

MET CS664 AI (Fall 2024) - Artificial Intelligence (Wednesdays, 6 PM)

Instructor

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Course Description

Study of the ideas and techniques that enable computers to behave intelligently. Search, constraint propagations, and reasoning. Knowledge representation, natural language, learning, question answering, inference, visual perception, and/or problem solving. Laboratory course.

Course Prerequisites

Python programming experience equivalent to MET CS 521. Or instructor's consent.

Course Grading Policy

The course grade will be based on class participation (10%), in-class assignments (30%), mid term exam (30%), and term project (30%).

Course Web Site

- <https://learn.bu.edu>

References

Reference Books

- *Artificial Intelligence: A Modern Approach, 4th ed.*, by Stuart Russell and Peter Norvig, Pearson, 2021. ISBN: 9780134610993. **(Reference book)**
<https://aima.cs.berkeley.edu>
- "*Artificial Intelligence, 3rd ed.*", by David L. Poole and Alan K. Mackworth, Cambridge University Press, 2023. ISBN: 9781009258197. **(Reference book)**
<https://artint.info/3e/html/ArtInt3e.html>

Student Conduct Code

[Please review the academic conduct code](#)

Tentative Course Schedule

- **Module 1 -- Introduction**
 - Introduction to AI
 - Relevant Python Programming Review
- **Module 2 -- Search**
 - Uninformed Search: DFS, BFS, Uniform-Cost
 - Informed Search: Heuristics, Greedy techniques, A* Search
 - Games as Search
 - Adversarial Search: Minimax rule, Alpha Beta Pruning
- **Module 3 -- Constraint Satisfaction Problems**
 - Examples (Sudoku, N-Queens, Golomb Rulers, Map Coloring, etc.)
 - Local Consistency, Arc Consistency
 - Backtracking Search, Forward Checking, Local Search
- **Module 4 -- Logical Agents, Knowledge Representation & Planning**
 - Propositional Logic, First-Order Logic
 - Inference, Forward Chaining, Backward Chaining
 - Classical Planning, Hierarchical Planning
- **Module 5 -- Uncertainty**
 - Reasoning (Belief networks, Markov models)
 - Learning (Bayesian)
 - Planning with Uncertainty
- **Module 6 -- Deep Learning & Reinforcement Learning**
 - Neural networks (Feedforward, Convolutional, Recurrent)
 - Unsupervised (Generative Adversarial Networks, Autoencoders)
 - Reinforcement Learning
 - NLP Applications
- **Module 7 -- Generative AI**
 - Topics in Generative AI
 - Attention, Transformers
- **Mid Term Exam (October 16th)**
- **Project Presentation (Dec 4th & 11th)**