

# Visual Media Compression

## Titulaires

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## Mnémonique du cours

INFO-H516

## Crédits ECTS

5 crédits

## Langue(s) d'enseignement

Anglais

## Période du cours

Deuxième quadrimestre

## Campus

Solbosch

## Contenu du cours

In this course, fundamental algorithms for compression of image and video are introduced, such as transform coding, quantization rate-distortion optimization, and entropy coding. This course will also review the fundamental techniques to compress 3D contents in different formats: multiview video, and 3D mesh / point clouds. The course will also provide knowledge to understand the state-of-the-art video compression standards. Finally, new trends in visual media compression, such as compression using neural networks, and compression of plenoptic video contents are also introduced. This course will consist of three parts: a theoretical one, a practical one and project work. The course content will be as follows:

- > Review of Image / video processing tools
- > Why compression, and its history
- > Lossless and lossy coding, scalability
- > Transform coding, Quantization, entropy coding
- > Prediction models, Rate-distortion optimization
- > JPEG and MPEG standards
- > 3D video compression techniques and Standards
- > Compression by neural networks
- > Plenoptic video and compression techniques
- > Future trends in visual media compression

## Objectifs (et/ou acquis d'apprentissages spécifiques)

- > Understand compression algorithms
- > Develop a single tool compression, and
- > Use existing, advanced compression tools

## Pré-requis et co-requis

### Connaissances et compétences pré-requis

- > Knowledge in programming using C / C ++, Python or MATLAB
- > Weak prerequisites: basic knowledge in image / video processing

## Méthodes d'enseignement et activités d'apprentissages

Theoretical (50%) / practical (50%) teaching and assignments, followed by project work presentation

## Références, bibliographie et lectures recommandées

- 1 D. S. Taubman, M. W. Marcellin, "JPEG2000 – Image Compression Fundamentals, Standards, and Practice," Kluwer Academic Publishers, 2002.
- 2 Iain E. Richardson, "The H.264 advanced video compression standard", Second Edition, Willy 2010.
- 3 Y. Wang, J. Ostermann, Y.-Q. Zhang, "Video Processing and Communications," Prentice-Hall, 2002.
- 4 T. Wiegand, H. Schwarz, "Source Coding: Part I of Fundamentals of Source and Video Coding, Foundations and Trends in Signal Processing" 2011.

## Autres renseignements

### Lieu(x) d'enseignement

Solbosch

### Contact(s)

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## Méthode(s) d'évaluation

Rapport écrit, Projet et Présentation orale

### Méthode(s) d'évaluation (complément)

The final evaluation is only based on your exercise/project presentation during the examination session, submitted report, and submitted presentation file.

Note: There are weekly reports and tutorial paper reading and presentations during the lecture. Failing to submit the assignments during the course corresponds to negative scores

from the final evaluation score. The details will be announced in the UV.

### Langue(s) d'évaluation principale(s)

Anglais

## Programmes

### Programmes proposant ce cours à l'école polytechnique de Bruxelles

MA-IRCB | **Master : ingénieur civil biomédical** | finalité Spécialisée/bloc 2 et MA-IRIF | **Master : ingénieur civil en informatique** | finalité Spécialisée/bloc 1 et finalité Spécialisée/bloc 2

