

## Contenus

| Nom du Cours |                              | Semestre du Cours | Cours Théoriques | Travaux Dirigés (TD) | Travaux Pratiques (TP) | Crédit du Cours | ECTS |
|--------------|------------------------------|-------------------|------------------|----------------------|------------------------|-----------------|------|
| INF 529      | Traitement d'image numérique | 1                 | 3                | 0                    | 0                      | 3               | 6    |

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| Cours Pré-Requis                |  |
| Conditions d'Admission au Cours |  |

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| Langue du Cours   | Anglais                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Type de Cours     | Électif                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Niveau du Cours   | Master                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Objectif du Cours | Digital image processing is among the fastest growing computer technologies. Image and video modalities are considered as complex data structures due to multidisciplinary applications and broad range of file structures. With increasing computer power, it is now possible to do numerically many tasks that were previously done using analogue techniques. The objective of this course is to provide a brief introduction to methodologies applicable to digital image processing and to develop a foundation that can be used as the basis for further study and research in this field.                                                                                                                                                                         |
| Contenus          | <ul style="list-style-type: none"> <li>• Introduction, Image Representation, Image Encoding</li> <li>• Intensity Transformations, Geometric Transformations</li> <li>• Spatial Filtering, Fourier Transform, Short-Time Fourier Transform, Convolution</li> <li>• Frequency Domain Filtering, Sampling</li> <li>• Image Restoration, Image Enhancement</li> <li>• Edge Detection-Sharpening</li> <li>• Multi-resolution Analysis</li> <li>• Image Pyramids</li> <li>• Image morphology</li> <li>• Wavelets</li> <li>• Image Compression</li> <li>• Applications: segmentation, watermarking, recognition</li> <li>• Deep learning models in image &amp; video</li> <li>• Advanced topics: Video applications</li> </ul>                                                  |
| Ressources        | <p>Textbook(s):</p> <p>R. Gonzalez and R. Woods Digital Image Processing, Pearson, 4th Edition, 2018</p> <p>M. Sonka, V. Hlavac, and R. Boyle, Image Processing, Analysis and Machine Vision, 4th Edition Cengage Learning, 2015</p> <p>Supplementary Books:</p> <p>Alberto Fernandez Villan - Mastering OpenCV 4 with Python: A practical guide covering topics from image processing, augmented reality to deep learning with OpenCV 4 and Python 3.7 Packt Publishing, 2019</p> <p>A. Murat Tekalp - Digital Video Processing (Prentice Hall Signal Processing) 2nd Edition, 2015</p> <p>Ian Goodfellow, Yoshua Bengio, Aaron Courville – Deep Learning, MIT Press, 2016</p> <p><a href="https://www.deeplearningbook.org/">https://www.deeplearningbook.org/</a></p> |

Intitulés des Sujets Théoriques

| Semaine | Intitulés des Sujets |
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