

Course Syllabus – CPSC 470 / CPSC 570 (F17)

INSTRUCTOR

[Dragomir Radev](#)

TEACHING FELLOW

Meiying Qin

PIAZZA SITE

<https://piazza.com/class/j6f8979n8wn4x5>

SHORT DESCRIPTION

Introduction to Modern Artificial Intelligence

Topics include Intelligent Agents, Search and Problem Solving, Logic and Language, Reasoning and Uncertainty, and Learning

PRINCIPAL READING

Artificial Intelligence, A Modern Approach
Russell and Norvig
Third Edition (2009/2010)
Prentice Hall
ISBN: 0-13-604259-7
<http://aima.cs.berkeley.edu/>

WEEKLY READING WORKLOAD

30-50 pages of the textbook

TYPE OF INSTRUCTION

Lecture

WEEKLY MEETINGS

Two lectures of 75 minutes each.

COURSE ASSIGNMENTS (tentative)

- Project 0: Introduction to the Course Environment
- Project 1: Mathematical Models (problem set)
- Project 2: Search (Pacman)
- Project 3: Game Playing (Othello)
- Midterm
- Project 4: Language and Logic (Deep Learning and NLP)
- Project 5: Classification (Autonomous Cars)
- Project 6: Reinforcement Learning (AI Gym)
- Final

The programming assignments are in Python.

MAIN GOALS OF THE COURSE

1. Learn the basic principles and theoretical issues underlying artificial intelligence
2. Understand why artificial intelligence is difficult
3. Learn techniques and tools used to build practical, realistic, robust AI systems
4. Understand the limitations of these techniques and tools
5. Gain insight into some open research problems in AI

DISTRIBUTION REQUIREMENTS

This course satisfies the Quantitative Reasoning (QR) requirement.

PREREQUISITES

(CPSC 201 and CPSC 202) or permission of the instructor. All assignments are in Python.

ACADEMIC HONESTY

Unless otherwise specified in an assignment all submitted work must be your own, original work. Any excerpts, statements, or phrases from the work of others must be clearly identified as a quotation, and a proper citation provided. Any violation of the University's policies on Academic and Professional Integrity may result in serious penalties, which might range from failing an assignment, to failing a course, to being expelled from the program.

Violations of academic and professional integrity will be reported to Student Affairs. Consequences impacting assignment or course grades are determined by the faculty instructor; additional sanctions may be imposed.

TOPICS

1. Introduction

Introduction to AI, Python for AI, Agent-based view of AI

2. Problem Solving and Search

Problem Solving and Search, Informed Search, Heuristic Search, Advanced Search, Game Playing, Adversarial Search, Genetic Algorithms, Constraint Satisfaction, Planning (if time)

3. Language and Logic

Logical Agents, Predicate Logic, First Order Logic, Inference, Knowledge Representation, Natural Language Processing and Communication, Speech Processing

4. Reasoning under Uncertainty

Quantifying Uncertainty, Probabilistic Reasoning, Bayesian Networks

5. Learning

Learning from Examples, Classification and Clustering, Markov Decision Processes, Neural Networks, Reinforcement Learning, Autonomous Cars

SYLLABUS

1. Introduction to AI
2. Programming Languages for AI
3. Agent-based view of AI
4. Problem solving and search
5. Informed Search
6. Heuristic search
7. Adversarial search
8. Genetic algorithms
9. Constraint satisfaction
10. Intro to Logic and Logical agents
11. Propositional Logic
12. First order logic
13. Inference in FOL
14. Knowledge representation
15. Intro to Communication and Perception
16. Intro to uncertainty
17. Probabilistic reasoning
18. Bayesian Networks
19. Supervised Learning
20. Probabilistic reasoning over time (HMM+MDP)
21. Natural Language Processing and Speech
22. Neural networks, Deep Learning
23. Reinforcement learning

Course Summary:

Date	Details
Fri Sep 8, 2017	Homework0 due by 11:59pm
Fri Sep 22, 2017	Homework 1 due by 11:59pm
Mon Oct 9, 2017	Homework 2 due by 11:59pm
Mon Oct 30, 2017	Homework3 due by 11:59pm
Mon Nov 13, 2017	Homework4 due by 11:59pm
Fri Dec 8, 2017	Homework6 due by 11:59pm

Assignments are weighted by group:

Group	Weight
Assignment0	2%
Assignment1	8%
Assignment2	10%
Assignment3	10%
Assignment4	10%
Assignment5	10%
Assignment6	10%
Midterm_with_bonus	15%
Final_with_bonus	20%
Participation	5%
Total	100%