

Learning theory

**ECTS** : 3

**Volume horaire** : 21

**Description du contenu de l'enseignement :**

1. **Supervised Learning**: Bayes decision rule, Consistency and no free lunch theorem, Hypothesis class, Probably Approximately Correct (PAC) framework. Empirical Risk Minimization (ERM), PA Cbounds with ERM
2. **Concentration Inequalities** : Chebyshev's inequality, Hoeffding's inequality, Sub-Gaussian random variables, Concentrations of functions of random variables, Bernstein's deviation inequality, Deviation inequality for quadratic forms
3. **Generalization Bounds via Uniform Convergence**: Finite hypothesis class, Bounds for infinite hypothesis class via discretization, Rademacher complexity (RC), Empirical RC,
4. **Bounding the Rademacher complexity**: Shattering numbers, VC theory, Covering number, entropy, Dudley's chaining

**Compétence à acquérir :**

L'objectif du cours est d'acquérir des notions théoriques d'apprentissage statistique.

**Mode de contrôle des connaissances :**

Examen final.

**Document susceptible de mise à jour - 01/04/2026**

**Université Paris Dauphine - PSL** - Place du Maréchal de Lattre de Tassigny - 75775 PARIS Cedex 16