

- Faculté des sciences
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Reinforcement Learning and Decision Making Under Uncertainty (3IN2064)

Filières concernées	Nombre d'heures	Validation	Crédits ECTS
Master en économie appliquée	Cours: 2 ph Exercice: 2 ph	Voir ci-dessous	5
Master en finance	Cours: 2 ph Exercice: 2 ph	Voir ci-dessous	5
Master en informatique	Cours: 2 ph Exercice: 2 ph	Voir ci-dessous	5

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

Période d'enseignement:

- Semestre Printemps

Equipe enseignante

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Contenu

Statistical decision problems
 Introduction to Bayesian inference
 Markov decision processes
 Dynamic programming:
 - Backwards Induction
 - Value Iteration
 - Policy Iteration
 - Temporal Differences
 Stochastic Dynamic Programming:
 - Q-Learning
 - Sarsa
 - Actor Critic Methods
 - Monte Carlo Methods
 Model Based Reinforcement Learning:
 - Direct Model-Predictive Control
 - Bayesian Reinforcement Learning
 Upper confidence bounds:
 - Bandit problems
 - Reinforcement Learning
 Inverse Reinforcement Learning
 Multi-agent Reinforcement Learning

Forme de l'évaluation

Mandatory assignments (ungraded)
 Group project (60% of the grade)
 Written exam (40% of the grade)

Pré-requis

Linear Algebra
 Calculus
 Probability Theory
 Basic competence in a programming language (C, Python, Octave/Matlab, etc)

Forme de l'enseignement

URLs	1) https://github.com/olethrosdc/rldmuu 2) https://ilias.unibe.ch/ilias.php?baseClass=ilrepositorygui&cmdNode=yw:mu&cmdClass=ilObjCourseGUI&ref_id
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Lectures and exercises

Objectifs d'apprentissage

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

- Formulate Decision Problems
- Develop Algorithms
- Apply Algorithms
- Compute Probabilities and expectations
- Explain Algorithms and Theory
- Develop Project
- Integrate Theory and Practice

Compétences transférables

- Explore Scientific literature
- Develop state-of-the-art methods

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