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## Introduction to machine learning (3IN1042)

| Filières concernées | Nombre d'heures | Validation | Crédits ECTS |
|---|---|---|---|
| **Bachelor en science des données** | **Cours: 2 ph** <br> **Exercice: 2 ph** | **Voir ci-dessous** | 6 |

ph=période hebdomadaire, pg=période globale, j=jour, dj=demi-jour, h=heure, min=minute

**Période d'enseignement:**

- Semestre Automne

**Equipe enseignante**

Christos Dimitrakakis
Hortence Yiepnou Nana (assistant)

**Contenu**

This course gives a methodological, theoretical and practical introduction to machine learning. Topics covered:
- Learning problems: estimation, prediction, classification, regression
- Pipeline: Experiment design, data collection and processing
- Data analysis: generalisation, model selection, testing and simulation
- Principles: loss minimisation, Bayesian inference
- Algorithms: stochastic gradient descent
- Models: nearest neighbours, neural networks, graphical models
- Applications: healthcare, image processing, text prediction/generation
- Python: pandas, numpy, scikitlearn, matplotlib

**Forme de l'évaluation**

Continuous evaluation
- Weekly assignments (40%)
- Project (60%)

The assignments are structured so that you can properly prepare your project. You must pass both the assignments and the projects to successfully complete the course.

**Modalités de rattrapage**

If you have narrowly failed your project, an oral exam might be possible. Otherwise, the project has to be resubmitted. Failing to submit the weekly assignments requires a repetition of the course.

**Pré-requis**

- Probability
- Calculus
- Linear Algebra
- Python

**Forme de l'enseignement**

- 4 hours of mixed lectures, demos, exercises, group work and tutorials
- Short videos and course notes
- Office hours: 14:00-16:00 on Friday (by appointment).

**Objectifs d'apprentissage**

| URLs | |
|---|---|
| | 1) https://github.com/olethrosdc/machine-learning-neuch |

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Au terme de la formation l'étudiant-e doit être capable de :

- Communicate results
- Simulate pipelines
- Explain algorithms
- Formulate scientific questions
- Compare methods
- Design experiments
- Estimate effects
- Identify learning problems

### Compétences transférables

- Communicate research
- Formulate problems
- Synthesise methods
- Present results
- Develop project
- Explain methods and algorithms

| URLs | 1) https://github.com/olethrosdc/machine-learning-neuch |
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