

# CSPB 3202: Introduction to Artificial Intelligence Syllabus

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## Course Information

### Instructor Information

Instructor: Hoang Truong (he/him)

Email: [hoang.truong@colorado.edu](mailto:hoang.truong@colorado.edu)

Preferred Method of Contact:

Piazza: for any questions regarding the course

Zoom: for interview grading meetings and office hours

Email: contact me for emergency issues, include "CSPB 2820" in the subject

### Course Description

Surveys artificial intelligence techniques of search, knowledge representation and reasoning, probabilistic inference, machine learning and natural language.

### Learning Goals

Learning goals of the AI course include:

- Explain what goals the AI field is trying to achieve: in terms of answering what kind of scientific questions, solving what kind of problems, what applications are possible or not possible nowadays.
- Explain what ethical and social issues AI might bring and suggest/conduct responsible behavior.
- Explain taxonomy of AI problems and their solving methods, and compare and evaluate performances and limitations of those algorithms.
- Implement algorithms into codes.
- Demonstrate problem-solving skills and apply learned methods to new problems.

### Prerequisites

Prerequisite Courses: CSPB 2270, CSPB 2824, and CSPB 3022

### Required Texts

- *Artificial Intelligence: A Modern Approach (4th Edition)* by Russell and Norvig

- You may use the 3rd edition. Note that chapter numbers will be different and toward the end of this course there are new chapters in the 4th edition that do not exist in the 3rd edition.
- *Reinforcement Learning (2nd Edition)* by Sutton and Barto
  - Free online version: <http://incompleteideas.net/book/RLbook2018.pdf>

## Grading Categories

Assessment	% of Grade	Description
Exams	25%	Two midterm exams
Homework	35%	Assignments are a mix of theoretical and computational problems
Reading Quizzes	18%	Short reading/video quizzes that ask you to reflect on your understanding of the material and relevant learning outcomes
Final Project	15%	RL Algorithm Challenge on OpenAI Gymnasium environment
Participation	7%	Weekly Piazza discussion

## Homework

Assignments will be a mix of theoretical and computational problems. The theoretical problems may include by-hand computations and simple proofs. The computational problems will involve implementing algorithms in Python. You are expected to write up your solutions neatly, with full explanations and justifications. You may discuss problems with your classmates, but all work must be your own. See the Collaboration Policy below for more details.

The course has different types of Homework assignments:

- A type: Programming assignments, usually implementation of algorithms we learned
- B type: Theoretical and calculation-based assignments
- C type: Something else - it could be an essay or a competition

## Method of Instruction

This is a live course and participation is essential. While there is flexibility in when you access the materials, there are strict weekly due dates - no late work is accepted. You may have access to future

assignments if you wish to move faster, however, weekly discussion and instructor support will be focused on the current week.

A variety of materials and approaches will be used including: videos, readings, discussions, quizzes, and writing assignments.

As this is an online course, it requires a good deal of self-discipline and time management skills in order to be completed successfully. It is up to you, the student, to understand the schedule and keep up with the assignments. Make sure you know your deadlines and due dates.

## **Student Responsibilities and Class Expectations**

### **Textbook Reading**

This is an essential duty in this course. You will need both reading and lecture to fully grasp the material contents and be well-prepared for the assignments.

### **Reading Quizzes**

Some modules have short reading/video quizzes that ask you to reflect on your understanding of the material and learning outcomes of that topic.

### **Piazza Participation**

Piazza is a great way to share ideas. In this particular course, nothing is off-limits. You can post insights, tips, and hints (not the explicit solution). Your work will be graded on how well YOU explain and communicate the ideas in your own words.

## **Grading Policies**

### **Submission Policies**

Writing assignments require submission on Gradescope and specification of problem pages as Gradescope instruction.

Grading will be done before the subsequent assignment is due or within 6 days of the due date (whichever is first).

Large one time projects may take two weeks to grade

### **Individual Check-In**

If you have a unique situation that may be affecting your work or class experience or you need clarification of an email, Piazza, or ZOOM exchange, please email your instructor with the subject line

“Individual Check-In”. Your instructor will email you back to set up a Zoom call to discuss the specific situation and work with you to develop a solution and/or strategy to move forward.

