

- Textbook: David Poole and Alan Mackworth
Artificial Intelligence: Foundations of Computational Agents.
available online at artint.info
- Secondary textbooks:
 - ▶ Russell and Norvig
Artificial Intelligence aima.cs.berkeley.edu/
 - ▶ Ian Goodfellow and Yoshua Bengio and Aaron Courville
Deep Learning - deeplearningbook.org/
- Website:
<https://cs.uwaterloo.ca/~jhoey/teaching/cs486/index.html>
- Discussion forum and email: Piazza
piazza.com/uwaterloo.ca/spring2022/cs486686/home
- assignments handed in and returned, grades, on LEARN

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AccessAbility Services Volunteer Notetaker Required

Interested? Complete an online application using your WATIAM:

<https://york.accessiblelearning.com/UWaterloo/>

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Website: <https://uwaterloo.ca/accessability-services/current-students/notetaking-services>Email: notetaking@uwaterloo.ca

Phone: 519-888-4567, ext. 35082



To accommodate a classmate who is registered with AccessAbility Services, the AccessAbility Services staff and I are looking for a volunteer notetaker for CS486. We appreciate your contribution to the university on behalf of fellow students who are unable to take notes due to a disability. If you are interested in being a volunteer notetaker, please complete the application form on the AccessAbility Services website by signing-in with your WATIAM credentials (<https://york.accessiblelearning.com/UWaterloo/>)." ◂ ◃ ◅ 6/11

Overview of the Course

Lectures:

- Introduction
- Agents and AI
- Representation and Reasoning
 - ▶ States and Searching
 - ▶ Features and Constraints (CSPs)
 - ▶ Logical inference
 - ▶ Uncertainty (Bayesian probability)
- Learning
 - ▶ Supervised learning (Regression)
 - ▶ Neural Networks and Deep Learning (Stochastic gradient descent)
 - ▶ Bayesian learning (learning Bayes Nets)
 - ▶ Unsupervised learning (Expectation-Maximization)
- Planning
 - ▶ deterministic (under certainty)
 - ▶ with uncertainty (Markov decision processes)
 - ▶ reinforcement learning
- Topics (time permitting)

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Integrity, Intellectual Property

- See official course outline at <https://cs.uwaterloo.ca/~jhoey/teaching/cs486/S22CS486Outline.html>
- Property of UW:
 - ▶ Lecture content, spoken and written (and any audio/video recording thereof);
 - ▶ Lecture handouts, presentations, and other materials prepared for the course (e.g., PowerPoint slides);
 - ▶ Questions or solution sets from various types of assessments (e.g., assignments, quizzes, tests, final exams); and
 - ▶ Work protected by copyright (e.g., any work authored by the instructor or TA or used by the instructor or TA with permission of the copyright owner).
- Sharing intellectual property without the intellectual property owner's permission is a violation of intellectual property rights.

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- Organizations:
 - ▶ Waterloo AI institute waterloo.ai
 - ▶ Assoc. for the Advancement of A.I. (AAAI) aaai.org
 - ▶ European Association for A.I. (EurAI) eurai.org
 - ▶ Canadian A.I. Association caiac.ca
 - ▶ Intl. Machine Learning Society machinelearning.org
 - ▶ Association for Affective Computing (AAAC)
<https://aaac.world/>
- Journals
 - ▶ Artificial Intelligence
journals.elsevier.com/artificial-intelligence/
 - ▶ Journal of AI Research jair.org
 - ▶ Journal of Machine Learning Research jmlr.org
 - ▶ arXiv AI <https://arxiv.org/list/cs.AI/recent>
 - ▶ arXiv Learning <https://arxiv.org/list/cs.LG/recent>
- Conferences
 - ▶ International Joint Conferences on A.I. ijcai-22.org
 - ▶ AAAI 2018 aaai.org/Conferences/AAAI-22
 - ▶ Neural Information Processing Systems neurips.cc
 - ▶ International Conf. on Machine Learning icml.cc

The synthesis and analysis of computational agents that act intelligently.

An agent acts *intelligently* when

- what it does is appropriate for its circumstances and its goals, taking into account the short-term and long-term consequences of its actions
 - it is flexible to changing environments and changing goals
 - it learns from experience
 - it makes appropriate choices given its perceptual and computational limitations
- What is AI? (Poole & Mackworth chapter 1.2-1.10,2.1-2.3)
 - Search (Poole & Mackworth chapter 3)