**ECUE Apprentisage automatique pour la sciences des données**

10h CM, 10h TD, 10h TP

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**Description**

This course, Apprentissage Automatique pour la Science des Données, provides a comprehensive overview of traditional machine learning models and delves deeply into advanced deep learning techniques. The course aims to equip students with both theoretical knowledge and practical skills necessary for solving complex data science problems using state-of-the-art machine learning and deep learning methodologies. This course will be taught in English

**Course Content**

1**. Review of the Traditional Machine Learning Models**

Supervised et non supervised learning

Model evaluation and validation techniques (cross-validation, grid search)

**2. Introduction to Deep Learning**

Basics of neural networks

Activation functions

Loss functions and optimization algorithms (Gradient Descent, Adam)

**3. Deep Learning Architectures**

Feedforward neural networks

Convolutional neural networks (CNNs)

Image processing applications

Architectures (LeNet, AlexNet, VGG, ResNet)

Recurrent neural networks (RNNs)

LSTM and GRU

Generative models

Autoencoders

**4. Advanced Topics in Deep Learning**

Transfer learning

Fine-tuning pre-trained models

Attention mechanisms and Transformers

Reinforcement learning basics

Assessing and evaluating model biased

**Evaluation**

Assignments and Projects (60%)

Final Exam (30%)

Class Participation and Attendance (10%)

By the end of this course, students will have a solid understanding of both traditional and deep learning models, and will be able to apply these techniques to various data science problems, preparing them for advanced roles in the industry.