### Grading Reviews

Deadline to ask for a grade review is within a week of an assignment being returned.

Any grade review may include a review of all work submitted and your grade may go up or down

All grades are final on the last day of classes. No grade changes will be made after the last days of classes.

### Late Work Policy

A one time late assignment submission is allowed with reasonable notification to the instructor before the deadline.

### Grading Scale

All coursework grades are final and will not be changed after the last day of classes. Please review your scores during the semester.

93 - 100	A
90 - 93	A-
87 - 90	B+
83 - 87	B
80 - 83	B-
77 - 80	C+
73 - 77	C
70 - 73	C-
67 - 70	D+
63 - 67	D
60 - 63	D-
0 - 59.9	F

## Course Topics

The course consists of three big units: **Search**, **Probabilistic Reasoning**, and **Learning**.

We will discuss the following topics in those units:

- **Search Algorithms:** Survey of modern search algorithms through a discrete data set to find an optimal solution. This includes algorithms that evaluate the entire search space, as well as algorithms that can be used to prune the search space and reduce run-time complexity.
- **Search Heuristics:** Methods for designing heuristic methods that can be used to find approximate solutions to problems.
- **Game Trees:** Introduction to search methods when there are two players with conflicting objects influencing the search space.
- **Markov Decision Processes:** Introduction to algorithms for navigating a search space when the environment is stochastic.
- **Reinforcement Learning:** We will discuss a set of methods and algorithms solving MDP.
- **Bayes Nets and Probabilistic Reasoning:** Introduction to Bayesian reasoning and calculating probability of outcomes given a set of state variables. This also includes the probability of an event given an existing set of events that has already occurred.
- **Intro to ML:** Introduces to basic machine learning models. Since ML can be a full course by itself, we will only touch the basics due to the limited time
- **Advanced Topics:** We will briefly cover the latest trend of the artificial intelligence field, such as deep learning and its applications.

## Program Policies and University Policies

### Service Interruptions and Support

Due to the online nature of this program, there is always the possibility of service interruptions. If you are unable to access the course materials (Moodle, Piazza, etc.), we encourage you to visit <https://www.isitdownrightnow.com/applied.cs.colorado.edu.html>.

For non-urgent issues related to platform support, please contact [cscihelp@colorado.edu](mailto:cscihelp@colorado.edu).

### Classroom Behavior

Students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote, or online. Failure to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age,

disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation, or political philosophy.

For more information, see the classroom behavior policy, the Student Code of Conduct, and the Office of Institutional Equity and Compliance.

## Collaboration Policy

We welcome collaboration! Sharing insights, asking questions, learning by doing, and learning by helping others are essential skills in learning computer science.

Collaboration is discussing ideas of the course with others, sharing insights and extra resources, working through similar questions to an assignment, sharing resources, and helping others. The Piazza forum in your class is an ideal place to share ideas, lead a discussion or be the hero that asks the “dumb question” everyone else is afraid to ask. And Piazza is often a source for content for instructors to include in letters of recommendations. Your leadership, courage, and determination will not go unnoticed.

### Collaboration is not:

- “Having a partner.” In particular, Group Projects, or projects that specify “working with a partner” will have individual guidelines.
- One student solving problems 1-4, and another solving 6-10.
- An identical group solution submitted by multiple students.

Unless specified in the assignment, all coursework is individual.

### In general:

- You must document resources and collaboration on any assignment. This should be in the form of comments at the start of code and/or within solution notes.
- Cite Your Sources: If you collaborated with someone on an assignment, or if your submission includes quotes from a book, a paper, or a web site, you must clearly acknowledge the source.
- Plagiarism is forbidden. Copying answers directly or indirectly from solution manuals, web pages, or your peers is a violation of honor code. The assignments and code that you turn in should be written entirely on your own
- Copying/soliciting a solution to a problem from the internet or another classmate constitutes a violation of the course's collaboration policy and the honor code and may have serious consequences.
- You may not actively search for a solution to the problem from the internet. This includes posting to sources like StackOverflow, Reddit, Chegg, CourseHero, etc.

