Written examination

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

Written examination

Examination methods in case of permanent assessment

Report

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: written closed-book exam
During semester: graded project reports. Second chance: Not possible
Frequency: one time project

Calculation of the examination mark

Evaluation throughout semester as well as during examination period. Special conditions: The end grade is a weighted average of the grades of the project (1/3) and the exam (2/3), unless the project grade is below 8. In the latter case, the final grade equals minimum(exam grade, project grade-2).