

Title of course : Introduction to AI (Artificial Intelligence)

Number of hours	Lecture 22h + TP (practicals)- 8h	Semester : 10
Number of ECTS	3	
Responsible :	R. VanRullen	
Aims	Familiarize students with the history of AI, and its recent developments. Expose them to state-of-the-art methods in various domains (image, text processing). Give them pointers to use and apply modern software and deep learning frameworks.	
Content	<ul style="list-style-type: none">• Symbolic AI : history and foundations (2h - IRIT : Emiliano Lorini)<ul style="list-style-type: none">○ Introduction : symbolic AI vs subsymbolic AI○ Chronological view of symbolic AI○ Formal methods for symbolic AI○ Logic-based modeling in AI○ Integration of symbolic and subsymbolic approaches...• Neural networks : history and foundations (2h cours + 1h TP - VanRullen chair/PhD/post-doc)<ul style="list-style-type: none">○ History of neural networks○ Artificial neurons - Perceptrons○ Multi-layer perceptrons (MLPs), CNNs and RNNs○ Objective functions, Gradient descent and Back-propagation○ Loss functions, optimization, regularization and hyperparameters• Deep learning in Computer Vision (6h cours + 2h TP - VanRullen or Serre chairs/PhD/post-doc)<ul style="list-style-type: none">○ Image classification○ Object detection, semantic segmentation, U-nets○ Zero-shot and few-shot learning○ Self-supervised and unsupervised learning, auto-encoders, GANs○ Visual reasoning• Natural Language Processing (NLP) (4h cours + 2h TP - IRIT : Chloe Braud, ANITI : Romain Bielawski)<ul style="list-style-type: none">○ Word embeddings○ LSTMs and recurrent neural networks for NLP○ Neural machine translation○ Transformers• Deep learning for sound processing, speech recognition (1h cours + 1h TP - IRIT : Thomas Pellegrini)<ul style="list-style-type: none">○• (Deep) Reinforcement Learning (3h cours + 2h TP - ISAE : Emmanuel Rachelson/PhD/post-doc)<ul style="list-style-type: none">○• Deep Learning and predictive medicine (4h, Paul Monsarrat)<ul style="list-style-type: none">○ Machine learning and data mining, oral medicine as an example	

Assessment	Project
Pre-requisites	Basic knowledge of Python programming
Keywords	AI, deep learning, neural networks
FTLV (Y/N)	
Competencies	
Core competencies	