- StackExchange Clarification: Searching for basic techniques in Python/C++ is totally fine.
- If you have taken this course prior to this semester and have done some/all of homeworks previous code or previous homework solutions may not be reused. You must start each homework from scratch.
- When in doubt, ask. If something doesn't seem right - you are not sure if you can use a resource or if you are feeling pressure to share a specific solution - please reach out to your instructor.

Note: Other information on the Honor Code can be found at [www.colorado.edu/policies/honor.html](http://www.colorado.edu/policies/honor.html) and <https://www.colorado.edu/sccr/honor-code>.

### Requirements for Infectious Diseases

Members of the CU Boulder community and visitors to campus must follow university, department, and building health and safety requirements and all applicable campus policies and public health guidelines to reduce the risk of spreading infectious diseases. If public health conditions require, the university may also invoke related requirements for student conduct and disability accommodation that will apply to this class.

If you feel ill and think you might have COVID-19 or if you have tested positive for COVID-19, please stay home and follow the [guidance of the Centers for Disease Control and Prevention \(CDC\) for isolation and testing](#). If you have been in close contact with someone who has COVID-19 but do not have any symptoms and have not tested positive for COVID-19, you do not need to stay home but should follow the [guidance of the CDC for masking and testing](#).

### Accommodation for Disabilities, Temporary Medical Conditions, and Medical Isolation

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the [Disability Services website](#). Contact Disability Services at 303-492-8671 or [dsinfo@colorado.edu](mailto:dsinfo@colorado.edu) for further assistance. If you have a temporary medical condition, see [Temporary Medical Conditions](#) on the Disability Services website.

If you have a required medical isolation for which you require adjustment, please contact your instructor.

## Preferred Student Names and Pronouns

CU Boulder recognizes that students' legal information doesn't always align with how they identify. Students may update their preferred names and pronouns via the student portal; those preferred names and pronouns are listed on instructors' class rosters. In the absence of such updates, the name that appears on the class roster is the student's legal name.

## Honor Code

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the [Honor Code](#). Violations of the Honor Code may include but are not limited to: plagiarism (including use of paper writing services or technology [such as essay bots]), cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty.

All incidents of academic misconduct will be reported to Student Conduct & Conflict Resolution: [honor@colorado.edu](mailto:honor@colorado.edu), 303-492-5550. Students found responsible for violating the [Honor Code](#) will be assigned resolution outcomes from the Student Conduct & Conflict Resolution as well as be subject to academic sanctions from the faculty member. Visit [Honor Code](#) for more information on the academic integrity policy.

## Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

CU Boulder is committed to fostering an inclusive and welcoming learning, working, and living environment. University policy prohibits [protected-class](#) discrimination and harassment, sexual misconduct (harassment, exploitation, and assault), intimate partner violence (dating or domestic violence), stalking, and related retaliation by or against members of our community on- and off-campus. These behaviors harm individuals and our community. The Office of Institutional Equity and Compliance (OIEC) addresses these concerns, and individuals who believe they have been subjected to misconduct can contact OIEC at 303-492-2127 or email [cureport@colorado.edu](mailto:cureport@colorado.edu). Information about university policies, [reporting options](#), and [support resources](#) can be found on the [OIEC website](#).

Please know that faculty and graduate instructors have a responsibility to inform OIEC when they are made aware of incidents related to these policies regardless of when or where something occurred. This is to ensure that individuals impacted receive an outreach from OIEC about their options for addressing a concern and the support resources available. To learn more about reporting and support resources for a variety of issues, visit [Don't Ignore It](#)



## Religious Holidays

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, please contact me directly. See the [campus policy regarding religious observances](#) for full details.

## Mental Health and Wellness

The University of Colorado Boulder is committed to the well-being of all students. If you are struggling with personal stressors, mental health or substance use concerns that are impacting academic or daily life, please contact [Counseling and Psychiatric Services \(CAPS\)](#) located in C4C or call (303) 492-2277, 24/7.

Free and unlimited telehealth is also available through [Academic Live Care](#). The Academic Live Care site also provides information about additional wellness services on campus that are available to students.