

- Faculté des sciences
- [www.unine.ch/sciences](http://www.unine.ch/sciences)

### Reinforcement Learning and Decision Making Under Uncertainty (3IN2064)

Filières concernées	Nombre d'heures	Validation	Crédits ECTS
<b>Master en informatique</b>	<b>Cours: 2 ph Exercice: 2 ph</b>	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

Lectures and exercises

#### Objectifs d'apprentissage

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

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### **Reinforcement Learning and Decision Making Under Uncertainty (3IN2064)**

- 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